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# Socioeconomic Determinants Of Child Mortality Among Liberian Rural Households In Margibi County

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## Abstract

The child mortality rate is a vital indices of socioeconomic development and the value of life in Liberia. Liberia is among the countries that rank highest in records of child mortality in Africa. Therefore, this study aimed at identifying the socioeconomic factors of child mortality in Liberia. The study employs use of primary data that were collected from some selected three rural communities in Kakata, the capital of Margibi County of Liberia. A total of 137 households were sampled through simple random and purposive sampling technique. The data collected include household socioeconomic data such as age, sex, education, marital status, and occupation of both the household head and mother. Others are household income, household size, and distance of residence to nearest health facility. Binary logit regression model was used for analyzing the data. The study discovered that age of household head, educational attainment of the mother, and household wealth status have inverse relationship with incidence of child mortality. On the other hand, distance to healthcare facility, household size and dependence on streams and unprotected well as source of water have direct relationship with occurrence of child mortality in the study area. It was concluded that government should ensure establishment of adequate health facilities in rural communities, portable sources of water, and female gender education; while households should embark on family planning program for better livelihoods for their children.

**Keywords:** Child mortality; rural household; socioeconomic factors; Margibi County.

## Background of the study

The child mortality rate is an indicator of child health as well as the overall development and well-being of a population. Infant and child mortality rates reflect the prevailing health conditions in a society; they measure the success of health programs and policies aimed at their education. The World Summit for Children, held in 1990, instituted a package of objectives for implementation by the year 2000. Among these objectives was the aim to reduce infant and under-five mortality by one third or to 50 and 70 deaths per 1000 births, respectively, whichever was less (Ariunaa, 2002). This was reaffirmed at the 1994 International Conference on Population and Development (ICPD) (United Nations, 1999).

One of the priorities of the Sustainable Development Goals is reduction of the child mortality rate of 25 or fewer deaths per 1000 live births by 2030 (United Nation, 2016). Over the past 25 years progress has been made globally in reducing child mortality rate by 51%, from 91 deaths per 1000 live births in 1990 to 43 in 2015 (United Nation, 2015). However, the global decline of child mortality fell short of the two-thirds reduction envisaged in the Millennium Development Goals era (UNICEF, World Health Organization, World Bank Group, 2015). Many low-income countries in Sub-Saharan Africa and South Asia continue to face high rates of child mortality estimated at 83 and 51 per 1000 live births in 2015, respectively (UNICEF, 2015; Grusovin et al., 2009).

In many countries affected by war, the risk of child mortality was found to be 80 times higher than those countries not affected by war (UNICEF, 2015; Grusovin et al., 2009). According to World Bank estimates, of the 20 countries with the highest child mortality rate in the world, nine were from war-torn countries including South Sudan (UNICEF, 2015).

Promiserenewed (2011) gave Liberia child mortality rate as 68 out of 1000 live births; according to Promiserenewed (2011), Liberia ranks 3rd among the countries with highest child mortality rates globally, after Lao PDR and Timor-Leste. According to World Population Review (2022), Liberia's child mortality rate was 58.15 with the country having 12th highest child mortality rate globally. This seemed to be a reduction, however, it is much higher than the African average of 20.35. The irony of the fact is that none of Lao PDR and Timor-Leste remain in the worst 30 countries, which are mainly African countries. These could not unconnected to the aftermath of 14 year civil war and the incidence of Ebola that ravaged the country.

In order to address the social determinates of health inequality that are preventable, avoidable and unfair, the WHO established the Commission on Social Determinants of Health as a global strategic mechanism to address the problems associated with health equity (Solar and Irwin, 2010). According to the WHO model, the chance of dying in childhood is strongly determined by the living conditions into which the child is born and the systems in place to deal with illness (Commission on Social Determinants of Health (CSDH), 2008; Solar and Irwin, 2010). For example, the probability of dying in childhood is strongly related to remoteness, rural dwelling and the socioeconomic position of the parents or household (Khadka et al. 2011; Houweling and Kunst, 2010). These factors are further shaped by the socioeconomic and political mechanisms, such as macroeconomic policy. Therefore, social and economic policies have a determining impact on whether a child can develop to her/his full potential and live and flourish or whether her/his life will be withered (Commission on Social Determinants of Health (CSDH), 2008).

Past studies from the post conflict settings indicate that children are particularly vulnerable to the consequences of violence, poverty, being a child solider, landmine injuries and mental health impairment (Macassa et al, 2003; Avogo, 2010; Arnaldo, 2014) which might increase their risk of

mortality. Therefore, examining child mortality in the post conflict and post Ebola settings of Liberia is a valid indicator for monitoring child health and survival, and for developing programs aimed at improving access to evidence-based interventions for child health. This study aims to identify factors associated with child mortality in Liberia. Findings from this study will enable policymakers and public health practitioners to develop cost-effective lifesaving interventions targeting the subpopulation of children at risk.

The high level of child mortality rates, call for the identification of the main causes of this phenomenon. Moreover, there is a dearth of community studies on infant and child mortality. The main objectives of this study were to determine the factors determining child mortality rates in Liberia.

### Statement of problems

Previous studies have shown that short birth intervals, high parity, low maternal age and high maternal age adversely impact infant and child mortality (Bicego 1990; Zerai 1996; Manda 1999). Socioeconomic variables such as wealth status determine the availability of nutritional resources, which is especially important because once infants reach the age of 6 months; they can no longer depend on nourishment from breast milk alone. Also, mother's education has been found to be important because it facilitates her integration into a society impacted by traditional customs, colonialism, and neo-colonialism. Education heightens her ability to make use of government and private health care resources and it may increase the autonomy necessary to advocate for her child in the household and the outside world (Caldwell 1989). However, the level of education had been generally poor in Liberia. Moreover, distinct childhood mortality differentials by place of residence (rural-urban) have been observed in some African countries (Zimbabwe Central Statistical Office/ Macro International Inc, 2007). These mortality differences are a result of regional differences in health infrastructure, and communication and disease prevalence conditions. Place of delivery is also an important determinant of mortality, particularly neonatal mortality. Children delivered in modern health facilities usually exhibit lower rates of mortality. However, in some cases, mortality among children delivered in modern facilities is observed to be higher because mothers use these facilities mostly when they have pregnancy complications. Moreover, in Liberia, household contamination is still a big problem. Pipe-borne water is scarcely come by to households. Major sources of water are boreholes, unprotected wells and streams. Sanitation measures are grossly inadequate. Improvements in hygienic sanitation facilities lower mortality through the mechanism of less exposure of children to contamination making them less susceptible to disease and eventually death. Only less than 50 percent of households in Liberia have access to improved toilet facilities (Kamanda et al. 2022). This evidence confirms the importance of the study of determinants of child mortality. Therefore, this study focuses on rural communities which are usually known to be at the receiving end of dearth of modern infrastructures. It is against this background that this paper study the selected socio-economic variables in order to determine their impact on child mortality in Margibi County of Liberia.

## 2. METHODOLOGY OF THE STUDY

### 2.1 The study area

Margibi is a county on the north to central coast of Liberia. It is one of 15 counties that constitute the first-level of administrative division in the country. Margibi has five districts, with Kakata as the capital. The county has an area of 2,616 square kilometres (1,010 sq mi) (Liberia Institute of Statistics and Geo-information

Services 2009). The 2008 Census put the county's population to be 199,689, making it the sixth most populous county in Liberia (Liberia Institute of Statistics and Geo-information Services 2009). The county is bordered by Montserrado County to the west, Grand Bassa County to the east, and Bong County on the north. The southern part of Margibi lies on the Atlantic Ocean.

Rice and cassava interplanted with Sugarcane are the major crops grown in the region. The northern or the upper part of the highland has tropical forest which is usually 30 m (98 ft) above the mean sea level. The regions receive a bimodal rainfall with a gap of two weeks in between. Cocoa, coffee, rubber, citrus, and oil palm are the most common crops in the region (Food and Agricultural Organization, 2016).

As of 2008, the county had a population of 209,923: 105,840 male and 104,083 female (Liberia Institute of Statistics and Geo-information Services 2009). The number of households during 2008 was 19,254 and the average size of the households was 4.6 (Liberia Institute of Statistics and Geo-information Services 2009). The population was 7.20 per cent of the total population (Liberia Institute of Statistics and Geo-information Services 2009). Liberia experienced civil war during various times and the total number of people displaced on account of wars as of 2008 in the county was 46,663 (Liberia Institute of Statistics and Geo-information Services 2009). The number of people residing in urban areas was 88,868, with 43,723 males and 45,145 females. The total number of people in rural areas was 121,055, with 62,117 males and 58,938 females. The total fraction of people residing in urban areas was 42 per cent, while the remaining 58 per cent were living in rural areas. The number of people resettled as of 2008 was 29,813 while the number of people who were not resettled was 1,754 (Liberia Institute of Statistics and Geo-information Services 2009). The number of literates above the age of ten as of 2008 was 55,994 while the number of illiterates was 39,112 making the literacy rate to 58.88. The total number of literate males was 33,596 while the total number of literate females was 22,398 (Liberia Institute of Statistics and Geo-information Services 2009). Around 90% of the county's population are Christians, 5% are Muslims, and 5% is Animist (Government of Liberia, 2008).

## 2.2 Sampling techniques

The study was carried out in the rural communities of Kakata, which comprises of six rural communities. These are: 26 Gate, Bright Farm, Cooper Farm, Gola Napola, Money Sweet, David Cooper Farm, Kollie, Holder Farm and Lahai. For the purpose of this study, three of these communities were randomly selected for data collection. The selected communities were 26 Gate, David Cooper Farm and Kollie.

A sample size of 137 households were selected for the study using simple random sampling. These were selected from the total number of households that were having children from age 5 downward. However, for ease of analysis, purposive sampling was introduced to obtain n>30 households that witnessed child mortality within the last 2 years. The household heads or any other household member that could offer adequate information on behalf of the household were selected as respondents for the data collection. A structured questionnaire as well as scheduled interview were used for data collection. The data collected include the demographic characteristics of the parents and their respective households. A total of 150 questionnaire were administered, but only 137 were useful for the study. This gave a success rate of 91.3%.

## 2.3 Analytical techniques

This study adopted modified McCarthy and Maine's framework. The study examines the socioeconomic determinants of child mortality in rural Kakata in Margibi County. Households that have at least one child that was 5 years old or younger were included in the study. Also included were households that have at one deceased child within the last 2 years. These were identified through the help of health centers within the community and snowball sampling.

The data required for the study include household wealth status, gender of the household head, education of the household head, religion, maternal education, maternal marital status, household size, paternal occupation, vaccination of child, main source of drinking water, availability of electricity, type of toilet facility, household income and type of health delivery system used by household.

After gathering the responses from the households, the Statistical Package for Social Sciences (SPSS Version 20.0) was used for data analysis. Frequencies and percentages were computed for categorical variables, and bivariate analysis association was examined using the binary logistic regressions. Statistical significance was tested at 0.05 level of significance.

## Theoretical background

For this study, binary logistic function will be employed for the data analysis. The explanation of logistic regression can begin with an explanation of the standard logistic function. The logistic function is a sigmoid function, which takes any real input t, and outputs a value between zero and one (Hosmer, 2000). For the logit, this is interpreted as taking input log-odds and having output probability. The standard logistic function $\sigma$: $R \rightarrow (0,1)$ is defined as follows:

$$\sigma(t) = \frac{e^t}{e^t + 1} = \frac{1}{1 + e^{-t}}$$

(equation 1)

Let us assume that t is a linear function of a single explanatory variable x (the case where t is a linear combination of multiple explanatory variables is treated similarly). We can then express t as follows:

$$t = \beta_0 + \beta_1 x$$

(equation 2)

And the general logistic function $\rho$: $R \rightarrow (0,1)$ can now be written as:

$$\rho(x) = \sigma(t) = \frac{1}{1 + e^{-(\beta 0 + \beta 1 x)}}$$

(equation 3)

In the logistic model, $\rho(x)$ is interpreted as the probability of the dependent variable Y equaling a success/case rather than a failure/non-case. It is clear that the response variables $Y_i$ are not identically distributed: $P(Yi = 1 \mid X)$ differs from one data point Xi to another, though they are independent given design matrix X and shared parameters $\beta$ (David, 2009).

If there are multiple explanatory variables, the expression $\beta_0 + \beta_1 x$ can be revised to

$$\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots. + \beta_n x_n = \beta_0 + \sum_{i=1}^{m} \beta_i x_i$$

(equation 4)

Then when this is used in the equation relating the log odds of a

success to the values of the predictors, the linear regression will be a multiple regression with m explanators; the parameters $\beta_j$ for all $j = 0,1,2,\ldots,m$ are all estimated.

Again, the more traditional equations are:

$$\log \frac{\rho}{1 - \rho} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots. + \beta_m x_m$$

(equation 5)

and

$$\rho = \frac{1}{1 + b^{-(\beta 0 + \beta 1x1 + \beta 2x2 + \ldots. + \beta mxm)}} \quad \text{(equation 6)}$$

where usually b = e.

### 2.3.1 Variables and their measurements

Y: Occurrence of child mortality was the dependent variable for this study. This is a dummy variable. Death of at least a child in the household = 1; otherwise (non-occurrence of such death) = 0.

Explanatory variables include the following:

$X_1$: Age of household head (if not mother) (in years).

$X_2$: Age of mother (in years).

$X_3$: Sex of household head is measured as dummy variable: male = 1; female = 0

$X_4$: Distance of household to the nearest modern health facility in kilometer.

$X_5$: Maternal marital status was categorized as "single", "married", "divorced", or "widow". These are measured as dummy variables.

$X_6$: Household size is measured as number of individuals living under same roof.

$X_7$: Religion was categorized as "Christians", "Muslims" and "Traditional". These are measured as dummy variables.

$X_8$: Household income was measured in monetary terms as total household expenses per month (USD).

$X_9$: Possession of formal education was scored with years spent in formal institution of formal education as follows: individuals with no formal education = 0; primary education = 6; secondary education = 12; tertiary education = 17. The figures represent the years spent in educational institutions.

$X_{10}$: Paternal occupation: this is measured as dummy variable. Employed = 1; otherwise = 0.

$X_{11}$: For wealth status, poor household = 1; household belonging to middle class = 2; while rich household = 3.

$X_{12}$: Completion of vaccination of children age 5 and below, measured as: complete vaccination = 3; incomplete = 2; no vaccination = 1.

$X_{13}$: The source of water was classified as "stream", "unprotected well", and "borehole". These are measured as dummy variables.

$X_{14}$: The type of house is measured as dummy variable for each of these housing types: zinc house; story building; mud house with zinc roof; incomplete building; concrete house with zinc roof.

$X_{15}$: Availability of electricity measured as dummy variable: available = 1; otherwise = 0.

$X_{16}$: Type of toilet facilities. These are classified as "No facility (use of bush/open field)", "Pit latrine", and "Flush toilet". These are measured as dummy variables.

$X_{17}$: Type of health delivery system used by household. These are classified as "no health facility", "hospitals/clinics", and "trado-medicals". These are measured as dummy variables.

## RESULTS AND DISCUSSION

Table 1 presents the characteristics of the selected households in the area of study.

**Table 1. Percent distribution of respondents' characteristics by child survival in the study area**

| Variables | Child is Alive | | Average |
|---|---|---|---|
| | Yes | No | |
| **Age of household head** | | | 44.5±7.9 |
| 20–29 | 6 (75.0%) | 2 (25.0%) | |
| 30–39 | 25 (83.3%) | 5 (16.7%) | |
| 40–49 | 53 (86.9%) | 8 (13.1%) | |

| | | | |
|---|---|---|---|
| 50–59 | 21 (80.8%) | 5 (19.2%) | |
| 60 and above | 9 (90.0%) | 1 (10.0%) | |
| **Age of mother** | | | 32.4±5.7 |
| 20–24 | 17 (81.0%) | 4 (19.0%) | |
| 25–29 | 45 (81.8%) | 10 (18.2%) | |
| 30–34 | 48 (88.9%) | 6 (11.1%) | |
| 35–39 | 4 (80.0%) | 1 (20.0%) | |
| 40 & above | 2 (100.0%) | 0 (0.0%) | |
| **Sex of household head** | | | |
| Male | 85 (87.6%) | 12 (12.4%) | |
| Female | 31 (77.5%) | 9 (22.5%) | |
| **Distance to Healthcare Facility (km)** | | | |
| < 1 | 31 (91.2%) | 3 (8.8%) | |
| 1 – 2 | 32 (84.2%) | 6 (15.8%) | |
| 3 – 4 | 50 (83.3%) | 10 (16.7%) | |
| 5 & above | 3 (60.0%) | 2 (40.0%) | |
| **Mother's marital status** | | | |
| Single | 4 (100.0%) | 0 (0%) | |
| Married | 108 (85.0%) | 19 (15.0%) | |
| Divorced/Separated | 2 (66.7%) | 1 (33.3%) | |
| Widowed | 2 (66.7%) | 1 (33.3%) | |
| **Household size** | | | 5.2±3.4 |
| 1-3 | 31 (88.6%) | 4 (11.4%) | |
| 4-6 | 50 (86.2%) | 8 (13.8%) | |
| 7-9 | 21 (84.0%) | 4 (16.0%) | |
| 10 & above | 14 (73.7%) | 5 (26.3%) | |
| **Religious Affiliation** | | | |
| Christianity | 82 (87.2%) | 12 (12.8%) | |
| Islam | 31 (77.5%) | 9 (22.5%) | |
| Traditional worshippers | 3 (100.0%) | 0 (0%) | |
| **Household income** | | | 152.17±36.42 |
| 0-99 | 66 (84.6%) | 12 (15.4%) | |
| 100-199 | 40 (83.3%) | 8 (16.7%) | |
| 200-299 | 8 (88.9%) | 1 (11.1%) | |
| 300 & above | 2 (100.0%) | 0 (0.0%) | |
| **Father's Educational Attainments** | | | |
| No education | 6 (75.0%) | 2 (25.0%) | |
| Primary | 10 (83.3%) | 2 (16.7%) | |
| Secondary | 33 (82.5%) | 7 (17.5%) | |
| Post-secondary | 30 (83.3%) | 6 (16.7%) | |
| Vocational | 37 (90.2%) | 4 (9.8%) | |
| **Mother's Educational Attainment** | | | |
| No education | 2 (66.7%) | 1 (33.3%) | |
| Primary | 34 (87.2%) | 5 (12.8%) | |

| | | |
|---|---|---|
| Secondary | 39 (81.3%) | 9 (18.7%) |
| Post-secondary | 31 (88.6%) | 4 (11.4%) |
| Vocational | 10 (83.3%) | 2 (16.7%) |
| **Father's Occupation** | | |
| Unemployed | 38 (86.4%) | 6 (13.6%) |
| Employed | 78 (83.9%) | 15 (16.1%) |
| **Mother's Occupation** | | |
| Unemployed | 11 (78.6%) | 3 (21.4%) |
| Employed | 105 (85.4%) | 18 (14.6%) |
| **Household wealth status** | | |
| Poor | 87 (87.0%) | 13 (13.0%) |
| Middle class | 21 (75.0%) | 7 (25.0%) |
| Rich | 8 (88.9%) | 1 (11.1%) |
| **Vaccination of child** | | |
| Complete | 76 (87.4%) | 11 (12.6%) |
| Incomplete | 32 (86.5%) | 5 (13.5%) |
| No vaccination | 8 (61.5%) | 5 (38.5%) |
| **Source of water** | | |
| Stream | 27 (79.4%) | 7 (20.6%) |
| Unprotected well | 14 (73.7%) | 5 (26.3%) |
| Protected well | 54 (88.5%) | 7 (11.5%) |
| Borehole | 21 (91.3%) | 2 (9.7%) |
| **Type of house** | | |
| Zinc house | 36 (83.7%) | 7 (16.3%) |
| Mud house with zinc roof | 30 (83.3%) | 6 (16.7%) |
| Incomplete building | 44 (86.3%) | 7 (13.7%) |
| Concrete house with zinc roof | 6 (85.7%) | 1 (14.3%) |
| **Availability of electricity** | | |
| Available | 33 (78.6%) | 9 (21.4%) |
| Unavailable | 83 (87.4%) | 12 (12.6%) |
| **Type of toilet** | | |
| No facility (bush/open field) | 61 (88.4%) | 8 (11.6%) |
| Pit latrine | 35 (77.8%) | 10 (22.2%) |
| Flush toilet | 20 (87.0%) | 3 (13.0%) |
| **Type of health patronage** | | |
| None | 69 (84.1%) | 13 (15.9%) |
| Hospital/Clinic | 25 (86.2%) | 4 (13.8%) |
| Trado-medicals | 22 (84.6%) | 4 (15.4%) |

Table 1 shows the descriptive statistics of the socioeconomic characteristics of households that experienced child mortality in the study area. The result revealed that out the sampled households, the households whose heads fell within age 50-59 years witnessed highest mortality rate (19.2%). Similarly, mothers within age range of 20-24 and 35-39 years witnessed highest child mortality.

Female headed households had higher level of child mortality than male headed households. This implies that too early or late motherhood could be at the detriment of the child upbringing and livelihood. Table 1 further shows that households that were farther away from healthcare centers observed higher rates of child mortality. The result implies that the farther away from the health center, the more the tendency of increase in child mortality. Considering the marital status of the mother, it is observed that mothers that were separated from their husbands either by physical separation or death, had higher rates of child mortality compared to those that were still married to their husbands. This implies that the physical presence of the two parents is critical to the upbringing and livelihood of the child. Households that had larger sizes observed higher rates of child mortality compared to those with smaller sized households. Muslim households in the study area witnessed higher child mortality rate than households of other religions. Child mortality was more common among households that earned low monthly income. About 92% of the households earned less than USD200 per month. Liberia Institute of Statistics and Geo-information Services (2009) state that average household size in Margibi County was 4.6. Hence, an average household would live below poverty line of USD1.00. Moreover, households whose fathers and mothers had no formal education were observed to have higher child mortality rate than any other household. Households whose parents had higher level of education were observed to have low child mortality rate. This implies that education has positive influence on child upbringing and livelihood. The result further shows that non-working mothers witnessed more child mortality than non-working fathers. This implies that mother's employment status in a household is more influential on the livelihood of a child compared to father's employment status. Naturally, mothers are more concerned about the welfare of her child than anyone else in a household. Child mortality rate was highest among middle class households, but lowest among rich families. It is expected that such kind of mortality would be lowest among rich families. However, it is unexpected that middle class households would have higher child mortality than poor families. With the categorization of households based on vaccination programs, households that did not follow vaccination programs were observed to have highest child mortality rate. This implies that immunization programs is very important for child livelihood. Furthermore, households that depended on streams and unprotected well as sources of water witnessed higher child mortality than those that made use of protected well and borehole. All the types of houses inhabited by families have roughly similar levels of child mortality. Households with mud and zinc houses had slightly higher mortality rate than others. Families that had access to electricity witnessed higher child mortality rate than those with no access to electricity. This implies that availability of electricity might not be important in the livelihood of a child in the study area. Households that used pit latrine were observed to have highest child mortality rate compared to households with no toilet facility. This is unexpected but not impossible, especially if the pit latrines are not kept in hygienic conditions. Lastly, households that did not patronize hospitals or clinics during periods of illness were observed to witness highest rate of child mortality; this was followed by those that patronized trado-medical practitioners. This implies that visiting health centers during child illness is very crucial in saving the lives of household children.

**Socioeconomic factors that determine the child mortality in the study area**

**Table 2. Socioeconomic determinants of child mortality in the study area**

| Variables | Coefficient | Sig. |
|---|---|---|
| Age of household head | -0.029 | 0.047** |
| Age of mother | -0.012 | 0.307 |
| Sex of household head | 0.327 | 0.420 |
| Distance to Healthcare Facility (km) | 0.808 | 0.036** |
| Mother's marital status | -0.405 | 0.421 |
| Household size | 0.702 | 0.066* |
| Household income | 0.000 | 0.187 |
| Father's Educational Attainments | 0.301 | 0.532 |
| Mother's Educational Attainment | -0.516 | 0.034** |
| Father's Occupation | 0.277 | 0.177 |
| Mother's Occupation | -0.194 | 0.233 |
| Household wealth status | -0.326 | 0.082* |
| Child vaccination | -0.367 | 0.382 |
| Source of water | | |
| Stream | 0.874 | 0.061* |
| Unprotected well | 1.043 | 0.056* |
| Protected well | 0.475 | 0.322 |
| Borehole | 1.379 | 0.178 |
| Type of house | | |
| Zinc house | -0.114 | 0.380 |
| Mud house with zinc roof | -0.481 | 0.644 |
| Incomplete building | -0.163 | 0.382 |
| Concrete house with zinc roof | 0.475 | 0.189 |
| Availability of electricity | 0.721 | 0.149 |
| Type of toilet | | |
| No facility (bush/open field) | 0.073 | 0.529 |
| Pit latrine | 0.719 | 0.230 |
| Flush toilet | 0.574 | 0.229 |
| Type of health patronage | | |
| None | 0.679 | 0.788 |
| Hospital/Clinic | -0.076 | 0.643 |
| Trado-medicals | 0.307 | 0.158 |
| Constant | 9.922 | 0.077 |

NB: ** 0.05 significance level; *0.10 significance level

Table 2 shows the factors that determine child mortality among the sampled households in the study area. These factors were significant at 5% and 10% significance levels. They include age of the household head, proximity to healthcare facility, household size, mother's educational level, household wealth status, and source of water.

From the logistic regression result, it is observed that higher mortality was associated with households that had younger household heads. This may be plausible due to inexperience in

parentage. It is assumed that age is correlated with experience. The result shows that the households headed by younger leader is about three times more susceptible to child mortality than households headed by older person.

Proximity to healthcare facility significantly contributed to child mortality in the households. Households that were farther away from hospitals or clinics had higher tendency to witness child mortality than households that were nearer to such healthcare facilities. The result shows that every kilometer distance away from healthcare facility tends to result in more than 2 times susceptibility to child mortality in the household.

Furthermore, large households tend to experience child mortality than smaller households. The result suggests that an increase in household size by a member results in about twice susceptibility to child mortality. This implies that keeping a moderate household size would enhance the livelihoods of its members, especially the children.

The level of education of the mother in the household has been revealed to be a significant factor in reducing child mortality. A mother that is well educated has tendency to witness reduction in child mortality by more than double compared to mothers that are not formally educated. This is expected because education has potentials exposing the mother to necessary information that would enhance both the life of the mother and child, thereby improving their livelihoods within the household,

Similarly, household wealth status has an inverse relationship with child mortality. In other words, the higher the wealth status of a household the lower the tendency of witnessing child mortality. The logistic regression result shows that wealthy households have more than double tendency to reduce incident of child mortality than poor households. This is expected because such wealthy households would be able to afford quality healthcare services that are required for quality living and livelihood of the children in the households.

Lastly, source of water significantly contributed to the incidence of child mortality in the study area. Dependence upon streams and unprotected well had direct relationship with incidence of child mortality. Dependence on streams for household chores and drinking has tendency of increasing incidence of child mortality by more than double compared to households that did not depend on stream. Also, dependence on unprotected well for household chores and drinking has tendency to increase incidence of child mortality by almost three times compared to households that did not depend on unprotected well.

## Conclusions and recommendations

The findings of the study will accelerate the knowledge base of mothers on the importance of healthcare practices which holds great potential for improvement of child survival leading to the achievement of MDG 4. It would be of significant may help to the government and stakeholders to design comprehensive and integrated interventions towards reducing the level of child mortality in the study area and by extension the entire country. Attention should be placed on factors that have been found to influence child mortality in the study area. Government should make policies that would ascertain that health facilities are located at virtually all rural communities.

Households should take advantage of family planning programs that are being promoted by governments, thereby enhancing the livelihoods of both mother and child. Female gender education should be championed among rural communities. As the saying goes: “if you educated a man, you educate a person; but if you educate a woman, you educate a nation”. An

improvement in level of education of a mother would bring improvement to the life of the child.

Government should ensure availability of portable water in all rural communities. Many of the diseases that affect households, especially children are water-borne. Hence, provision of clean water goes a long way in improving the livelihoods of households and their respective children.

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