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Determinats of Child Mortality in Arba Minch Hospital

Tilahun Ferede Asena* — Department of Statistics, Arba Minch University, P.O. Box 25, Arba Minch, Ethiopia

Demisse Dagne — Department of Statistics, Arba Minch University, P.O. Box 25, Arba Minch, Ethiopia

Ashenafi Senbeta Bedane — School of Mathematical and Statistical Sciences, Hawassa University, P.O. Box 05, Hawassa Ethiopia,

Abstract: This research identifies the important determinants of child mortality from 2012-2013 G.C in Arba Minch hospital. Logistic regression method was used to determine the impact of child mortality. The results show that among bio-demographic factors, gender of child, mother age and breast feeding are the important determinants for child mortality. However, breast feeding has a significant impact on child mortality. Among Socioeconomic determinants education, household size are the most important determinants for child mortality. Therefore policies should be revised and implement and health intervention program that focus on mothers and children health should be strong to achieve the Millennium Development Goals of child mortality in the remaining years.

Keywords: Child mortality; Bio-demographic factors; socioeconomic factors; Arba Minch hospital.

1. Introduction

1.1. Back Ground of the Study

Child mortality was a factor that can be associated with the well-being of a population and taken as one of the development indicators of health and socioeconomic status and also indicates a life quality of a given population, as measured by life expectancy as Desta [1]. That is why reduction of infant and child mortality is a worldwide target and one of the most important key indexes among [2]. Hence its indication is a very important for evaluation and public health strategy. Thus it is an area that many researchers focus and that has attracted the attention of policy-makers and program implementer's worldwide [3]. One of the most important targets of (MDGs) that introduced in 2000 at the United Nations Millennium Summit was reducing infant and under-five child mortality rates by two-thirds from the 1990 levels by 2015.

In 2000 the Ethiopian government announce the intention by signed the millennium declaration committing to achieve the (MDGs) by 2015, many of which overlap with the 2015 national policy goals, for instance, in 2000 the Ethiopian administer prepared child survival strategy and implementation plan to reduce under-five mortality of 140/1000 live births to 67/1000 live births by 2015.

Gamo Gofa zone is the second largest zone in SNNPR and the least developing zone with high fertility and rapid population growth rates. The population is estimated nearly 1.6 million [4]. A population is a predominantly rural and young society and the majority of the population has traditionally been concentrated in the highlands, with nearly 85 percent of the population living in rural areas while the rest lives in urban areas.

Most of the scholars indicated that the decline of mortality especially infant and child mortality in Ethiopia. According to Kenny and Kenny [5] and Desta [1] the mortality rate of children in Ethiopia has been declining. The main reason for this as they noted is the dawn ward of agriculture, the increase of urbanization which accelerates the economic performance of the country.

Child mortality, also known as under-5 mortality, refers to the death of infants and children under the age of five. In 2010, 7.6 million children under five died, down from 8.1 million in 2009 8.8 million in 2008, and 12.4 million in 1990. About half of child deaths occur in Africa. Approximately 60 countries make up 94% of under-five child deaths as [6].

Death is often preceded by illness (morbidity). As a result, the state of health of individuals and societies is the prime determinant of mortality differences. However, variations in the types and About 472,000 Ethiopian children die each year before their fifth birthday, which places Ethiopia sixth among the countries of the world in terms of the absolute number of child deaths. Yet, there are effective low cost interventions to prevent two-thirds of these deaths (NSCSE, 2005). Children in the third world, especially in sub-Saharan Africa, usually suffer from more than one disease at a time. In most Countries of sub-Saharan Africa, the main causes of under five deaths are more or less the

*Corresponding Author

same. Ethiopia is a sub-Saharan Africa country with a land area of 1.14 million square kilometers. The size of the country and its location has accorded it with diverse topography, geographic and climatic zones and resources. With a projected population of 75.1 million in 2006, Ethiopia is the second most populous country in Sub-Saharan Africa (SSA). About 85% of the population resides in rural areas while the rest live in urban areas. According to the data of Millennium Development Goals Indicators Collected by the United Nations, IMR in 2007 at world level is 47; this rate is 5 for developed regions whereas 51 for the developing countries.

Poverty is one of the most important factors affecting the under five mortality rate in Africa. Ethiopia is one of the poorest African countries with, according to UNCEF [7] report, with a Gross National Income per capita of about $220 in 2007. Infant and child mortality rates remain high, with most deaths being caused by easily preventable diseases, such as malaria, pneumonia and diarrhea. [7].

1.2. Statement of the Problem

The study of under- five mortality becomes one of the most important researches in developing countries because there is high level of children mortality. There is much research on the patterns of determinants of under-five mortality, by analyzing how less than five mortality is differently affected by demographic, socioeconomic and environmental variables.

This paper presents an analysis of the impact of demographic, socioeconomic and environmental variables on under-five mortality. The overall purpose of the paper is to determine the relative importance of various demographic, socioeconomic and environmental variables on under-five mortality in Arbaminch. In particular, the study will focus on the relationship between under five mortality and mother age, child's sex, breastfeeding status, mother's education, wealth, and area of residence.

1.3. Objectives of the Study

The major objective of this research is to determine basic factors affecting child mortality in Arbaminch Hospital. Specifically:

- To determine basic determinants (socioeconomic and bio-demographic) of child mortality in Arbaminch hospital.
- To analysis the effect of child mortality in Arbaminch Hospital.
- To identify determinants of child mortality in Arbaminch hospital.

2. Literature Review

Theoretical frameworks are often presented as health production functions, which capture the Structural relation between health outcomes and the household's behavioral variables, like nutrition, breastfeeding, child spacing, etc. [8]. In the framework of a health production function, child mortality risks depend on both observed health inputs and unobserved biological endowment or frailty. Not properly taking into account of these unobserved characteristics or the relation between children within a family may lead to inconsistent and inefficient estimators [9].

Poverty is one of the most important factors affecting the under five mortality rate in Africa. Ethiopia is one of the poorest African countries with, according to UNCEF [7] report, with a Gross National Income per capita of about $220 in 2007. Infant and child mortality rates remain high, with most deaths being caused by easily preventable diseases, such as malaria, pneumonia and diarrhea. [7].

Goro [10] used data from 1993, 1998, and 2003 DHS surveys in Ghana to examine the determinants of infant and child mortality in three northern regions by using multivariate logistic regression model found that education of mothers, birth order of child and marital status of mothers are powerful significant determinants for infant mortality, while only mothers education have a significant impact for child mortality. Similarly, Twum – Baah [11] indicated that children born to mothers with higher educational level associated with lower risk of child mortality as compared to children born to mothers with primary education level or non-educated.

Kombo and Ginneken [12] using the result of 2005-06 Zimbabwean DHS investigate the maternal, socioeconomic and sanitation factors on infant and child mortality by using Cox regression model. They found an evidence of birth order (6+) with short preceding interval significantly associated with high risk of infant and child mortality. Multiple births tend to increase infant and child mortality. On the other hand the expected U shape relationship between birth order and infant and child mortality, and mothers age and infant and child mortality is not conformed in their analysis, that children who are first born and those born to mothers aged 40-49 years are found tend to decrease infant and child mortality [1]. However socioeconomic determinants are rather small and insignificant effect on infant and child mortality. They suggest that the influence of birth order, preceding birth intervals, maternal age, type of birth and sanitation factors are more pronounced on infant mortality while weak effect on child mortality. Although as they discussed, the association of maternal, socioeconomic and sanitation factors with infant and child mortality weak as compared to 1994 and 1999 DHS surveys, which show those determinants are highly correlated and significant impact on infant and child mortality.

Kumar and Gemechis [13] uses data from Ethiopia Ethiopia Demographic and Health Survey [14] and employs cross tabulation technique to examine the selected socioeconomic, bio-demographic and maternal health care factors that determine child mortality in Ethiopia. The result show that among socioeconomic variables birth interval with preceding birth and mothers education have significant impact to lowering the risk of child mortality. The result conformed that the child mortality risk associated with children of less than 2 years of birth interval with previous child was highest (15 percent) and lowest (4. 2 percent) for the children whose birth interval was 4+ years. On the other hand, they reported that children whose mother's educational level are significantly correlated to the low risk of child mortality relative to children born from illiterate mothers and fathers with primary educational level. Birth order and place of residence also an important determinates of child mortality in Ethiopia.

In Ethiopia, Ezra and Gurum [15] employees a logistic regression model to investigate the impact of birth interval on infant and child mortality in the context of communities characterized by high reproductivty, prolonged breast feeding practice and poor living conditions. They found that short birth interval (<18 months) significantly associated with infant and child mortality as compared to long birth interval (>24 months), this implies the influence of short birth interval are more pronounced on infant mortality while weaker impact on child mortality. Together with this main results of the analysis, they observed that children born to young mothers age (15-19) and oldest mothers age (35-49) have a significant effect on infant and child mortality as compared with children born to mothers in the age category (25-34). Education also has a significant determinant of infant and child mortality.

Mturi and Curtis [16] used data from 1991/92 DHS in Tanzania to study the determinants of infant and child mortality by using hazard model found that short birth interval, adolescent pregnancy and previous child mortality associated with increased risk of infant and child mortality while no significant effect of socioeconomic status (i.e. maternal education, partner's education, urban/rural residence and presence of radio in the household) of the population on infant and child mortality. They conclude that demographic and biological factors such as short birth interval (less than 2 years), teenage pregnancies (<20 years) and previous child death were all have an impact on infant and child mortality and socioeconomic mortality differential are not significant [16].

Hala [17] applied duration modeling to assess the impact of water and sanitation on child mortality in Egypt. Results show that access to municipal water decreases sanitary risks. Manda [18] used data from the 1992 Demographic and Health Survey in Malawi to study the relationship between infant and child mortality and birth interval, maternal age at birth and, birth order, with and without controlling for other relevant explanatory variables. He also investigated the direct and indirect (through its relationship with birth intervals) effects of breastfeeding on children mortality. The study employed the proportional hazards model. The results show that birth interval and maternal age effects are largely limited to the period of infancy.

Mutunga [19] used data from 2003 DHS in Kenya to investigate the impact of socioeconomic and environmental variables of infant and child mortality in urban areas of Kenya. The results show that the infant and child mortality were lower for those who were of birth order 2-3, birth interval more than 2 years, single births, living in wealthier households, had a access to drinking water and sanitation facilities, and users of low polluting fuels as their main source of cooking. However, maternal age, maternal education and gender of the child had no significant association with child mortality [19]. Other study in Kenya by Hill, *et al.* [20] found that mother's educational levels and economic status have a significant impact on infant and child mortality while urban areas are associate with high risk of infant and child mortality than rural areas, however, controlling for HIV prevalence child mortality are lower in urban areas [20]. Generally infant and child mortality in urban areas is lower than in rural areas.

Sahn and Stifel [21] used data from DHS for 24 African countries, found that the infant mortality in urban areas lower relative to in rural areas. Various factors contribute for this urban- rural variation such as better education, improvement of public and health infrastructures in urban than in rural areas. However, HIV/AIDS epidemic are partly responsible for the high risk of infant and child mortality in Africa, particularly in sub-Saharan countries.

3. Methodology

3.1. Study Area

Arba Minch ("forty springs") is a city and separate woreda in southern Ethiopia; the first common name for this city called **Ganta Garo**. Located in the Gamo Gofa Zone of the Southern Nations, Nationalities, and Peoples Region about 500 kilometers south of Addis Ababa, at an elevation of 1285 meters above sea level. It is the largest town in Gamo Gofa Zone and the second town in SNNPR next to Awassa. It is surrounded by Arba Minch Zuria woreda.Arba Minch received its name for the abundant local springs which produce a groundwater forest. Besides the forty springs crossing the town is a river kulfo, which is used by the local people for washing cloths and farming. Located at the base of the western side of the Great Rift Valley, Arba Minch consists of the uptown administrative centre of Shecha and 4 kilometers away the downtown commercial and residential areas of Sikela, which are connected by a paved road. On the eastern side of Sikela is the gate to Nechisar National Park, which covers the isthmus between Lake Abaya to the north and Lake Chamo to the south.

3.2. Sample Size

Households comprised the second stage of sampling. A complete listing of households was carried out in each of the 140 sample selected Arba Minch Hospitals from January 2012 through March 2013.

3.3. Methodology

3.3.1. Variables Included in the Study

In this study we employed two types of variables, these are dependent (response variable) and independent (Explanatory variables) variables.

3.3.2. Dependent variables

The dependent variable is child mortality rate is the relative risk of dying in a specific age range of childhood.

3.3.3. Independent variables

The determinants of infant and child mortality categorized in to socioeconomic, demographic and biological variables. In this section I discuss few of these determinants used for the analysis.

3.3.4. Socioeconomics Variables

Used in this study include parental educations levels, literacy, type of place of residence (urban/rural) and household size.

3.3.5. Educations

Education play an important role for the reduction of child mortality, since better educated parents, particularly mother's education important for better use of the available information's crucial for child. Many researchers indicated that child mortality in urban areas are smaller than the rural areas. This variation occurred due to unequal distribution of socioeconomic factors and health facilities.

3.3.6. Household size

The household size in this study is categorized in to three where 1) less than 2 household size 2) 2_4 household size 3) greater than 4 house hold size. Concerning the household size the result found are expected much or less similar from the evidence of previous literatures.

3.3.7. Household Environmental Conditions

Source of drink water, floor material and toilet facility are among the environmental factors which highly affect child mortality. As indicate by Mosley and Chen [22] better water supply and the provision of sanitation facilities are important for child survival.

3.3.8. The Bio-Demographic Factors

In this study are maternal age at first birth, mother age at first intercourse, sex of child, order and duration of breast feeding.

3.3.9. Breastfeeding

Breastfeeding is almost prolonged and universal in developing countries. Breastfed child contribute a significant advantage for the reduction of infant and child mortality, for instance infant and child who are not breastfed are 14 times greater the risk of death from diarrhea and 3 times higher the risk of death respiratory infectious diseases [23].

3.4. Logistic Regression Model

Logistic regression can be used to predicted probability of a dependent variable on the basis of continuous and /or categorical independent variables and to determine the odds ratio in the dependent variable explained by the independent variables; to rank the relative importance of variables; and to understand the impact of covariate control variables. The logistic regression applies maximum likelihood estimation after transforming the dependent into logit variable (the natural log of the odds of the dependent variable occurring or not).In this way, logistic regression estimates the probability of a certain event occurring. Note that logistic regression calculates change in the log odds of the covariates.

Unlike OLS regression, however logistic, egression does not assume linearity of relationship between the independent and the dependent variable, does not require normality distributed variables, does not assume homoscedasticity, and in general has less stringent requirement (Homer and lemesh Logistic regression model solves this problem by determining the 'odds' of 1 or 0. For e.g. if the odds of 1 are higher than the odds of 0, then we would expect a 1 and not a 0. This is accomplished by estimating something called the Log Odds Ratio, which is just the log of the odds of 1 divided by the odds of 0. Since odds are a probability; you have a ratio of 2 positive numbers, which has a maximum value of +infinity. The log of a positive number can have a value between –infinity and + infinity, which removes the upper and lower bound on the dependent variable, which can now be estimated by a regular regression model. [24]

The likelihood function for $(\beta_0, \beta_1, \beta_2, \ldots, \beta_k)$ given $(y_1, \ldots, y_n)$ can be expressed as

$$L(\beta_0, \beta_1, \beta_2, \dots, \beta_k | y_1, \dots, y_n) = \prod_{i=1}^{n} p_i (1-p_i)^{1-y_i}$$

By substituting $P_i = P(Y = 1|x_{1i}, \dots, x_{ki})$ given above, we obtain

$$L(\beta_0, \beta_1, \beta_2, \dots, \beta_k | y_1, \dots, y_n) = \prod_{i=1}^{n} \left\{ \left[\frac{exp(\beta_0 + \sum_{j=1}^{k} \beta_j x_{ji})}{1 + exp(\beta_0 + \sum_{j=1}^{k} \beta_j x_{ji})} \right]^{y_i} \left[\frac{1}{exp(\beta_0 + \sum_{j=1}^{k} \beta_j x_{ji})} \right]^{1-y_i} \right\}$$

Binary Logit Model or Logistic Regression model is used when the dependent variable is not continuous but instead has only two possible outcomes, 1 or 0. This model is typically used when predicting an event which has two possible outcomes.

Binary logit models in business are most popularly used in direct marketing, to identify who is most likely to respond to an offer (dependent variable is 'Will Respond=1' and 'Will Not Respond=0'). The model is compared to a base model that is expected to capture 10% of responders in each decile. In this study the logistic regression have multiple independent variables, in which all are categorized in to k levels. The dependent variables are explained by the odd ratio of the explanatory variables.

We use the concept of odds ratio to interpret the parameters in logistic regression model. The odds of Y=1 vs. Y=0 for a given set of predictor variables $(x_1, x_2, x_3, \dots, x_k)$ is denoted by

$$odds(x_1, x_2, \dots, x_k) = \frac{Pr(Y = 1|x_1, x_2, \dots, x_k)}{Pr(Y = 0|x_1, x_2, \dots, x_k)}$$

and substituting the appropriate values give

$$odds(x_1, x_2, \dots, x_k) = exp\left(\beta_0 + \sum_{J=1}^{k} \beta_j x_j\right)$$

Assumptions in Logistic Regression

- The dependent variable must be a dichotomy (2 categories) for bivariate logistic regression model.
- Linear relationship between the logit (natural log of the odds of the dependent occurring or not) and the set of predictors.
- The distribution of the response variable need not be normal but within the range of the exponential family of distributions.
- There should be meaningful coding of variables.

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4. Analysis and Discussion

4.1. Descriptive Results of Determinants of Child Mortality in Arba Minch Hospital from 2012-2013

The major objective of this study is to determine basic factors affecting child mortality in Arba Minch Hospital. Based on the descriptive results presented on Table 4.1 about 140 children are considered for determining Child Mortality in Arba Minch Hospital from the year 2012-2013 G.C. accordingly, about 74(52.9%) children in this study resides in rural areas where as about 66 (47.1%) children resides in Urban areas. Based on the type of dirking water classified, about 40(28.6 percent) of children drinks water which are unprotected water the rest 100(71.4 percent) children drinks water from pipe with respect to the mothers educational level around 13 (9 percent) children considered in this study are born with a mother having no education, 47(33.6 percent) children are born with a mother having learn up to primary educational level. According to gender of children about 61(43.6 percent) children consider in this study are born with mother having female, whereas about 79(56.4 percent) children are male.

Table-4.1. Descriptive results of determinants of Child Mortality in Arba Minch Hospital

Variable		Frequency	Percent			Frequency	Percent
Place of residence	Rural	74	52.9	Gender of Child	Female	61	43.6
	Urban	66	47.1		Male	79	56.4
	Total	140	100.0		Total	140	100.0
Mother Educ.	No education	13	9.3	Type of D.Water	Other	40	28.6
	Primary	47	33.6		Pipe water	100	71.4
	Secondary and higher	80	57.1		Total	140	100.0
	Total	140	100.0				

4.2. Logistic Regression Analyses for of Determinants of Child Mortality in Arba Minch Hospital from 2012-2013

According to the omnibus tests of model coefficients table 4 indicates that, when we consider age, sex, house holed size, breastfeeding ,place of residence drink water, mother education together, the model is significant (chi-square = 51.2, *df*= 7, *n*= 140,*p* < .001). The model summary table includes two different ways of estimating *R2* (percent of variance accounted for) as was done in multiple regression. These "pseudo" *R2* estimates indicate that approximately 47% of the variance in whether or not child took child mortality can be predicted from the linear combination of the variables age, sex, house holed size, breastfeeding ,place of residence drink water, mother education together. From the classification table 4.2 that, overall, 86.4% of the participants were predicted correctly. Age, sex ,drink water, house hold size, breast feeding mother education level, place of residence variables were better at helping us predict who would *not* live child mortality 56.3% correct than at who would take it (95.4% correct).

Table-4. Omnibus tests of model coefficients

		Chi-square	Df	Sig.
Step 1	Step	51.186	11	.000
	Block	51.186	11	.000
	Model	51.186	11	.000

Table-4.2. classification table (a) of child mortality in Arba Minch hospital

Observation		Predictor		
		Death status		Percentage correct
		Live	Died	
Death status	Live	18	14	56.3
	Lied	5	103	95.4
Over all percentage		23	117	86.4

The categorical variables coding table in the appendix shows that categories have parameter coding values 0.000 are the reference categories and this implies that all the first categories are references of the rest. from table 4.3, those 140 children included in the study 77.1% are alive and 22.9% are not alive. This shows the percentage of correct predictions (77.1%) if all of the child mortality were predicted to be in the larger group. The first variables (age) in the equation table shows that if you predicted that all children would not live in child mortality the odds of successful prediction would *be* significantly.

Table-4.3. classification table of child mortality of death status.

Observed		Predicted		
		Death status		Percentage correct
		Died	Live	
Death status	Died	0	32	22.9
	Live	0	108	77.1
Over all percentage				100.0

Logit (π(x)) = ln {π(x) /1-π(x)} =13.237 -.416 mother age -1.177 sex of child -1.863 house hold size +2.170 drink water -1.367 place of residence -1.808 mother education.

This logistic regression model is constructed in order to determine how the age of mother, sex house hold size, drink water, place of residence status of the child affect under five mortality.

From the table 4.4 output we conclude based on p-value that the p-value of 0.003 for the mother age indicates that there is significant effect of this on less than five mortality. The p- value of 0.041 for the first sex category (sex 1) indicates that illiteracy has significant effect on mortality of less than five. The p-value of 0.032 for the first mother's education level category (mother education level primary) indicates that children mortality is also significantly affected when the education level of their mothers is primary.

The p- value of 0.035 for the first place of residence category urban (residance1) indicates that there is a significant effect of low living standard of family on under five mortality. The p- value of 0.049 for the first house hold category indicates that greater than 2 have significant effect on mortality of under five. The p –value of 0.004 the effect of drink water is significant of child mortality. Finally the constant term is significant, because of its p-value is smaller than that of the significance level, 5%.it means that about 13.237 women's use family planning by eliminating other factors on average.

This all interpretation are depend on the p-value and for those are significant (p-value< α =0.05) only.

The value of odds ratio exp (b) =.660 for mother age in the output indicates that under five mortality for mothers age 0.66 times less than that of the mother age. The odds ratio of mother education category two which is 0.164

indicates that mortality of children for the third category of mother's education is 0.164 times less than first category but first category is not significant. Exp(b)=.255 for place of residence category one indicates that under five mortality for children under urban is 0.255 times those children under rural area. The estimated odds ratio of 0.308 for gender category one (male) is 0.308 times greater than gender category two (female). Exp(b) =0.155 for house holed size category one indicates that under five mortality for children under 2-4 family size is 0.155 times less than those of category two but third category is insignificant . The estimated odds ratio of 8.762 for drink water category one is 8.762 times greater than drink water category two. Thus all odd ratios are calculated by using the first category of every variable as reference.

Table-4.4. logistic regression parameter estimates for determinants of child mortality in Arba Minch hospital.

variables		B	S. e	Wald	Df	Sig	Exp(b)	95% c.i for Exp(b)	
								lower	upper
Age	Age	-.416	.139	8.93	1	.003	.660	.503	.866
Sex	**Sex 1**	-1.177	.576	4.169	1	.041	.308	.100	.954
Household size	**Household size**			6.028	2	.049			
	Household size(1)	-1.864	.763	5.965	1	.015	.155	.035	.692
	Household size(2	-1.048	.751	1.948	1	.163	.351	.081	1.528
Beast feeding	**Beast feeding**			3.942	3	.268			
	Beast feeding(1)	1.514	.906	2.792	1	.095	4.543	.770	26.812
	Beast feeding(2)	.907	.991	.838	1	.360	2.477	.355	17.268
	Beast feeding(3)	.308	1.022	.138	1	.710	1.462	.197	10.845
Drink water	**Drink water(1)**	2.17	.774	8.516	1	.004	8.762	2.040	37.639
	Mother education			4.895	2	.087			
Mother education	Mother education(1)	-1.808	.843	4.596	1	.032	.164	.031	.856
	Mother education(2)	-.38	.585	.004	1	.949	.963	.306	3.029
Place of residence	**Place of residence(1)**	-1.3667	.647	4.459	1	.035	.255	.072	.906
	constant	**13.237**	3.99	10.956	1	.001	560938.318		

Tests of significance of all parameters

H_0: $b_i=0$ for all i's versus H_1:$b_i\neq 0$ at least one i

Thus from the output of table 4.5 implies that all significant values are small suggests us to reject the null hypothesis and to conclude that all model parameters are different from zero.

Table-4.5. omnibus tests of model coefficient for determinants of child mortality in Arba Minch hospital

		Chi- square	Df	Sig
Step 1	Step	51.1	11	0.00
	Block	51.1	11	0.00
	Model	51.1	11	0.00

Thus goodness of any model is tested by using hosmer and lemshow test of goodness. The output shows that for testing a hypothesis of H0 : the model fit the data well versus H_1 : not H_0. The test statistics and decision rule reject H0 when p-value < 0.05 unless accept it. Thus the significance for hosmer and lemshow is 0.638 greater than 0.05 implies accept the null hypothesis. Therefore we can conclude that the model fits the data well.

Table-4.6. Homers and lemeshow test for determinants of child mortality in Arba Minch hospital

step	chi-square	Df	Sig
1	6.082	8	0.638

4.3. Discussion

According to Hala [17] applied duration modeling to assess the impact of water and sanitation on child mortality in Egypt. Results show that access to municipal (metropolitan) water decreases sanitary risks. I compared to my results from Hala of drink water there is similar impact in child mortality from the result I identified rural area children are more affected by unclean water where as urban area children are fewer affected by pipe water. Based on Goro [10] in Ghana to examine the determinants of infant and child mortality found that education of mothers, birth order of child and marital status of mothers are powerful significant determinants for child mortality, while only mothers education have a significant impact for child mortality other researcher Kumar and Gemechis [13] to examine the selected socioeconomic, bio-demographic and maternal health care factors that determine child mortality in Ethiopia. The result show that among socioeconomic variables birth interval with preceding birth and mothers education have significant impact to lowering the risk of child mortality but child mortality in Arba Minch hospital descriptive and inferential result is little bit difference to Kumar and Gemechis mother education result where as Goro‘s result is similar Impact of child mortality in Arba Minch hospital.

5. Conclusions and Recommendations

5.1. Conclusions

The objective of this study has empirically investigated and determines basic determinants of child mortality in Arba Minch Hospital in the year of 2012 _ 2013 using logistic regression method. Based on this study source of drink water mother age, education level of mother, place of residence, and sex of the child are more important determinants for under five mortality in Arba Minch Hospital. On the other hand, the relationship between mother’s literacy and child mortality is expected and also significant by Hill, *et al.* [20] found that mother’s educational levels and economic status have a significant impact on child mortality while urban areas are associate with high risk of child mortality than rural areas, however, Hill’s study is similar to educational level but place of resident is opposite to my result. From my study result I conclude that controlling HIV prevalence child mortality are lower in urban areas generally child mortality in urban areas is lower than rural areas. This significant effect of mother’s literacy might be due to the correlation with other variables. From conclusion, government policy should be focus on the above important determinants of child mortality and in the remaining years, health intervention policies should revise and implement to achieve the Millennium Development Goals of reducing child mortality.

5.2. Recommendations

Based on this study’s findings, we make the following recommendations for Arba Minch Hospital and concerned policy makers and bodies:

- The policies and efforts have to be put in place to improve women education. Since women are the primary caretakers of child mortality, they should be empowered through education, so that the health of their children will be enhanced.
- The administer should work closely with both the private sector and civil society to teach households to have sufficient knowledge and awareness on under five mortality and mechanisms of reduction and moreover to make children very well and strong risk takers of tomorrow’s Arba Minch.
- The study shows that mother’s education level can influence under five - mortality and, therefore, these major determinants must be addressed in Arbaminch sustainable preventive interventions.

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