DETERMINANTS OF UNDER FIVE MORTALITIES AMONG THE PASTORALSISTS IN KAJIADO, KENYA

Lydia Kirika
Maseno University
KENYA

ABSTRACT

This was a cross sectional study of the determinants of under-five mortalities among the pastoralists in Kajiado, Kenya. The study utilized both qualitative and quantitative methods. The aim of the study was to find out the determinants of death among children (5 years and below) born of pastoralist parents living in Mashuru Division in Kajiado Sub-County, Kenya. Theoretically, the study was anchored on Mosley and Chen (1984) framework which provides that all social and economic determinants of child mortality necessarily operate through a common set of biological mechanisms, or proximate determinants (intermediate variables) to directly influence the risk of mortality. Data was analyzed using SPSS 20.0. Descriptive analysis involving frequencies and percentages was employed as well as chi-squared test at 95% CI. The study has shown that 68 % of the mothers reported death of their children through miscarriage or after birth. Of the 1563 children born during the 5 year period, 253(16%) died. Infant mortality rate was found to be at 119/1,000 live births. Under 5 mortality rate was 162/1,000 live births. The three leading causes of death were pneumonia (25%), malaria (18%) and neonatal sepsis (13%). The most significant determinants of the under-five mortality were mother's education, age at first birth and low immunization coverage. The study recommends appropriate public health measures to curb the high neonatal and child mortality in the area.

Keywords: Neonatal, Mortality, Child mortality, Pastoralists, Neonatal Sepsis.

INTRODUCTION

Under five mortality is defined as the probability of a child born in a specific year or period would die before reaching the age of five (Preston and Haines, 2014). Infant and child mortalities are the indicators of the third sustainable development of goal of ensuring healthy lives and promoting well-being for all at all ages. The government of Kenya through the Ministry of Health is undertaking a number of interventions aimed at reducing childhood mortality in the country. In Kenya, acute respiratory infection (ARI) is the second highest contributor to the burden of disease with a high prevalence in children 6-11 months of age (Demographic, 2014).

Kajiado County covers an approximated area of 21,900.9 square kilometers. The County consists of a number of administrative districts including Kajiado Central, Isinya, Loitokitok, Magadi, Mashuru, Namanga and Ngong. Kajiado County is adjacent to the Capital City of Kenya, Nairobi. Kajiado's County neighbours inclued counties of Machakos, Makueni, Narok, Taita Taveta and Kiambu counties. This study was conducted in Mashuru District ("About Kajiado - The County Government of Kajiado", 2017).

The county is the home to pastoralist Maasai communities. The population is highly dispersed with only 19 people per square kilometer. Given the very basic levels of nutrition

(the diet is primarily maize and beans occasionally supplemented with goat) there is a high incident of disease (diarrhea, trachoma, intestinal works and malaria) (Demographic, 2014).

LITERATURE REVIEW

Most developing countries are faced with huge challenges in dealing with diseases that are deeply entrenched in their communities leading to deaths of under-five (Kirigia, Muthuri, Nabyonga-Orem & Kirigia, 2015) Some of the diseases such as pneumonia and malaria among many others have resulted in loss of many lives particularly among children under five years old. Infant and child mortality rates are important indicators of societal and national development as they serve as key markers of health equity and access (Preston and Haines, 2014; Demographic, 2014]. Despite huge investments by national governments and developmental partners in improving access to health care, the reduction of infant and child mortality rates by two-thirds between 1990 –2015 (Kirigia, Muthuri, Nabyonga-Orem & Kirigia, 2015; Cohen, Alfonso, Adam, Kuruvilla, Schweitzer, & Bishai, 2014) has not been attainable within low and middle income countries.

Worldwide, 5.9 million children below five years of age died in 2015. The risk of a child dying before completing five years of age is still the highest in the World Health Organization (WHO) African countries (81 per 1000 live births), about 7 times higher than in the WHO European region (11 per 1000 live births). Low-income countries reported 76 deaths per 1000 live births, about 11 times the average rate in high-income countries (7 deaths per 1000 live births) (Demographic, 2014). Sub-Saharan Africa continues to confront significant challenges, as the region with the highest child mortality rates in the world: 98 deaths per 1,000 live births in 2012. All 16 countries with an under-five mortality rate above 100 deaths per 1,000 live births are in sub-Saharan Africa (Kirigia, Muthuri, Nabyonga-Orem & Kirigia, 2015). Child health is determined by many factors including parental education, access to health services, and income of families (Naidoo and Wills, 2016). According to Mosley and Chen (1984), child mortality is determined by a combination of socioeconomic, biological, environmental, and behavioral factors (Mosley and Chen, 1984)

Though poverty is well acclaimed as an essential factor influencing child mortality (Cohen, Alfonso, Adam, Kuruvilla, Schweitzer, & Bishai, 2014; Mosley and Chen, 1984; Pritchard and Keen, 2016), findings on the effect of household socio economic differentials on child mortality have been mixed. A study in parts of rural Ghana and another in Tanzania did not find any significant effect of household socio economic status on child mortality (Wagstaff, 2000; Schellenberg et al, 2003) while a study using Nigeria Demographic and Health Survey for 2008, found that relatively prosperous households were less likely to experience child death than the poorest households in rural Nigeria (Kayode, Adekanmbi & Uthman, 2012)

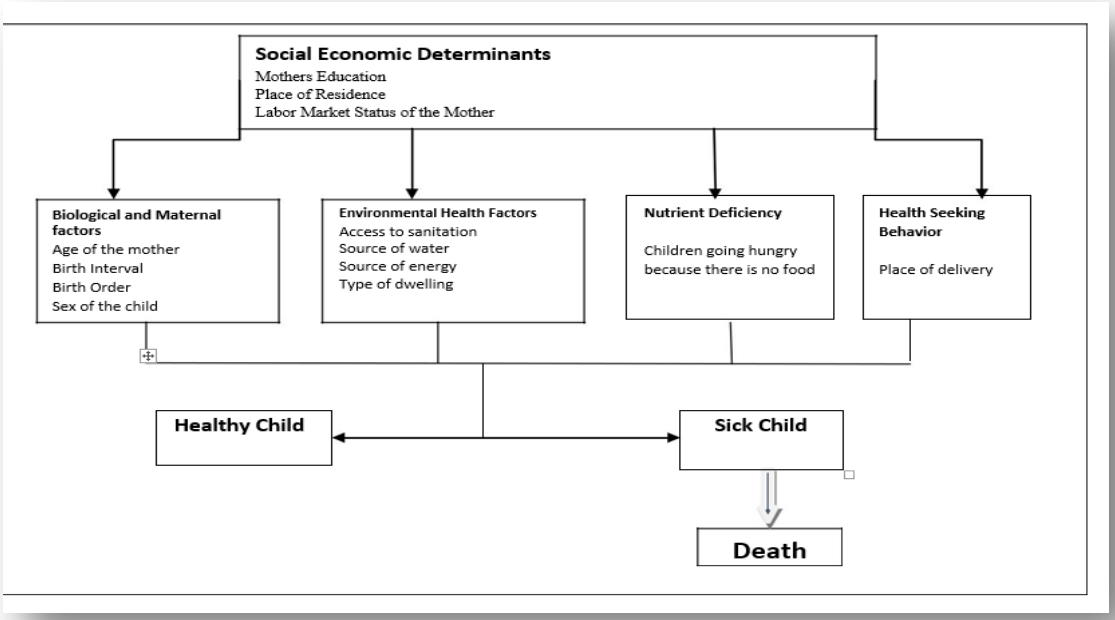
Due to disagreements in existing literature on the in influence of particular social, economic and demographic attributes of mothers on under-five mortality coupled with sparse information on the topic in the Kenyan setting, this paper further examine social, economic and demographic factors that influence under-five deaths and the magnitude of their influence in a rural pastoralist setting in Rift Valley, Kenya. It is hoped that findings from this paper will contribute to literature on under-five mortality in rural poor settings and perhaps contribute to identifying priority interventions to address the persistent mortality in settings such as this.

Pastoralists' communities are nomadic or semi-nomadic and move from area to area looking for green pastures to feed their animals which are sources of their incomes and food. According to the Kajiado District poverty reduction strategy paper (2001-2004) they undergo a lot of health hardships related to childhood mortality due to underlying reasons such as lack of immediate accessibility to health facilities, distance. Health facilities are poorly distributed as they are concentrated in highly populated areas and outreach services in these areas are inadequate because of cost implications. The cost discourages them to seek immediate medical care for the under-five and pregnant mothers both of whom are vulnerable to disease.

THEORETICAL FRAMEWORK

According to Mosley and Chen (1984), all social and economic determinants of child mortality necessarily operate through a common set of biological mechanisms, or proximate determinants (intermediate variables) to directly influence the risk of mortality. This study adopts this approach to ascertain factors associated with under-five mortality Kajiado. Figure 1 below illustrates the path to a healthy child or a sick child and eventual death. The socioeconomic factors operate through maternal, biological, environmental, nutritional and health seeking behavior factors leading to a healthy child or sick child. This framework assumes that in an optimal setting, over ninety-seven per cent of newborn infants can be expected to survive through the first five years of life, and that reduction in this survival probability in any society is due to the operation of social, economic, biological and environmental forces. It further assumes that socioeconomic determinants (independent variables) must operate through more basic proximate determinants that in turn influence the risk of disease and the outcome of disease processes and that specific diseases and nutrient deficiencies observed in a surviving population may be viewed as biological indicators of the operations of the proximate determinants. Growth faltering and ultimately mortality too in children (the dependent variable) are the cumulative consequences of multiple disease processes (including their biosocial interactions). Only infrequently is a child's death the result of a single isolated episode (Ibid).

Fig. 1 Analytical Framework for the Study of Child Survival Mosley and Chen (1984)



Adapted from Mosley and Chen 1984.

METHODOLOGY

Study Design

The study took a cross-sectional design to investigate determinants of under-five mortality among the pastoralist in Mashuru Division of Kajiado, Kenya

Study Site

The study was carried out in Mashuru Division, Kajiado Sub-County. The division covers an area of 2994.2 square kilometers. The areas is served by 9 health facilities and are mostly located about 10 kilometers away from each other. The facilities are underutilized due to the migratory lifestyle of the pastoralists, sparse population in some sections of the area, poor transport and communication infrastructure in the area and lack of clean and adequate supply of water in the area.

Study Population

The study targeted all women of child bearing age (15-49 years) who represented the under-fives.

Inclusion and Exclusion criteria

All mothers of the under-fives who belong to pastoral communities of Mashuru Division in Kajiado County, Kenya. The study excluded all mothers of children under the age of five.

Sampling Technique

The study employed random sampling technique and the sample size was determined using Fisher et al., (1991) formula to come up with 384 mothers who participated in the study. Since the study area comprised of other administrative units, cluster sampling was adopted to ensure that participants of the study were drawn from all the smaller administrative areas in the study area. A total of 5 administrative areas were identified with a total population of 2,953 households from which a sample of 13% was drawn. Table 1 represents the sampling frame for the study.

Table 1: Sampling frame

No.	Location	Number of households	Sampled households
1	Imaroro	749	97
2	Osilalei	461	60
3	Maparasha	956	124
4	Arroi	361	48
5	Merueshi	426	55
	Total	2953	384

With the help of the community health workers, the first household in every location was determined by throwing a pencil and the direction pointed became the starting point. The sampling interval from one household to the next was the 8th household.

Study Instruments

Data collection was carried out by using structured interviews. Interviews were conducted in Maasai language and then translated by the research assistants to English.

Data analysis and presentation

Data analysis was performed using SPSS 22.0. To find out the under-five mortality rate, descriptive statistics involving frequencies and percentages was employed. To compare the factors associated with choice of mode of delivery, one way ANOVA tests were conducted. All statistical tests were performed at a 5% level of significance (95% CI).

RESULTS

The study was conducted in Mashuru Division of Kajiado County. It was conducted among all the mothers of reproductive ages with children under the age of five years. Data was obtained from a total of 384 mothers and 1563 children under the age of five years.

Demographic characteristics

The demographic characteristics considered in the study included maternal age, level of education, marital status, type of marriage as well as occupation. A majority of the women, 32.29 % were aged between 25-29 years while 25.26% were aged 25-29 years old. Women aged between 15-19 years accounted for 24.22%. Only 3.91 % were aged between 35-39 years old. About 55.73% of the women indicated that they were not educated. Those who had completed primary education were 15.36while only 12.5% had post-secondary school education. Most women, 35.42% had no occupation while 26.04% had salaried employment with 21.35% self-employed. Most women, 73.44% indicated that they were married (54.26% polygamy and 47.52% Monogamy).

Table 2. Demographic characteristics

Variable		Frequency	Percentage
Age of Mother	15-19	93	24.22
	20-24	124	32.29
	25-29	97	25.26
	30-34	55	14.32
	35-39	15	3.91
Education Level	None	214	55.73
	Primary Complete	59	15.36
	Secondary	63	16.41
	Post-Secondary	48	12.50
Occupation	None	136	35.42
	Farmer	66	17.19
	Salaried	100	26.04
	Self Employed	82	21.35
Marital Status	Married	282	73.44
	Divorced	13	3.39
	Single	44	11.46
	Widow	45	11.72
Marriage form	Monogamy	134	34.90
	Polygamy	153	39.84

Causes of under -five Mortalities

The leading probable causes of death among the under five were pneumonia, malaria and neonatal sepsis accounting for 24.8%, 18.11% and12.99% respectively. This was as presented in figure 2 below.

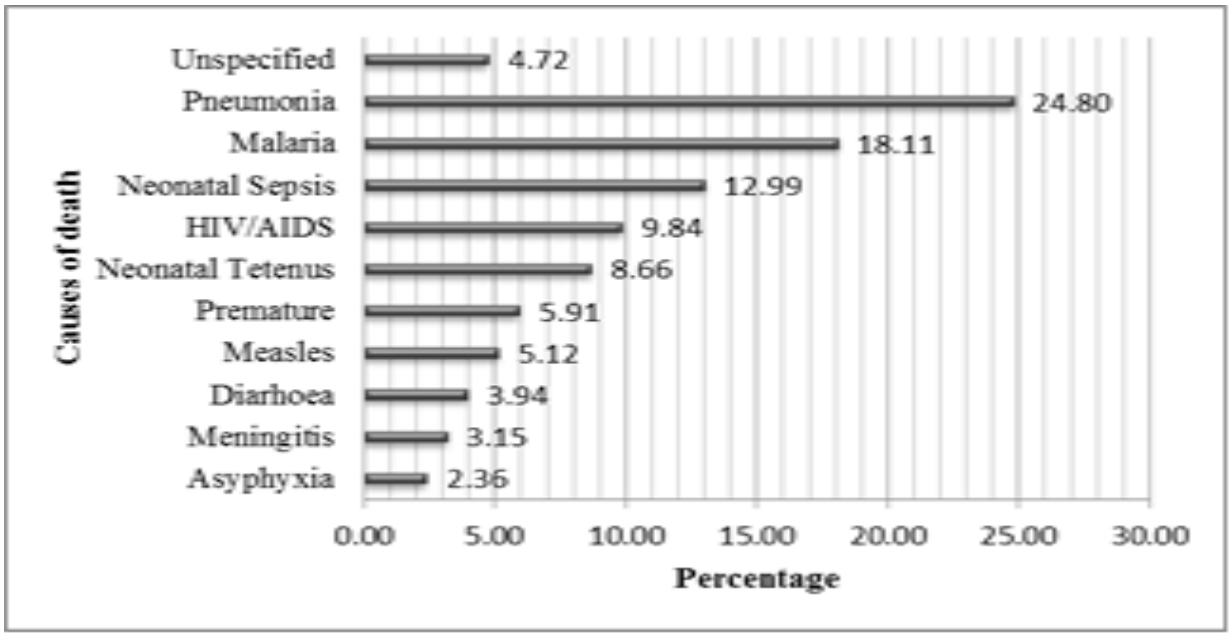


Figure2. Causes of under five deaths

Determinants of under-five mortalities

The factors considered included both the maternal and neonatal factors

Maternal factors predictive of modes of delivery

From Table 4 below, under five deaths occurred mostly among children whose mothers were below the age of 30 years. Of the 218 live births of mothers aged between 15-19 years, 37.16% died below the age of 5 years. Only about 10.92% of the children born of mothers aged 35-39 died before the age of five years. The age of the mother was found to be a determinant of under-five mortality at a significant p-value of 0.01907, F (8.57) .Similarly, most women who had no education, 25.87% of 603 live births died before the age of five. Only 9.29% of the 183 children born of mothers who had post-secondary education died before the age of five. The relationship between the level of education of the mother was found to be statistically significant at p=0.013492, F=11.96. The occupation of the mother was also found to be a determinant of under-five mortality. Of the 473 children born of mother who had no occupation, 21.78% died before attaining the age of five years while only 10.58% of the 312 children born of mother who had salaried occupations died before the age of five. This was found to be statistically significant at p=0.001647, F=29.28. Marital status and form of marriage were not found to be significant factors predictive of under-five mortalities (P=0.123978, F=3.2 and 0.283855, F=2.11). Table 3 below represents the maternal factors predictive of under-five mortality.

Table 3. Maternal factors predictive of under-five mortality

Variables		live Births	Deaths	F	p-value
age of Mother	15-19	218	81(37.16%)	8.57	0.01907
	20-24	513	62(12.09%)		
	25-29	472	60(12.71%)		
	30-34	241	37(15.35%)		
	35-39	119	13(10.92%)		
Education Level	None	603	156(25.87%)	11.96	0.013492
	Primary Complete	491	51(10.39%)		
	Secondary	286	29(10.14%)		
	Post-Secondary	183	17(9.29%)		
Occupation	None	473	103(21.78%)	29.28	0.001647
	Farmer	508	74(14.57%)		
	Salaried	312	33(10.58%)		
	Self Employed	270	43(15.93%)		
Marital Status	Married	915	182(19.89%)	3.2	0.123978
	Divorced	99	4(4.404%)		
	Single	219	45(20.55%)		
	Widow	330	22(6.67%)		
Marriage form	Monogamy	256	78(30.47%)	2.11	0.283855
	Polygamy	659	108(16.39%)		

Neonatal factors predictive of under- five mortalities

The study looked at the neonatal factors predictive of under-five mortalities. The factors investigated included age of the baby and immunization status. One way ANOVA test was done to establish the relationship between the variables. The study revealed that immunization status of the child was a factor determinant of under-five mortalities (p=0.0239, F=2.57). Of the 710 children who were never immunized, 22.82% succumbed before the age of five. Further, 11.56% of the children who were partially immunized also succumbed before the age of five. While most children died before they were one month old (35.34% of 283 live births, the relationship between age of the child and under five mortality was not found to be statistically significant (P=0.09932). Table 4 below represents the neonatal factors predictive of under-five mortalities.

Table 4.Neonatal factors predictive of under-five mortalities

Variables		live Births	Deaths		p-value
Age of child	0-28 days	283	100(35.34%)	.57	0.09932
	29 days-1 Year	468	86(18.38%)		
	>1-<5 Years	812	67(8.25%)		
Immunization status	Fully Immunized	282	25(8.87%)	2.57	0.0239
	Partially Immunized	571	66(11.56%)		
	Never Immunized	710	162(22.82%)		

The F-values from the study indicate that occupation of the mother, immunization status of the child, level of education and age of the mother were the most significant factor predictive of the under-five mortalities in that order. Figure 3 below indicates a graphical representation of the order.

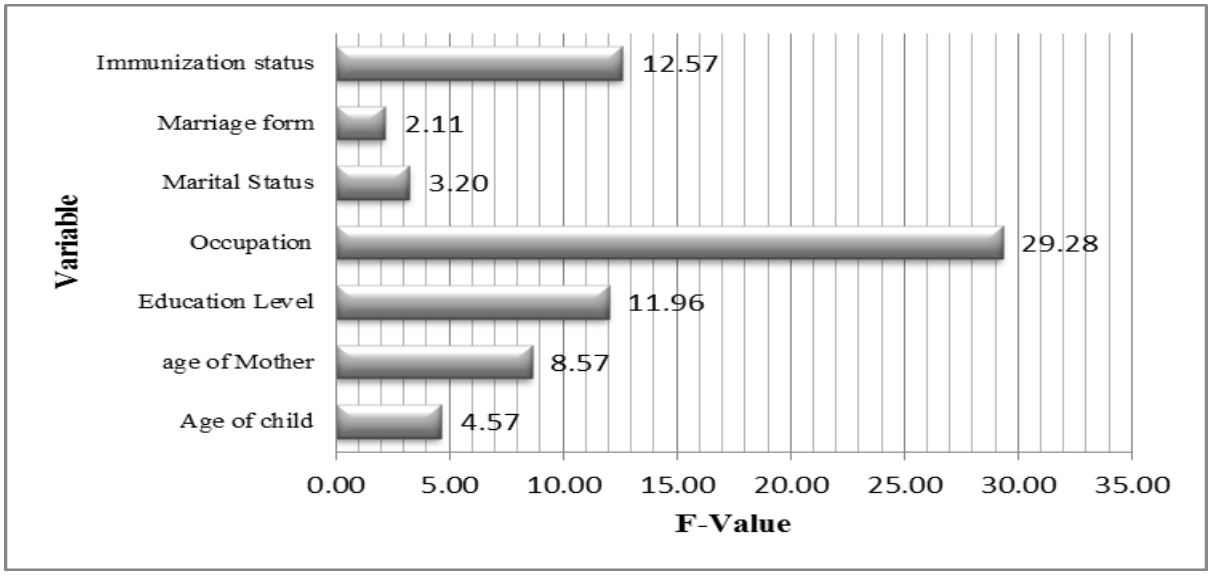


Figure 3. Factors predictive of under-five mortalities

DISCUSSION

The ANOVA test revealed that the maternal and neonatal factors predictive of under-five mortalities include occupation of the mother, immunization status of the child, level of education of the mother and age of the mother at birth .The study established that most children born of mother who were unemployed died before the age of five years as compared to their counterparts who had salaried employment.. The findings of the study indicate that employment status of the mother is a factor predictive of under-five mortality. Other studies have established a correlation between mothers employment status and child mortality (Mosley and Chen, 1984; Pritchard and Keen, 2016). It is possible to conclude the unemployed mothers were not economically empowered and therefore were unable to make decisions involving economic expenditures towards their newborn's health. Similarly, the study revealed that children born of mothers who did not have formal education died before age five. This finding reveal that mother's level of education is a predictive factor for child mortality. Non educated women are less likely to make informed choices on maternal and neonatal health (Naidoo and Wills, 2016). This finding affirms the findings of the 2014 KDHS where education of the mother was found to be a factor contributing to under five mortalities.

Focused postnatal care services require that a mother attends clinic sessions regularly and that vaccinations are to be provided at that time (de Jongh, Gurol–Urganci, Allen, Zhu & Atun, 2016) .The study revealed that most children who were not immunized died before age five. This finding leads to an understanding that immunization status of children below the age of five years determines mortality. A global study conducted in the year 2015 indicated that immunization status of children influenced mortality (Wilson, Paterson, Jarrett & Larson, 2015).

The study also found that age of the mother was a determinant of under-five mortality. More children born of mothers below the age of thirty died under the age of five as compared to their counterparts born of older mothers. This finding leads to an understanding that the age of the mother influenced child mortality. This finding affirms a similar study conducted in Ghana among women of reproductive age in the rural set ups (Kanmiki, et al, 2014). From this finding, it could be argued that younger mothers are less economically and socially empowered to make right decisions regarding their health as well as that of their newborn. Since the community allows marriage of girls aged below 18, it is possible to conclude that such women do not have adequate information on child illnesses.

The present study did not find significant relationship between the under-five mortalities, age of child and marital status as well as marriage type. Most women among the pastoralists in the study area are married as young as 14 years old and it is the cultural expectation of the society that all women are married.

RECOMMENDATIONS

The recommendations made for this study should enhance public health interventions on child survival programs. Based on the results of this study, the following recommendations are made

There is need to enhance educational opportunities for the pastoralist mothers given the high number of women with no formal education in the study area. This will empower women to make informed decisions regarding their health and that of their newborns. There should be increased strategies for improving accessibility of health outreach services to the pastoralist in the study area. Such will enable women to seek early antennal and post-natal care services to boost neonatal health in the region. Since pneumonia and malaria, the leading causes of under-five mortalities in the area can be prevented, the researcher recommends community outreach programs in the area to educate the community members on strategies of preventing pneumonia and malaria.

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