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Prevalence of acute diarrhea and associated precipitating factors among under-five children in West Guji Zone, Oromia Region, Ethiopia, 2018: Community based cross sectional study

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Child hood diarrhea has continued as a leading cause of morbidity and mortality in Ethiopia. In conjunction with implementing control programs, an up to-date comprehensive information on the magnitude and contributing factors among child hood diarrhea is needed to develop and design effective interventions at the district level. A community based cross sectional study was carried out among 717 mothers/care givers of under five children in four districts of West Guji Zone from July 21, 2018 up to August 21, 2018. The study participants were selected using systematic random sampling techniques. The collected data were entered into Epi-data version 3.5.4 and exported to SPSS version 20 for analysis. Descriptive statistics such as frequencies with percentages were computed. AOR with 95% C.I was employed to test significant association. A total of 717 children participated in this study; of which 262(36.5%) suffered acute diarrhea within two-week prevalence. Factors significantly associated with childhood diarrhea were maternal educational status [AOR=3.75, 95% CI:(1.07,13.22)], age of index child [AOR=2.72; 95% CI(1.18, 6.27)], number of under five children [AOR= 1.527; 95% CI: (1.04, 2.24)], exclusive breast feeding practice [AOR = 2.45; 95% CI:(1.61,3.73)], time supplementary feeding initiated [AOR=2.16; 95% CI(1.22,.3.83)], waste disposal method [AOR = 1.92; 95% CI:(1.26,2.94)] and pneumococcal vaccination [AOR= 6.72; 95% CI(1.20,.37.65)], Vitamin A supplementation [AOR= 1.66 ;95 % CI(1.04,.2.68)]. More than one-third, 262 (36.5%, 95 CI: 33.13%, 39.87%) of the children reported childhood diarrhea which refers it is a major public health problem in the district. This finding point application of integrative intervention strategies such as building toilet, safe water access, effective health education related to appropriate child feeding practices.

Key words: Child health, diarrhea, pre-school children.

INTRODUCTION

Diarrhea is generally defined as the passage of loose or watery stools occurring three or more times in a 24- hour period, in a period not exceeding 14 days than is normal for that person (WHO, 2007). The dangers of diarrhea are related to severe dehydration, fluid loss and malnutrition that can leave the body without water and salt that are necessary for survival (WHO, 2009). Diarrheal disease has continued as a leading cause of

morbidity and mortality nearly one in every nine children throughout the world in 2015 (Black et al., 2003). Globally, diarrhea is the second most common cause of death among pre-school children with around 525,000 every year despite the availability of simple effective treatment (WHO, 2009; Walker et al., 2013). In contrast to mortality trends, morbidity due to diarrhea has not shown a parallel decline globally among pre-school children (Walker et al., 2013). The risk of pre-school children dying due to diarrhea before younger than five years in Africa remains seven times higher than European region (WHO, 2017).

Diarrhea remains still a major cause of morbidity and accounts for approximately 98% of diarrheal deaths in low income countries (Boschi et al., 2008). In Africa one-fourth of deaths among children under age of five years are due to diarrhea and around half million children die each year from diarrhea related to dehydration (WHO, 2017). Among the different African countries, Ethiopia is one of the top five countries that bear the greatest burden of diarrheal deaths among under five children in the world (WHO, 2009). The prevalence of diarrhea among children under five years ranges from 18 to 23.8% in Sub-Saharan African Countries (El Gilany and Hammad, 2005; Boadi and Kuitunen, 2005; Tambe et al., 2015).

Despite the Ethiopia success in reduction of all causes and specific diarrhea mortality in several years, diarrheal diseases have persistently been the first or the second causes of visits to health units in the country among children under age of five years. In Ethiopia, diarrhea in under five children accounts for 12% of under-five mortality (Central Stastical Agency Addis Ababa, 2016). Moreover, few local studies have reported the magnitude of diarrhea among pre-school children in different regions of the country ranges from 12 to 31% Gedamu et al., 2017). However, based on the Guji Zonal Health Office report in 2016, diarrheal disease remains the first causes of morbidity and remains as public health concern despite the comprehensive health extension programs of disease prevention and promotion among under five years children (Department W.G.Z, 2017).

Different studies showed that several risk factors contribute to the occurrence of diarrhea in Ethiopia. Socio-demographic and economic, environmental and behavioral factors are the most risk factors contributing to the occurrence of under-five childhood diarrhea (Tamiso et al., 2014, Gebru et al., 2014, Mengistie et al., 2013). Furthermore, improper utilization of toilet, poor hand washing practices, waste disposal and open dump are major factors contributing to diarrheal disease (Anteneh and Kumie, 2010; Hashi et al., 2016). Diarrheal disease is not purely medical, but huge part of the problem should be traced back to those different aspects. This factors lead the problem with varied burden of disease across the country (Central Stastical Agency, 2016).

The necessity of conducting this study is to track the progress of achieving Sustainable Development Goal of post 2015 agenda to ensure health lives and promote well-being of under five children as well as to assess the impact and effectiveness of diarrheal disease control programmes. Evidence-based Ethiopian studies have documented a high prevalence of diarrhea among pre-school children in rural settings. So, more detailed, up-to date and comprehensive information is needed to tackle diarrhea by understanding the burden and contributing factors at the district level in order to develop effective intervention programs. It was based on this premise that this study was aimed to determine prevalence of acute diarrhea and associated factors among under five year's children in West Guji Zone.

METHODOLOGY

The study was conducted in West Guji Zone; located in Oromia Region, at 467 Km far from Addis Ababa. It has nine woreda and two administrative cities. According to the Zonal 2010 E.C. Central Statistics Agency (CSA), an estimated population of the zone is 1,273,888, of which 608,918 (49%) are males, and 664,970 (51%) are females when projected by considering 2.9% as rate of natural increase for Oromia region (FDRE, 2008). Total number of infant, under two years and under five years of children as estimated from the total populations of West Guji zone were 44,102, 72,739 and 209,299, respectively based on the assumption that 3.46, 5.6 and 15.6% of the total population is infant, under two years and under-five children. Community based cross sectional quantitative study was conducted from July onwards. All mothers/care givers with under five children in the last one year in West Guji is considered as source population. Mothers with children aged less than five years living in the selected kebeles were considered as study population. Inclusion criteria were mothers (caregivers) with their index under five children residents of the selected kebeles of Guji Zone for at least the past 6 months during the study period were included. Exclusion criteria were mothers (caregivers) who were seriously ill and unconscious/mentally disabled at the time of the study were not included in the study

Sample size was calculated using single population proportion formula using assumptions of 95% confidence level, expected diarrhea prevalence of 31% of Arbaminch district (Mohammed and Tamiru, 2013), 5% margin of error, design effect of 2 and 10% non-response rate. Epi info version 7 was used to calculate the sample size. The computed sample size with the above assumptions is 657 and by taking 10% non-response rate the total sample size was 722.

A multi stage cluster random sampling techniques was employed to select study population. From total districts three rural districts and one urban district were selected randomly; secondly each selected rural districts 14 kebeles and urban town 2 kebeles was selected based on number of eligible children. The proportional to size allocation was made for each district and each kebeles with in district. Households from randomly selected rural and urban kebeles were chosen by using systematic random sampling techniques.

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Mothers of the under-fives were the respondents in a household. If there were more than one mother with children under 5 years of age in the same household, one mother was selected by lottery method. Pretested interviewer administered structured questionnaire was used after thorough review of literatures. The questionnaire was translated from English to Afan Oromo and back translated to English to maintain consistency. Data were collected using face-to-face interview during house-to-house visit from mothers/caregivers who have under five years aged children. Data was collected from July 21/2018 onwards by eight diploma holder nurses working in health facilities that are fluent in Afan Oromo language and with prior experience of participation in data collection. Three BSc. holder health professionals were assigned to supervise the data collection.

The data collectors and supervisors were trained for two days on the importance of proper interviewing and filling the questionnaire. Prior to the actual data collection, pre-testing was done on 5% of the study eligible subjects and have similar characteristics at Bule Hora non selected kebeles which was not included on the actual study and based on findings during the pilot stage necessary corrections was made to the questionnaire. Data was entered into Epi-data version 3.5.4; cleaned and analyzed by SPSS software version 20. The outcome variable child hood diarrhea was dichotomized with assigning '1'for those who had diarrhea and '0' for those who had no diarrhea. Descriptive summary was described by using frequencies, proportions, means, standard deviations, tables and figures. Bivariate logistic regression was done to identify candidate independent variables for multivariate analysis at p-value of less than 0.05. AOR with 95% C.I was estimated to assess the strength of association and to control possible confounders. A p-value less than 0.05 were used to declare the statistical significance in the multivariate analysis. Hosmer and Lemeshow goodness-of–fit (p-value=0.608) was checked to test the model fitness. The independent variables were tested for multicolnearity using the Variance Inflation Factor (VIF) and the Tolerance tests. All continuous variables were checked for normality using Kolmogorov-Smirnov test.

Operational definitions

1. Acute diarrhea: This is defined as the passage of three or more loose or liquid stools per day during or within two weeks prior to the survey as reported by mother/ caregivers of child.
2. Index child: This refers to under-five child that is included randomly in the study from a household.
3. Ethics approval and consent to participate: Ethical consent was obtained from ethical committee of the Ethical review board of Bule Hora University to carry out the study before the data collection. Respondents gave their informed consent verbally before participating in the study. No names were required during the process of data collection to maintain anonymity and information obtained were kept confidential throughout the period of research.

RESULTS

Socio-demographic and economic characteristics of respondents

A total of 717 mothers or caregivers of children aged under five years participated in the study making a response rate of 99.3%. Out of total households involved, 442 (63%) were mothers, 103 (14.4%) were both mothers and father of the children and 22 (3.1%) were caregivers. From total respondents, 445 (62.1%) and 272 (37.9%) of them were rural and urban residents respectively. The majority of respondents 701 (97.8%) belong to Oromo ethnic group, and 628 (87.6%) follow protestant religion.

Majority of the interviewees 343 (47.8%) were aged between 25 and 34 years. Regarding occupation, majority of the women were confined to home and house hold activities. Accordingly, 453 (63.2%) were house wives, while 65(9.1%), 39(5.4%) were merchant and government employees respectively. With regard to educational status, more than one: third: 291 (40.6%) of mothers were attended primary education whereas 136 (19%) were uneducated, and majority were married 698 (97.4%). The mean and median age of the mothers or caregivers were 28.3 (±7.91SD) and 26.00 (IQR of 9.0) years, which ranges from 15 to 65 years (Table 1).

Socio-demographic and health characteristics of children

From a total participant children included in the study, 326 (45.5%) were females, 391(54.5%) were males. There were 353 (49.2%) of households with birth order of two up to four in the family. Out of the total children involved in this study, 169 (23.6%) were 48-59 months old and nearly for one-fourth of the children parent initiated supplementary feeding/weaning when they are under age of six months, 262(36.5%) of the children had diarrhea prior to preceding data collection period (Table 2).

Environmental health conditions and behavioral practices of the respondents

From the total of seven hundred seventeen households, 504 (70.3%) had houses with mud floor. In 114 (15.9%) of households domestic animals was kept in the same room with people. Two hundred ninety eight (41.5%) of study households was observed that they have two rooms (Table 3).

A significant number of households in survey site; 244 (34.1%) have not had toilet facilities. The extent of latrine utilization practices of households in the study area was poor; 132 (27.8%) households have feace around latrine. Safe and adequate water supply were assessed by asking source of drinking water and distance to obtain and bring water; 302 (41.2%) of households travelled round trip distance of more than 30 min to fetch water.

Management and control of diarrheal episodes based on study subject response

With regard to the action taken when diarrhea occur, out

Table 1. Socio-demographic characteristics of respondents at four districts, West Guji zone, South Ethiopia, 2018 (n = 717).

Variable	Category	Frequency	Percent
Respondents	Mothers	452	63.0
	Father	140	19.5
	Mother with father	103	14.4
	Care givers	22	3.1
Residence	Rural	523	72.9
	Urban	194	27.1
Age _group	15- 24	231	32.2
	24- 34	343	47.8
	>= 35	143	19.9
Religion	Christian	648	90.2
	Muslim	39	5.4
	Others	30	4.2
Marital status	Single	9	1.3
	Married	698	97.4
	Separated	4	.6
	Divorced	3	.4
	Widowed	3	.4
Educational status of mother	No formal education	136	19
	Primary	291	40.6
	Secondary	169	23.6
	Tertiary and above	35	6.0
Ethnicity	Oromo	701	97.8
	Others	16	2.3
Occupation of mothers	House wife	453	63.2
	Merchant	65	9.1
	Farmer	85	11.9
	Government employ	39	5.4
	Others	74	10.3
Occupation of fathers	Farmer	398	55.5
	Merchant	121	16.9
	Student	60	8.4
	Government employ	86	12
	Others	52	7.2
Monthly income	Less than 500	211	29.4
	500-2000	230	32.1
	≥2000	106	14.8
	Don’t know	170	23.7
Number of family members	≤4	161	22.5
	≥5	556	77.5

Table 2. Socio-demographic characteristics of children aged under 59 months of Guji Zone, Oromia, Ethiopia, 2018 (n= 717).

Variable	Category	Frequency	Percent
Child sex	Male	391	54.5
	Female	326	45.5
Age of index child (months)	<6	49	6.8
	6-11	75	10.5
	12-23	130	18.1
	24-35	166	23.2
	36-47	128	17.9
	48-59	169	23.6
Number of under five children	1	255	35.6
	2	367	51.2
	3	84	11.7
	4	11	1.5
Birth order	1	128	17.9
	2-4	353	49.2
	≥5	236	32.9
Breast feeding duration	Up to 24 months	664	92.6
	>24 months	53	7.4
Exclusive breast feeding for 6 months (n=681)	Yes	422	58.9
	No	259	36.4
Current status of Breast feeding	EBF	60	8.4
	Partial BF	260	39.1
	Not BF	377	52.6
Time supplementary feeding initiated	Less than 6 months	156	21.8
	Exactly at 6 months	422	58.9
	Above 6 months	103	14.4
	Not initiated	36	5.0
Rota virus vaccination taken	Yes by maternal history	352	49.1
	Yes by cards	166	23.2
	No	199	27.8
Pneumococcal vaccination taken	Yes by maternal history	340	47.4
	Yes by cards	173	24.1
	No	204	28.5
Measles vaccination taken	Yes by maternal history	257	35.8
	Yes by cards	134	18.7
	No	268	37.4
	Age less than 9 months	58	8.1
Vitamin A taken	Yes by maternal history	373	52.0
	Yes by cards	33	4.6
	No	243	33.9

Table 2. Contd.

	Age less than 9 months	49	6.8
	Do not know	19	2.6
Childhood diarrhea in the last two weeks	Yes	262	36.5
	No	455	63.5

**EBF-Exclusive Breast Feeding.

Table 3. Environmental condition and behavioral practices of the respondents.

Variable	Category	Frequency	Percent
Waste disposal methods	Proper	198	27.6
	Improper	519	72.4
Type of floor of house	Mud	504	70.3
	Wood	181	25.2
	Cement	32	4.5
Type of roof of house	Corrugated iron sheet	418	58.3
	Wood	219	30.5
	No covered material	80	11.2
Animal live with human	Yes	114	15.9
	No	603	84.1
Number of rooms	1	237	33.1
	2	298	41.5
	3 and above	182	25.4
Source of drinking water	Public tap	422	58.9
	River	106	14.8
	Tube well or bore hole	84	11.7
	Protected dug well or spring	56	7.8
	Unprotected dug well or spring	30	4.2
Main source of water	Protected	531	81
	Unprotected	136	19
Water storage method	Jerri cans with lid	664	92.6
	Jeri cans without lid	53	7.4
Daily water consumption (Liters)	≤20	415	57.9
	>20	302	42.1
Presence of hand washing facility	Yes	23	3.2
	No	694	96.8
Hand washing practices at critical times	Yes	316	44.1
	No	401	55.9
Treat water	Yes	155	21.6

Table 3. Contd.

	No	562	78.4
Toilet facility in the house hold	Yes	472	65.8
	No	245	34.2
Latrine with slab (n=472)	Yes	175	24.4
	No	297	41.4
Feces around latrine (n=472)	Yes	131	27.8
	No	341	72.2
Feces around yard (n=472)	Yes	85	18.4
	No	387	81.9
Time taken to obtain drinking water (round trip) (minutes)	< 30	371	51.7
	≥30	279	31.9
	Do not know	117	16.3

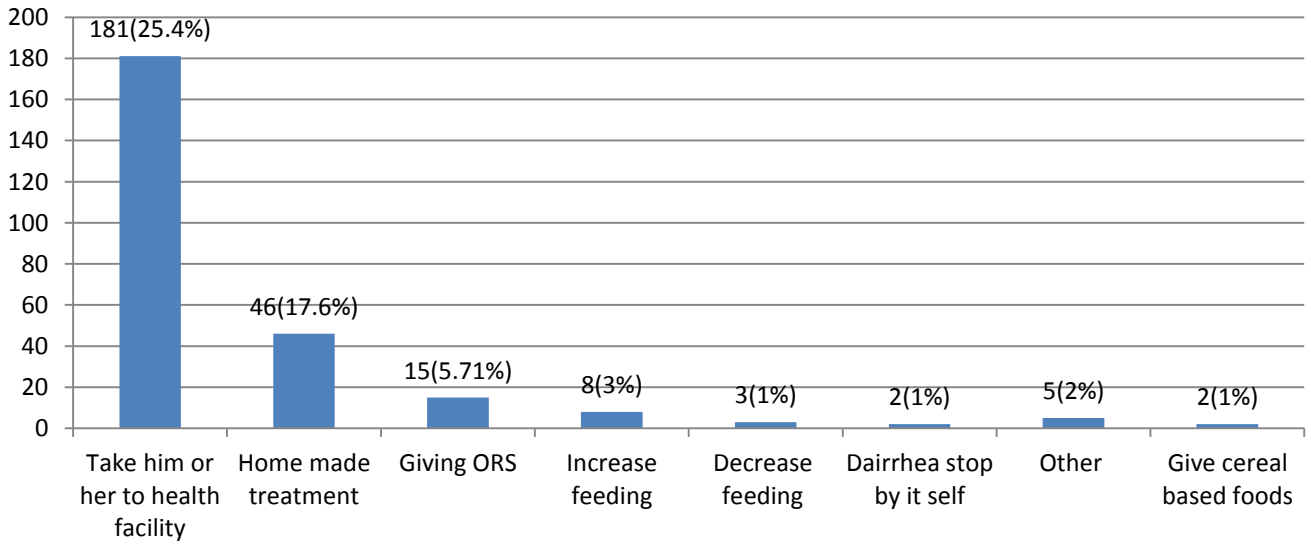

Figure 1. Action taken when diarrhea occur among under five children in West Guji Zone, 2018.

of 262 (36.5%) diarrheal episodes in children 181 (25.24%) of the episodes required to consult doctors and health professionals for treatment. About 46 (17.6%) and 15(5.7%) episodes were effectively managed by homemade treatment and ORS, respectively (Figure 1).

Prevalence of diarrhea

Out of the total 717 children in the study households, 262 (36.5%, 95 CI: 33.13%, 39 .87%) had history of diarrhea within two-weeks at the time of interview which were 180 (68.7%) and 82 (31.3%) from rural and urban areas respectively. Among males the prevalence of acute diarrhea was 149 (20.78%) and among female it was 113 (15.76%). The difference in the prevalence among male and female children was small and not statistically significant (P-value > 0.05). The mean duration of diarrhea was three days with minimum of one day and maximum of six days. The majority of children 214 (81.68%) had three or more episodes of diarrhea (Table 4).

Diarrhea prevalence was higher among those children with supplementary feeding initiated before six months,

Table 4. Prevalence of diarrhea in each district among under five children in West Guji Zone, Oromia Region, Ethiopia, 2018.

S/N	Name of district	Sample allocated	Diarrhea						
			Yes			No			>=3 loose stool
			M	F	Total	M	F	Total	
1	Bule Hora town	196	36	46	82	55	59	114	75
2	Bule Hora district	203	33	29	62	85	56	141	51
3	Dugdawa district	176	45	23	68	69	39	108	50
4	Melka soda district	142	35	15	50	50	42	92	35
Total			149	113	262	259	196	455	214

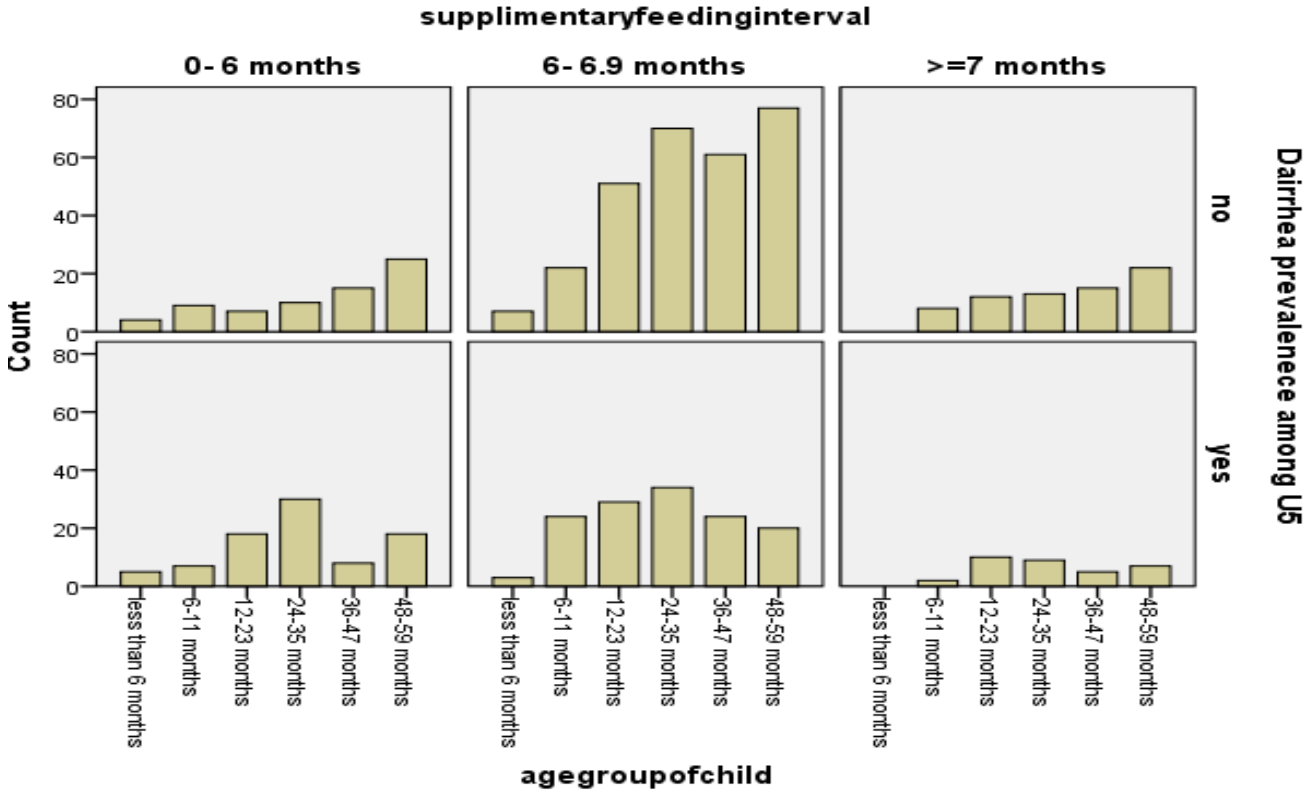

Figure 2. Diarrhea occurrence with respect to time supplementary feeding initiated and child age group.

86 (55.13%) and lower among those children initiated at six months and above as compared to the total study subjects of 525,167 (31.81%) (Figure 2).

Factors associated with childhood diarrhea

Factors associated with the outcome variable child hood diarrhea were dichotomized with assigning ‘1‘for those who had diarrhea and ‘0’ for those who had no diarrhea.

In bivariate analyses, significant differences in the occurrence of child hood diarrhea were noted by educational status of mother/caregiver, child age, time supplementary feeding initiated, daily consumption of water, waste disposal methods, number of under five children in households, exclusive breast feeding practices, current status of breast feeding and vaccination status of Rota, Pneumococcal , measles and Vitamin A supplementation.

In the current study an attempt was made to see several characteristics which were associated with childhood diarrhea. After conducting multivariate analysis , factors significantly associated with childhood diarrhea were maternal educational status [AOR=3.75, 95% CI:(1.07,13.22)], age of index child [AOR=2.72; 95% CI(1.18, 6.27)], number of under five children [AOR=

1.53; 95% CI: (1.04, 2.24)], exclusive breast feeding practice [AOR = 2.45; 95% CI:(1.61,3.73)], time supplementary feeding initiated [AOR=2.16; 95% CI(1.22,.3.83)], waste disposal method [AOR = 1.92; 95% CI:(1.26, 2.94)], daily consumption of water [AOR=.64; 95% CI: (0.44,0.94)] and pneumococcal vaccination status [AOR= 6.72 ;95 % CI(1.201,.37.646)] , Vitamin A supplementation status [AOR= 1.66; 95% CI(1.04,.2.68)], and Rota virus vaccination status [AOR= 0.16; 95% CI(0.03, 0.92)] (Table 5).

DISCUSSION

The overall prevalence of child hood acute diarrhea in this study was 262 (36.5%, 95 CI: 33.13, 39.87). This finding agrees with the studies reported from Arbaminch (30.5%) (Mohammed and Tamiru, 2013), Meskena (38.5%) (T M, 2003), Burundi (32.6%), Tanzania (32.7%) (Kakulu, 2012), Nekemte (28.9%) (Girma, 2008), Jigjiga (27.3%) (Hashi et al., 2016) and Mana district of Jima Zone (33.7%) (Kaba and Ayele, 2000) of two-week period prevalence of acute diarrhea morbidity respectively. But, the finding was higher than other studies reported from Eastern, Western and Southern part of Ethiopia (Gedamu et al., 2017; Mengistie et al., 2013; Atalay et al., 2018). The possible explanation for the variation in the magnitude of current and previous studies were might be attributed to the variation in socio-demographic and socio-cultural practices, basic infrastructure, behaviors of care givers and the time of the study.

In thus children whose mothers had low educational status were 3.75 times more likely have diarrhea than those mothers who had attended college and higher education [AOR = 3.75, 95% CI (1.06, 13.22)]. This finding is interrelated with several surveys done in Jigjiga District, Debre Birhan Town, North Gonder Zone (Hashi et al., 2016; Atalay et al., 2018). The possible suggestion might be mothers education level argues with access to health care information like good child caring practices, feeding, hygienic practices and awareness on prevention and control of communicable diseases.

Number of children in households was another factor associated with child hood diarrhea. In thus children with two children in households were 1.53 times more likely have diarrhea than those mothers who had one sibling [AOR= 1.53, 95% CI (1.04, 2.24)]. This is result coincide with findings from Eastern Ethiopia (Mengistie et al., 2013; Atalay et al., 2018). This could be explained by mothers would have time to practice hygienic practices and inability of mothers/caregivers for more than one child. Besides, it is possible to suggest that child birth spacing might have an influence on prevention of diarrhea.

Furthermore, socio-demographic characteristic of the children which was significantly associated with childhood diarrhea was age of index child. Thus, children with age 6-11 months were 2.7 times more likely to encounter diarrhea than when they were at age of the 48-59 months of life [AOR=2.7; 95% CI (1.18, 6.72)]. This finding in agreement with thestudy done in Kersa, Eastern Ethiopia, Debre Birhan Town, Northern Ethiopia, North Gondar Zone, Ferta Woreda, North West Ethiopia (Gedamu et al., 2017; Mengistie et al., 2013; Atalay et al., 2018). This might be related to the likely hood of mother's care for their children become low because of considering the support from in-laws, friends, siblings, parents and grandmothers to enable them to carry on with their various occasions such as occupation. The hygienic practices of these care givers can be questionable, exposing the children to diarrhea. In addition, on this age intervals children starts to stand, walk and they peak any contaminated materials from the environment into their mouth and ingest those materials which predisposes them to diarrhea. Furthermore, this may be due to introduction of contaminated weaning foods, starting crawling, risk of ingesting contaminated materials.

However, in our survey those children who were stated early supplementary feeding before 6 months were 2 times more likely to suffer child hood diarrhea as compared to their counterpart [AOR=2.16; 95% CI (1.22, 3.83). This is correlated with study done in North India, North West Ethiopia (Atalay et al., 2018). This is because breast feeding mothers are usually discouraged from exclusively breast feeding their babies because grandmothers and mother-in-law believe that breast milk is inadequate for the baby. Furthermore, mothers are made to stop exclusive breast feeding and introduce early complimentary feeding thus exposes the baby to diarrhea when hygienic measures are compromised.

This study also showed that, children who did not exclusively breast feed experienced diarrheal disease 2.4 times [AOR= 2.45; 95% CI (1.60, 3.33)] more likely compared to those who exclusively breast feed. This is similar with studies done at North West Ethiopia Khalid and Gupta, 2018). This is due to those children who did not exclusively breast feed might not have sufficient protective factors and compromised immunity to prevent various infections like diarrhea.

In our survey, children in the households who open dumped/field refuse around the house had 1.92 times higher odds of having diarrhea compared to children in households who use a waste disposal methods of burning and garbage removal techniques [AOR= 1.92; 95% CI (1.26, 2.94)]. This is an agreement with other study conducted in different parts of Ethiopia (Atalay et al., 2018). The suggestion might be inappropriate disposal of refuse provides breeding sites for micro-organisms/insects that may carry diarrhea pathogens from the refuse to food, water and on feeding utensils.

Children who did not take pneumococcal vaccine were more likely exposed to diarrhea than those who took vaccination [AOR = 6.72; 95% CI: (1.20, 37.65)]. Those

Table 5. Bivariate and multivariate analysis effect of independent variables on child hood diarrhea, West Guji zone, Oromia, Ethiopia, 2018

Variable	Category	Child hood diarrhea			95% C.I for odds ratio	
		Yes	No	P-value	COR	AOR
Educational status of mother	Illiterate	46	90	0.011	5.17(1.49-17.82)	3.05(.81,11.39)
	Primary	181	277		6.79(2.05-22.54)	3.75(1.07,13.22)**
	Secondary	32	57		5.80(1.64-20.49)	3.65(.97,13.68)
	College and above	3	31		1	1
Index child age (Months)	<6	15	34	0.01	1.22(.61-2.44)	3.19 (.52,19.66)
	6-11	34	41		2.28(1.29-4.03)	2.72(1.18,6.27) **
	12-23	58	72		2.22(1.37-3.61)	2.28(1.13,4.62)**
	24-35	73	93		2.16(1.37-3.42)	2.13(1.21,3.75)**
	36-47	37	91		1,12(.67-1.87)	1.30(.75,2.27)
	48-59	45	124		1	1
Number of under five children	1	71	186	0.001	1	1
	2	150	216		1.82 (1.29-2.56)	1.53(1.04,2.24) **
	3-5	41	53		2.03(1.24-3.31)	1.70(.97,2.99)
Time supplementary feeding initiated (Months)	Under 6 months	86	70	0.001	2.61 (1.55-4.38)	2.16 (1.22 3.83)**
	Exactly at 6 months	134	288		.97(.66-1.56)	6.33 (.53,76.15)
	> 6 months	33	70		1	
Daily consumption of water (Liters)	< 20	134	281	0.001	1.54(1.14-2.098)	.64 (.44,.94) **
	≥20	128	174		1	1
Child exclusive breast feed	Yes	132	290	0.001	1	1
	No	121	140		1.89(1.38-2.61)	2.45(1.61,3.73) **
Current status of breast feeding	EBF	18	42	0.003	1	1
	Partial BF	124	56		1.86(1.02-3.38)	2.03(.55,7.44)
	Not BF	120	257		1.09(0.62-1.97)	2.09(.54,8.05)
Waste disposal method	Proper	58	140	0.013	1	1
	Improper	204	315		1.56(1.10-2.23)	1.92(1.26,2.94) **
Rota virus vaccination taken	Yes	174	344	0.003	1	1
	No	88	144		1.57 (1.12-2.19)	0.16(.03,.92)**

Table 5. Contd.

				0.002		
PCP vaccination taken	Yes	169	344		1	1
	No	93	111		1.71(1.22-2.37)	6.72 (1.20,37.64)**
				0.002		
Measles vaccination taken	Yes	123	269		1	1
	No	139	186		1.64 (1.20-2.22)	.87(.51,1.51)
Vitamin A taken				0.001		
	Yes	122	287		1	1
	No	140	168		1.96 (1.440-2.67)	1.66(1.04,2.68) **

**p-value <0.05, statistically significant; COR-Crude Odds Ratio; AOR-Adjusted Odds Ratio.

children who did not take any dose of Vitamin A within preceding 6 months had 1.6 times [AOR = 1.66; 95% CI: (1.04, 2.68) higher risk for acute diarrhea compared to those who had Vitamin A supplementation. This is similar with the study done in North India (Khalid and Gupta, 2018). This might be due to timely administration of Vitamin A supplementation has been a protective of intestinal epithelium and effective primary interventions for preventing diarrheal morbidity. Children who did not take Rota virus vaccine were 84% more likely exposed to diarrhea than those who took vaccination [AOR = 0.16; 95% CI: (0.03, 0.92)]. This is consistence with a cross-sectional study in Ferta Woreda, North West Ethiopia (Gedamu et al., 2017).

Conclusion

The prevalence of acute diarrhea among under five children in West Guji Zone was very high. The main factors significantly associated with childhood diarrhea were maternal educational status, age of index child, number of under five children in households, exclusive breast feeding practices, time supplementary feeding initiated, waste disposal method, daily consumption of water and vaccination status such as Rota virus, pneumococcal, Vitamin A supplementation status. Hence, integrative interventions strategies should take into consideration of child birth spacing, building toilet, providing safe water supply, the strengthening of health intervention programs such as effective health education related to appropriate feeding, waste disposal system, vaccination, sanitation practices and Vitamin A supplementation to reduce burden of diarrhea among under five year children. Furthermore, efforts should be invested to educate parents about the importance of breast feeding in order to adopt the culture of breast feeding to reduce exposure to diarrhea.

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CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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