



Medicine and Medical Sciences (LRJMSS) ISSN: 2354-323X Vol. 3 issue 6 pp. 040-045, June, 2016
Available online <http://www.landmarkresearchjournals.org/lrjmms/index.php>
INDEXING: ISI Impact Factor (IF)=1.264; Scopus; Index Copernicus.
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Full Length Research Paper

Determinants of Under-Five Mortality in Abim District, Uganda

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Accepted 05 April, 2016

The study on the determinants of under-five mortality in Abim district, Karamoja region was to examine how maternal age at first birth, maternal age, previous birth interval, maternal education, maternal occupation, paternal occupation, latrine use and source of drinking water affect under-five mortality prevalence. The respondents for this study were mothers in the reproductive age of 15-55 years selected by purposive sampling. A logistic regression model was used for a dummy (1=death, 0=survival) and the independent variables. The odds of the logistic estimates revealed that under-five mortality was significantly high at 95% confidence level among mothers who had first birth below 20 years of age, maternal age at birth of less than 20 years, previous birth interval of less than 2 years and households that use borehole water. Other factors like maternal education, maternal/paternal occupation and latrine/toilet use were insignificantly related to under-five mortality. Hence it was recommended that campaign against early marriage and teenage pregnancy be explicitly done, mothers be encouraged to exclusively breastfeed for at least 2 years, mothers be sensitized about the advantages of family planning, personal hygiene and good sanitation be continuously practiced if under-five mortality in the Abim District is to be controlled.

Keywords: maternal age, education, occupation, water, latrine and under-five mortality.

INTRODUCTION

The United Nations Millennium Development Goal 4 aims at reducing mortality among children under age 5 by two-thirds between 1990 and 2015. Globally, the under-five mortality rate has dropped 41 per cent—from 87 deaths per 1,000 live births in 1990 to 51 in 2011. East Asia, North Africa, Latin America and the Caribbean, South East Asia and West Asia reduced their under-five mortality rate by more than 50 per cent (UNICEF, 2012).

According to WHO (2013), Africa continues to steadily reduce its under-five mortality rate, from 146 deaths per 1,000 live births to 91 deaths between 1990 and 2011, or 2.2 per cent a year. But it is not enough. Some of the factors contributing to Africa's inadequate achievement of the child health MDGs include weak health systems (physical and financial barriers to essential health services, shortage of medicine, poor human resources) and poor conditions as determinants of health (household education, income, insufficient and inappropriate nutritional practices, poor sanitation facilities).

For Uganda's case according to the 2011 UDHS data there is a remarkable decline in all levels of childhood mortality over the 15-year period preceding the survey. Infant mortality declined by 39 percent, from 89 deaths per 1,000 live births to 54 deaths per 1,000 live births while under-5 mortality declined by 37 percent over the same period, from 143 deaths per 1,000 live births to 90 deaths per 1,000 live births. As childhood mortality declines, post neonatal mortality usually declines faster than neonatal mortality because neonatal mortality is frequently caused by biological factors that are not easily addressed by primary care interventions (UBOS, 2014).

According to UDHS(2011), the under-five mortality ratio reduced by a half from 180 per 1,000 live births in 1995 to 90 per 1000 live births in 2011 with Kampala region having the highest rate(65 per 1000 live births) and Karamoja region having the highest rate(153 per 1000 live births) in the previous five years. The key predictors noted for the above rates were: too short birth interval of less than 24 months after the previous birth, too young mothers of less than 18 years and a high birth order or parity of four or more children.

Karamoja region has the highest under-five mortality rate (72 per 1000 live births) relative to the lowest in Kampala region (19 per 1000 live births) in the previous five years in Uganda. The key factors influencing childhood mortality in Uganda as a whole include: too short birth interval of less than 24 months after the previous birth, too young mothers of less than 18 years and a high birth order or parity of four or more children (MoH, 2013).

Abim district is one of the seven districts of Karamoja region and in Uganda mortality statistics is reported only up to regional level, this inadequacy makes it difficult to explain the determinants of under-five mortality at district level. However leading causes of morbidity like malaria (81%), pneumonia(11%), and latrine coverage (41%) at district level can give a shadow of mortality and its causes(UBOS, 2014). A number of development partners and non-governmental organizations such as UNFPA, WHO, WFP, UNICEF, KDDS, malaria consortium have projects directed towards health and nutrition supplements to children to reduce child mortality in the region alongside Government projects like Karamoja action plan for food security, PRDP and national programs like free immunization, free treated mosquito nets and establishment of village health teams(OCHA, 2009) have not been sufficient enough in reducing under-five mortality and therefore this study sought to examine factors that determine under-five mortality despite the stated interventions in the district and region.

METHODS AND MATERIALS

Based on the theoretical and previous literature discussed previously, the model for the empirical

analyses is classified to three parts. The models consist of maternal factors, socioeconomic factors and environmental factors.

The first model consists of maternal factors while the second model incorporates socioeconomic factors and the third incorporates environmental factors.

So the models in this study are:

Model (I)

Under-five mortality = (Maternal Age at first birth, Maternal Age at birth, previous birth interval).

Model (II)

Under-five mortality = (**Model I** and Maternal education, maternal occupation, paternal occupation).

Model (III)

Under-five mortality = (**Model II**, source of drinking water and Latrine/toilet facility use).

This method of analysis includes factors one at a time selected on theoretical basis.

The general form of logistic equation with several Maternal, socioeconomic and environmental factors is given as:

Logit $(P) = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7$

P: - denote the probability of the risk of under-five mortality and P is dichotomous that have a value 0 or 1

$b_0 \dots b_7$: - is the coefficient of the independent variables.

$X_1 \dots X_7$: - denote the Maternal, socioeconomic and environmental factors of under-five mortality

All mothers in the reproductive age of 15-55 years of age who visited Abim Main Hospital located in Abim Town in the period of May and June 2015 were interviewed randomly.

RESULTS

According to model I above, the significant maternal factors were maternal age at birth and previous birth interval since $p < 0.05$ and maternal age at first birth was insignificant ($p > 0.05$). It reveals that the odds of under-five mortality reduce with increase in maternal age and previous birth age. (See Table 1).

The results in Table 2 indicate that maternal education, maternal occupation and paternal occupation were statistically insignificant ($p > 0.05$) after controlling for maternal factors. This implies that socio-economic factors were insignificantly related to under-five mortality.

The environmental factors are presented in Table 3.

Table 1 Presents the logistic regression of maternal factors on under-five mortality (MODEL I)

Maternal Factors	B	Odds ratio(OR)	P-Value
Maternal age at first birth (<20)			0.109
20-29	-0.934	0.393	0.035
30-39	-21.454	0.000	0.999
Maternal age at birth(<20)			0.003
20-29	-1.393	0.248	0.069
30-39	-1.648	0.192	0.001
40+	-2.025	0.132	0.000
Previous birth interval(< year)			0.005
2 years	-1.810	0.164	0.003
> 2 years	-1.280	0.278	0.005

Table 2 Presents the logistic estimates of socio- economic factors on under-five mortality (MODEL II)

MATERNAL FACTORS	β	Odds ratio(OR)	P-Value
Maternal age at first birth (<20)			0.111
20-29	-0.995	0.370	0.036
30-39	-20.657	0.000	0.999
Maternal age at birth(<20)			0.012
20-29	-1.362	0.256	0.093
30-39	-1.570	0.208	0.007
40+	-1.939	0.144	0.001
Previous birth interval(< year)			0.014
2 years	-1.726	0.178	0.006
> 2 years	-1.203	0.300	0.013
SOCIO-ECONOMIC FACTORS	β	Odds ratio(OR)	P-Value
Maternal education(None)			0.687
Primary	0.932	2.540	1.000
Secondary	0.361	1.434	1.000
Tertiary	0.812	2.252	1.000
Degree+	1.000	2.719	1.000
Maternal occupation(Peasant)			0.999
Civil servant	18.191	7.945E7	0.999
Business	18.423	1.003E8	1.000
Others	-0.582	0.559	0.198

Model I consists of maternal factors only while model II includes socio-economic factors and model III incorporates environmental factors.

In model I (See Table 1) the under-five mortality risk ratios for first birth age, maternal age at birth and previous birth interval are in the expected direction. First birth age of 20-29 reduces the risk of under-five mortality by 61%, first birth age of 30+ are likely not to experience under-five mortality though insignificant at 90% or 95% level of significance (p -value>0.1) relative to first birth age of less than 20 years.

Maternal age at birth of 20-29 reduces the risk of under-five mortality by 75%; 30-39 reduces the risk by 81% and 40+ reduces the risk by 87% relative to maternal age of less than 20 years statistically significant at 90% level.

The previous birth interval of 2 years reduces the risk of under-five mortality by 84%, above 2 years reduces the risk by 72% relative to birth interval of less than 1 year which is statistically significant at 90 % and 95% confidence levels(p <0.1,0.05).

Model II extends Model I through the addition of socioeconomic factors including maternal education, paternal and maternal occupation (See Table 2). The probability of under-five mortality is high among younger mothers and those with birth interval of less than 2 years. The relationship of first birth age, maternal age and under-five mortality is not altered in the presence of maternal and socioeconomic variables. Model II presented in Table 2 also shows the effect of socioeconomic variables after controlling for maternal variables. It was revealed that socioeconomic factors do

Table 3 Presents the logistic estimates of environmental factors on under-five mortality (MODEL III)

Maternal Factors	β	Odds ratio(OR)	P-Value
Maternal age at first birth (<20)			0.158
20-29	-0.929	0.395	0.055
30-39	-20.442	0.000	0.999
Maternal age at birth(<20)			0.036
20-29	-0.965	0.381	0.254
30-39	-1.348	0.260	0.024
40+	-1.768	0.171	0.004
Previous birth interval (< year)			0.004
2 years	-2.029	0.131	0.002
> 2 years	-1.416	0.243	0.004
Socio-economic factors	β	Odds ratio(OR)	P-Value
Maternal education(None)			0.705
Primary	0.560	1.750	1.000
Secondary	-0.014	0.986	1.000
Tertiary	0.431	1.538	1.000
Degree+	0.758	2.133	0.999
Maternal occupation(Peasant)			0.999
Civil servant	18.154	7.657E7	1.000
Business	18.687	1.305E8	0.188
Others	-0.532	0.588	0.379
Paternal occupation(Peasant)			0.964
Civil servant	-1.016	0.362	0.038
Business	0.020	1.020	0.511
Others	2.112	8.268	0.945
Environmental factors	β	Odds ratio(OR)	P-Value
Latrine use(No)			0.014
Yes			
Source of drinking Water (Surfaced/rain/pond)			0.044
Borehole/spring	0.028	1.029	0.472
Tap/piped	1.862	6.439	0.999
Constant	0.602	1.826	0.999
	-18.507	0.000	0.999

not have a significant effect on under-five mortality ($p>0.1$).

Model III adds controls for two household amenities, namely water source and toilet/latrine facilities (see Table 3). The results revealed that under-five mortality was significantly high among households that use borehole water ($p<0.05$) and insignificantly high among households that use latrine ($p>0.05$).

DISCUSSION OF FINDINGS

The finding shows that maternal age at first birth is statistically insignificant in determining under-five mortality (see Table 2). However, John (2013) and Mesganow (2008) found that maternal age at first birth is a significant factor as teenage mothers had high under-five mortality but a related by Nutiye (2009) follows the

same conclusion that maternal age at first birth is insignificant and this can be true if these young mothers are provided with adequate health input, good nutrition and health care and delayed motherhood is of great advantage as it gives girls time to go through an education, gain economic stability and mature to get ready for producing children responsibly.

The results in Table 3 shows a negative relationship between maternal age at birth and under-five mortality which is statistically significant. This study shows that maturity of the mothers in terms of age reduces the risk of under-five mortality significantly though not in the expected U-shaped relationship since there is low risk of child mortality for adult mothers. This finding is similar to other studies like Gloria (2003), Hossain (2013), Maitra and Pal (2007) suggesting maturity, ability to make decisions, independence and use of healthcare facilities that comes with adulthood. On the other hand Bluaotra

and Soest (2008), Maître (2004) all agree that maternal age especially at very young and old ages have high risk of child mortality.

According to Table 3 previous birth interval is statistically significant in determining under-five mortality. Short previous birth interval is associated with high under-five mortality. Past studies that come to the same conclusion includes; Nasejje (2013), Assefa (2013), Ayiko *et al.* (2009) among others. Long previous birth interval enables exclusive breast feeding for at least 2 years which boosts immunity against diseases, reduces competition for care, attention and resources and gives the mother's body time to recover from the previous birth or pregnancy.

There was insignificant difference in under-five mortality among mothers who never had any education, primary and secondary education, tertiary education and degree or above (see Table 3). The finding is contradicting other previous studies by Cornelia (2010), Hsian (2008), Allen (2013), Nasejje (2013) and the argument is that educated mothers can use health inputs, more informed and can improve on hygiene, family planning practices, and have knowledge on good nutrition. The results could be due to the fact that illiterate rate is still high in Abim district especially among women although the trend is changing gradually due to girl-child education campaigns and programs by the government.

Maternal and paternal occupation were found to be statistically insignificant in determining under-five mortality. This result also supports other studies with the same conclusions such as; John (2013), Gloria (2003) who did not find parental occupation as an important or significant factor in determining under-five mortality.

Results in Table 3 show that there is a significant relationship between drinking water source and under-five mortality though in the unexpected positive relationship. This finding supports studies of Allen (2013), Omariba *et al.* (2007), Macassa *et al.* (2003) who concluded that access to clean water was an insignificant factor. This could be because majority of the respondents had access to borehole water, water source considered to be safe may not be and according to reports from the health officials no water borne disease outbreak has been reported over a long period of time.

It was also revealed that latrine/toilet use is insignificant in determining under-five mortality. These results are contrary to Assefa (2013), Nestar (2009), and Rubiiana (2005) who concluded that poor sanitation is associated with high under-five mortality. However, the finding concurs with the health reports from Abim District which recorded no disease outbreaks associated with unclean water and poor sanitation like cholera and diarrhea. According to the medical superintendent of Abim hospital common death cases were as a result of malaria, anaemia and pneumonia.

CONCLUSION

The odd ratios of logistic estimates revealed that under-five mortality was significantly high at 95% confidence level among mothers who had first birth below 20 years of age, maternal age at birth of less than 20 years, previous birth interval of less than 2 years and households that use borehole water. Other factors like maternal education, maternal/paternal occupation and latrine/toilet use were insignificantly related to under-five mortality. Hence, it was recommended that campaign against early marriage and teenage pregnancy be explicitly done, mothers be encouraged to exclusively breastfeed for at least two (2) years, mothers be sensitized about the advantages of family planning, personal hygiene and good sanitation be continuously practiced.

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