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The prevalence of diarrhea and associated factors among children under five years in Ethiopia

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Abstract
Diarrhea is one of the most challenging disease in developing countries especially in sub Saharan Africa countries including Ethiopia. This disease mostly affects children under five years of age. The present study assessed the prevalence of diarrhea and associated factors of under-five children Ethiopia. Diarrhea is second only to pneumonia as the cause of child mortality worldwide. Studies showed that different factors were associated with the occurrence of childhood diarrhea. The data was analyzed using SPSS software version 16. Hosmer and Lemeshow Test was employed to check the overall significance of the binary logistic regression model to event Diarrhea data. Based on binary logistic regression analysis the result reveals that the factors region where a child is living, family size, sex of a child and age of a child are the most significant factors that affect prevalence of diarrhea at 5% level of significant(p-value <0.05). From the result of binary logistic regression analysis, it can be conclude that a child whose age is 13-24 months has high probability to be infected by diarrhea as compared to the other age groups of under-five child.

Keywords: Diarrhea, associated factors, under-five children, Ethiopia

Introduction
Diarrheal disease remains the leading cause of morbidity and mortality among under-five children worldwide. Every day, more than 4000 children lose their lives due to diarrhea. In Ethiopia, diarrhea is the second killer of under-five children next to pneumonia [1]. Diarrhea remains the leading cause of morbidity and mortality in children under 5 years old worldwide. The burden is disproportionately high among children in low- and middle-income countries. Young children are especially vulnerable to diarrheal disease and a high proportion of the deaths occur in the first 2 years of life. Worldwide, the majority of deaths related to diarrhea take place in Africa and South Asia. Nearly half of deaths from diarrhea among young children occur in Africa where diarrhea is the largest cause of death among children under 5 years old and a major cause of childhood illness.

Diarrhea is second only to pneumonia as the cause of child mortality worldwide. Developing countries particularly in Sub Saharan Africa including Ethiopia have a high burden of this disease. Studies showed that different factors were associated with the occurrence of childhood diarrhea [2]. Diarrhea remains the second leading cause of death among children under five years globally. Nearly one in five child deaths, about 1.5 million each year, are due to diarrhea. It kills more young children than Acquired Immunodeficiency Syndrome (AIDS), malaria and measles combined. World Health Organization has accordingly underlined the need for epidemiological surveys of infantile diarrhea in all geographical areas[3]. The burden of diarrheal diseases among children is by far more in low and middle-income countries where it is the second leading cause of deaths in children under 5 years [4]. Diarrhea remains the second leading cause of death among children under five globally. Nearly one in five child deaths (about 1.5 million) each year is due to diarrhea. It kills more young children than AIDS, malaria and measles combined. Diarrhea is more prevalent in the developing world due, in large part, to the lack of safe drinking water, sanitation and hygiene, as well as poorer overall health and nutritional status. According to the latest available figures, an estimated 2.5 billion people lack improved sanitation facilities, and nearly one billion people do not have access to safe drinking water. These unsanitary environments allow diarrhea-causing pathogens to spread more easily [5].

Methods and Materials

Study Area and Population

Ethiopia is officially known as the Federal Democratic Republic of Ethiopia, which is a landlocked country located in the Horn of Africa. It is the second-most populous nation in Africa, with over 90 million populations and the tenth largest by area, occupying 1,100,000 km2. Ethiopia is bordered by Eritrea to the North, Djibouti and Somalia to the East Sudan and South Sudan to the West, and Kenya to the South. Ethiopia has eleven geographic or administrative regions: nine regional states (Tigray, Affar, Amhara, Oromia, Somali, Benishangul-Gumuz, SNNPR, Gambela and Harari) and two city administrations (Addis Ababa and Dire Dawa that are considered as region) with capital city of Addis Ababa. Administratively, each of the 11 geographic regions in Ethiopia is divided into zones and each zone is divided into lower administrative units called woredas. Each woreda is then further subdivided into the lowest administrative unit, called a kebele. The data used for this study is 2016 Ethiopia Demographic and Health Survey (2016 EDHS). The survey implemented by the Central Statistical Agency (CSA) from January 18, 2016 to June 27, 2016.

Sampling Design

The sampling frame used for the 2016 EDHS is the Ethiopia Population and Housing Census (PHC), which was conducted in 2007 by the Ethiopia Central Statistical Agency. The census frame is a complete list of 84,915 *enumeration areas* (EAs) created for the 2007 PHC. An EA is a geographic area covering on average 181 households. The sampling frame contains information about the EA location, type of residence (urban or rural), and estimated number of residential households. With the exception of EAs in six zones of the Somali region, each EA has accompanying cartographic materials. These materials delineate geographic locations, boundaries, main access, and landmarks in or outside the EA that help identify the EA. In Somali, a cartographic frame was used in three zones where sketch maps delineating the EA geographic boundaries were available for each EA; in the remaining six zones, satellite image maps were used to provide a map for each EA. The sample for the 2016 EDHS was designed to provide estimates of key indicators for the country as a whole, for urban and rural areas separately, and for each of the nine regions and the two administrative cities. The 2016 EDHS sample was stratified and selected in two stages. Each region was stratified into urban and rural areas, yielding 21 sampling strata. Samples of EAs were selected independently in each stratum in two stages. Implicit stratification and proportional allocation were achieved at each of the lower administrative levels by sorting the sampling frame within each sampling stratum before sample selection, according to administrative units in different levels, and by using a probability proportional to size selection at the first stage of sampling. In the first stage, a total of 645 EAs (202 in urban areas and 443 in rural areas) were selected with probability proportional to EA size (based on the 2007 PHC) and with independent selection in each sampling stratum. A household listing operation was carried out in all of the selected EAs from September to December 2015. The resulting lists of households served as a sampling frame for the selection of households in the second stage. Some of the selected EAs were large, consisting of more than 300 households. To minimize the task of household listing, each large EA selected for the 2016 EDHS was segmented. Only one segment was selected for the survey with probability proportional to segment size. Household listing was conducted only in the selected segment; that is, a 2016 EDHS cluster is either an EA or a segment of an EA. In the second stage of selection, a fixed number of 28 households per cluster were selected with an equal probability systematic selection from the newly created household listing. All women age 15-49 and all men age 15-59 who were either permanent residents of the selected households or visitors who stayed in the household the night before the survey were eligible to be interviewed. In all of the selected households, height and weight measurements were collected from children age 0-59 months [6].

Methods of Data Analysis

Data was sorted and checked for cleanness, quality and its validity. Then the data was analyzed using SPSS software version 16. Hosmer and Lemeshow Test was employed to check the overall significance of the binary logistic regression model to event Diarrhea data. The well-fitting models show non-significance on the Hosmer and Lemeshow goodness-of-fit test, indicating that model-prediction is not significantly different from the observed values. This does not mean that the model necessarily explains much of the variance in the dependent, only that however much or little it does explain is significant [7]. And the wald test is also employed to test the significance of particular explanatory variable in a statistical model. If for a particular explanatory variable, or group of explanatory variables, the Wald test is statistically significant, then we would conclude that the parameters associated with these variables are not zero, so that the variables should be included in the model. If the Wald test is not statistically significant then these explanatory variables can be omitted from the model.

Binary Logistic regression model

Binomial (or binary) logistic regression is a form of regression, which is used when the dependent variable is dichotomous, such as presence/absence or success/failure, positive/ negative and the independent variables are of any type. Logistic regression can be used to predict a dependent variable on the basis of continuous and/or categorical independent variables and to determine the percent of variance in the dependent variable explained by the independent variables; to rank the relative importance of the independent variables; to assess interaction effects; and to understand the impact of the covariate control variables. The binary logistic model was also used to analyze factor that affect the prevalence of diarrhea.

The dependent variable in this case is binary, which take the value of 1 for infant infected by diarrhea and 0 for infant not infected by diarrhea. Binary logistic regression analysis the odd of success defined as to be the ratio of the probability of success to the probability of failure.

$$Logit(P_i) = Log\{\frac{Pi}{1-pi}\} = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + ...\beta_k x_{ki} \quad 1$$

Where: - $\beta_0, \beta_1, ...\beta_k$ are the model parameters.

Fitting the Logistic Regression and Model Parameter Estimation

Since the logistic regression model is nonlinear an iterative algorithm is necessary for parameter estimation. Let p be the probability of success and it is equivalent to the probability that the response variable assumes value one.

$$P(Y=1)=\frac{1}{1+e^{-x'\beta}} \quad 2$$

Then each observation (response) can be considered as an outcome of a Bernoulli trial. Hence for the i^{th} observation Y_i the Bernoulli distribution is

$$P(Y=y_i)=p^{yi}(1-p)^{1-y_i} \quad 3$$

Since the observations are assumed to be independent the likelihood function is obtained as the product of the terms given in the above expression as follows.

$$LP^{yi}(1-\Pi p)^{1-yi}=\Pi(\frac{1}{1+e^{-x'\beta}})yi(\frac{e^{-x'\beta}}{1+e^{-x'\beta}})1-y_i \quad 4$$

The principle of maximum likelihood states that we use as our estimate of the value which maximize the expression the log likelihood is defined as.

$$\ln L=\sum y_i \ln(\frac{1}{1+e^{-x'\beta}})+\sum(1-y_i)\ln(\frac{e^{-x'\beta}}{1+e^{-x'\beta}}) \quad 5$$

Hence, through maximization of the above log-likelihood function we can theoretically estimate the parameter vector β. But the equation is nonlinear in β, and as a result the estimates do not have a closed form expression. Therefore, β will be obtained by maximizing using a numerical iterative method[7].

Results

Based on table 1 below, A total of 9185 children under-five years of age were included in the study, of which 1314 children had diarrheal illness diarrhea two weeks before the interview, thus giving a prevalence of 14.3%.

Table 1: The Overall Prevalence of Diarrhea on children under age five in Ethiopia.

Had Diarrhea		Frequency	Percent
	No	7871	85.7
	Yes	1314	14.3
	Total	9185	100.0

Table 2: Cross Tabulation

Variables	Labels	Frequency	percent	Had Diarrhea	
				Yes values (%)	No values (%)
Place of residence	Urban	1663	18.1	230 (13.8%)	1433(86.2%)
	Rural	7522	81.9	1084(14.4%)	6438(85.6%)
Maternal Education	No education	5791	63	784(13.5%)	5007(86.5%)
	Primary	2417	26.3	391(16.2%)	2026 (83.8%)
	Secondary	647	7	95(14.7%)	552(85.5%)
	Higher	330	3.6	44(13.3%)	286(86.7%)
Region	Tigrai	947	10.3	141(14.9)	806 (85.1%)
	Afar	885	9.6	118 (13.3)	767(86.7%)
	Amhara	900	9.8	149(16.6%)	751(83.4%)
	Oromia	1396	15.2	213(15.3%)	1183(84.7%)
	Somali	1237	13.5	145(11.7%)	1092(88.3%)
	Binishangul	749	8.2	87(11.6%)	662(88.4%)
	SNNPR	1140	12.4	204(17.9%)	936(82.1%)
	Gambela	610	6.6	88(14.4%)	522(85.6)
	Harari	473	5.1	59(12.5%)	414(87.5%)
	Addis Ababa	396	4.3	43(10.9%)	353(89.1%)
	Dire Dawa	452	4.9	67(14.8%)	385(85.2%)
Source of drinking water	Improved	5984	65.1	874(13.7%)	5110(86.3%)
	Unimproved	3201	34.9	440(14.6%)	2761(85.4)
Types of toilet facility	Improved	1693	18.4	232(13.7%)	1461(86.3%)
	Unimproved	7492	81.6	1082(14.4)	6410(85.6%)
Religion	Orthodox	2744	29.9	419(15.35)	2325(84.7%)
	Catholic	60	0.7	8(13.3%)	52(86.7%)
	Protestant	1658	18.1	254(15.3%)	1404(84.7%)
	Muslim	4564	49.7	615(13.5%)	3949(86.5%)
	Others	71	0.8	18(11.32%)	141(88.68%)
Family Size	<5	2500	29.2	374(15%)	2126(85%)
	6-10	6363	69.3	881(13.8%)	5482(86.2%)
	>10	322	3.5	59(18.3%)	263(81.7%)
Wealth Index	Poorest	3407	37.1	449(13.2%)	2958(86.8%)
	Poorer	1589	17.3	235(14.8%)	1354(85.3%)
	Middle	1298	14.1	194(14.9%)	1104(85.1)
	Richer	1144	12.5	194(14.9%)	1104(85.1%)
	Richest	1747	19	191(16.7%)	953(83.3%)

Anemia level	Sever	214	2.3	30(14%)	184(86%)
	Moderate	923	10	138(15%)	785(85%)
	Mild	2163	23.5	280(12.9%)	1883(87.1%)
	Not anemic	5885	64.2	866(14.7%)	5019(85.3%)
Maternal Current Marital Status	Never in union	56	0.6	8(14.3%)	48(85.7%)
	Married	8595	93.6	1238(14.4%)	7357(85.6%)
	Live with partner	85	0.9	5(5.9%)	80(94.1%)
	Widowed	111	1.2	14(12.6%)	97(87.4%)
	Divorced	255	2.8	34(13.3%)	221(86.7%)
	No longer live together/ separated	83	0.9	15(18.1%)	68(81.9%)
Sex of a child	Male	4704	51.2	707(15%)	3997(85%)
	Female	4481	48.8	607(13.5%)	3874(86.5%)
Place of Delivery	Home	6128	66.7	821(13.40%)	5307(86.60%)
	Government hospital	981	10.7	156(15.9%)	825(84.1%)
	Government HC	1518	16.5	250(16.5%)	1268(83.5%))
	Government health post	175	1.9	34(19.4%)	141(80.6%)
	Other public sector	1	0.0	0(0%)	1(100%)
	Private hospital	170	1.9	25(14.7%)	145(85.3%)
	Privet clinic	31	0.3	4(12.9%)	27(87.1%)
	Other privet sector	2	0.0	0(0%)	2(100%)
	NGO Health facility	66	0.7	7(10.6%)	59(89.4%)
	NGO other health facility	6	0.1	0(0%)	6(100%)
	Others	107	1.2	17(15.9%)	90(84.1%)
Child Age	<12 Months	2211	24.1	378(17.1%)	1833(82.9)
	13-24 Months	1770	19.3	344(19.4%)	1426(80.6%)
	25-36 Months	1783	19.4	266(14.9%)	1517(85.1%)
	37-48 Months	1747	19	206(11.8%)	1541(88.2%)
	49-60 Months	1674	18.2	120(7.2%)	1554(92.8%)

Based on table 2 above, A total of 9185 under five children were included in the study. The majority of the children, 7522 (81.9%), were from rural areas from which 1084(14.4%) had diarrhea while the rest, 1663 (18.1%), from urban areas of the country Ethiopia from which 230 (13.8%) had diarrhea. Of the total children, 4704 (51.2%) were males from which 707(15%) had diarrhea and the rest 4481(8.8%) are females from which 607(13.5%) had diarrhea. The majority of children 6363(69.3%) are living within the family size between 6 and 10, 2500 (29.2%) live within family less than 5 and the rest 322 (3.5%) live within a family size greater than 10. From this summary we observe that diarrhea is more prevalent (18.3%) on children who live within the family size greater than 10. Diarrhea is more prevalent on children in the age group (13-24) which gives a prevalence of 19.4% followed by the prevalence of diarrhea on the child in age group less than 12 months giving a prevalence rate 17.1%. And the prevalence of diarrhea on a child in age groups (25-36), (37-48) and (48-60) months provides a prevalence rate 14.9%, 11.8% and 7.2% respectively is relatively low as compared children who aged less than 12 months between 13-24 months. Therefore, the prevalence of diarrhea on children is decreased as the age of a children increases except the children with in age group 13-24 months. The prevalence of diarrhea on children who live with a family whose wealth status categorized as poorest, poor, middle, richer and richest is 13.2%, 14.8%, 14.9%, 14.9% and 16.7% respectively. Diarrhea prevalence is increased as the wealth of a people becomes higher and higher, this may be due to those wealth people buy anything they saw and give to the child to eat.

Table 3: Result of Logistic Regression Variables in the Equation

		B	S.E.	Wald	Df	Sig.	Exp(B)	95.0% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	Urban	-.024	.134	.032	1	.857	.976	.750	1.270
	Maternal Education Level			4.273	3	.233			
	No education	.039	.196	.040	1	.841	1.040	.708	1.529
	Primary	.187	.190	.967	1	.325	1.206	.830	1.751
	Secondary	.087	.204	.183	1	.669	1.091	.732	1.626
	Region			30.614	10	.001			
	Afar	-.055	.191	.084	1	.772	.946	.651	1.375
	Amhara	.000	.178	.000	1	.997	.999	.706	1.416
	Oromia	.177	.189	.876	1	.349	1.193	.824	1.727
	Eth. Somali	.123	.166	.551	1	.458	1.131	.817	1.566
	Binishanguel G.	-.189	.169	1.260	1	.262	.827	.594	1.152
	SNNPR	-.231	.189	1.481	1	.224	.794	.548	1.151
	Gambela	.369	.182	4.112	1	.043	1.447	1.012	2.067
	Harari	.128	.206	.389	1	.533	1.137	.760	1.702
	Addis Abeba	-.210	.198	1.122	1	.290	.811	.550	1.195
	Dire Dawa	-.430	.230	3.512	1	.061	.650	.415	1.020
	Un improved Water	.127	.067	3.546	1	.048	1.135	.995	1.295
	Un Improved Toilet	-.009	.096	.008	1	.927	.991	.822	1.196

	Religion			3.993	5	.550			
	Catholic	.689	.416	2.745	1	.098	1.992	.881	4.501
	Protestant	.438	.559	.613	1	.434	1.549	.518	4.630
	Muslim	.523	.409	1.632	1	.201	1.687	.756	3.762
	Traditional	.604	.414	2.135	1	.144	1.830	.814	4.116
	Others	.529	.523	1.024	1	.312	1.698	.609	4.736
	Familysize			6.389	2	.041			
	<5	-.382	.170	5.035	1	.025	.682	.488	.953
	5-10	-.394	.156	6.375	1	.012	.675	.497	.916
	Wealth index			1.551	4	.818			
	Poorer	.048	.145	.109	1	.742	1.049	.789	1.394
	Middle	.068	.146	.215	1	.643	1.070	.804	1.424
	Richer	.031	.149	.044	1	.834	1.032	.771	1.381
	Richest	.145	.145	1.000	1	.317	1.156	.870	1.536
	Anemia Level			5.895	3	.117			
	Moderate	.136	.207	.430	1	.512	1.146	.763	1.720
	Mild	.150	.108	1.922	1	.166	1.161	.940	1.435
	Not Anemic	-.115	.077	2.257	1	.133	.891	.767	1.036
	Marital Status of mother			6.226	5	.285			
	Married	-.351	.486	.521	1	.470	.704	.272	1.825
	Live with Partner	-.296	.294	1.017	1	.313	.744	.418	1.323
	Widowed	-1.347	.549	6.026	1	.014	.260	.089	.762
	Divorced	-.298	.415	.516	1	.473	.743	.330	1.673
	No longer live together	-.348	.346	1.012	1	.314	.706	.358	1.391
	BORD			13.360	13	.420			
	BORD(1)	19.011	2.298E4	.000	1	.999	1.805E8	.000	.
	BORD(2)	19.047	2.298E4	.000	1	.999	1.871E8	.000	.
	BORD(3)	19.112	2.298E4	.000	1	.999	1.997E8	.000	.
	BORD(4)	19.218	2.298E4	.000	1	.999	2.220E8	.000	.
	BORD(5)	19.081	2.298E4	.000	1	.999	1.935E8	.000	.
	BORD(6)	19.126	2.298E4	.000	1	.999	2.024E8	.000	.
	BORD(7)	18.822	2.298E4	.000	1	.999	1.494E8	.000	.
	BORD(8)	19.013	2.298E4	.000	1	.999	1.809E8	.000	.
	BORD(9)	19.108	2.298E4	.000	1	.999	1.988E8	.000	.
	BORD(10)	19.234	2.298E4	.000	1	.999	2.256E8	.000	.
	BORD(11)	18.542	2.298E4	.000	1	.999	1.129E8	.000	.
	BORD(12)	18.975	2.298E4	.000	1	.999	1.741E8	.000	.
	BORD(13)	20.229	2.298E4	.000	1	.999	6.098E8	.000	.
	Female	.140	.061	5.274	1	.022	1.150	1.021	1.295
	Place of Delivery			6.590	12	.883			
	Public sectors	.075	1.111	.005	1	.946	1.077	.122	9.505
	Gov't Hospital	.063	.272	.053	1	.818	1.065	.624	1.816
	Gov't Health center	.083	.353	.055	1	.814	1.087	.544	2.172
	Gov't Health Post	.281	.290	.939	1	.333	1.324	.751	2.335
	Other public Sectors	.148	.278	.284	1	.594	1.160	.672	2.002
	Privet sector	.338	.332	1.037	1	.308	1.403	.731	2.689
	Privet Hospital	-19.516	4.019E4	.000	1	1.000	.000	.000	.
	Privet Clinic	.401	.367	1.194	1	.275	1.493	.727	3.066
	Other privet sectors	-.040	.611	.004	1	.947	.961	.290	3.184
	NGO Health facility	-19.090	2.841E4	.000	1	.999	.000	.000	.
	NGO other Health facility	-.207	.491	.178	1	.673	.813	.310	2.128
	Other	-19.079	1.628E4	.000	1	.999	.000	.000	.
	Child Age			116.937	4	.000			
	<12 Months	.972	.113	74.439	1	.000	2.644	2.120	3.297
	13-24 Months	1.135	.114	98.905	1	.000	3.113	2.488	3.893
	25-36 Months	.817	.117	48.753	1	.000	2.263	1.799	2.846
	37-48 Months	.546	.121	20.320	1	.000	1.726	1.361	2.187
	Constant	-21.971	2.298E4	.000	1	.999	.000		

The result on table 3 above, reveals that the factors region where a child is living, family size, sex of a child and age of a child are significant factors at 5% level of significant. The odds of a child who live in oromiya is 1.193 (95% CI:0.824, 1.727) which implies that the probability that a child live in oromia region infected by Diarrhea is 1.193 times more likely than a child who live in tigray region. The probability that a child live in Ethiopian Somali be infected with diarrhea is 1.131 times more likely than a child live in Tigray. (Odds 1.131, 95% CI: 0.817, 1.566). More over a child live in Gambela and Harrari is 1.447 and 1.137 times more likely to be infected by diharrea as compared to a child who live in Tigray region.(odds 1.447, 95% CI: 1.012, 2.067) and (odds 1.137, 95% CI: 0.760, 1.702) respectively. Moreover, the probability that a child whose mother is not educated is 1.04 times more likely to be infected by diarrhea as compared to a child whose mother's enroll in higher education level. (Odds 1.04, 95% CI: 0.708, 1.529). The

odds of a child whose mother's education level is primary education is 1.206 (95% CI: 0.83, 1.751) and a child whose mother's education level is secondary education is 1.091, (95% CI: 0.732, 1.626), this implies that the probability that a child whose mother's education level is primary and secondary is 1.206 times and 1.091 times respectively more likely to be infected by diarrhea as compared to a child whose mothers enrolled in higher education.

The odds of a child whose age is less than 12 months and (13-24 months) is 2.644, (95% CI: 2.12, 3. 297) and 3.113, (95% CI: 2.488, 3.893) respectively. This implies that the probability that a child whose age is less than 12 months and between 13-24 months is 2.644 times and 3.113 times more likely to be infected by diarrhea as compared to a child whose age is 49-60 months. A child whose age is 25-36 months is 2.263 times more likely to be infected by diarrhea as compared to a child whose age is 49-60 months, (odds 2.644, 95% CI: 1.799, 2.846) and also a child whose age is 37-48 months is 1.726 times more likely to be infected by diarrhea as compared to a child whose age is 49-60 months, (odds1.726, 95% CI: 1.361, 2.187). From this result, it can be conclude that a child whose age is 13-24 months has high probability to be infected by diarrhea as compared to the other age groups of a child.

The odds of female children is 1.15, (odds 1.15, CI: 1.021, 1.295) which implies that the probability that female children to be infected by diarrhea is 1.15 times more likely than male children. And also the odds of a child who live in urban area is 0.976 (odds 0.976, CI: 0.750, 1.270) this indicates that the probability that a child who live in urban area to be infected by diarrhea is 0.976 times less likely than a child who live in rural area. We found children using improved water (OR: 1.135; 95% CI: 0.995, 1.295) more likely to suffer from diarrhea as compare with a child who use UN improved water. In contrast, lower rates of diarrhea prevalence were seen in children from households with less than five and 5-10 children (odds 0.682 95% CI: 0.488, 0.953) and (odds 0.675, 95% CI: 0.497, 0.916) respectively as compared to children from household more than 10 children.

Discussion

This study provides thorough information about household characteristics in Ethiopia conducted by CSA, EDHS 2016 and their interrelation with diarrhea prevalence among the children aged under five years. Our study reveals that age of a child is a significant factors that affects the prevalence of diarrhea on children under five years old. This result is concedes with a study entitled Predictors of under-five childhood diarrhea: Mecha District, West Gojam, Ethiopia [8].

The odds of prevalence of diarrhea were higher among children who live in rural area than children who live in urban ones and this was consistent with the findings in eastern Ethiopia [9]. Moreover, In this logistic regression analysis, the age of a child is found to be significantly associated with childhood diarrhea and this study is concedes with a study in Benishangul Gumuz Regional State, North West Ethiopia [10].

The findings of this study regarding maternal education emphasizes that mothers with lower educational status put their children at higher risk for having diarrhea, which is in line with a study in Benishangul Gumuz Regional State, North West Ethiopia [10].

Conclusions

In over all, the prevalence of diarrhea in children under five years is quite high in Ethiopia with children younger than two years (24 months) of age being the most affected. Based on binary logistic regression analysis the factors region where a child is living, family size, sex of a child and age of a child are the most significant factors that affect the prevalence of diarrhea at 5% level of significant. The prevalence of diarrhea is high on children whose household uses unimproved water for drink, live in rural area and whose maternal education status is relatively low.

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