Original Article

Health System Factors and Morbidity Profiles as Determinants of Nutritional Status of Under 5 Orphans and Vulnerable Children in Isiolo County, Kenya

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ABSTRACT

Malnutrition is the single most important threat facing those under 5 years with alarming associated morbidity and mortality. Whereas the assessment of malnutrition under 5 in the general population is commonly done, little is known about the nutritional quagmire facing Orphans and vulnerable children in the country. The study was a cross-sectional analytical study design administered at the community level. Data were collected from 394 OVCs and their caregivers. Simple random sampling was used to sample individual sample respondents from each of the 3 wards of Garbatulla Sub-County of Isiolo County. Both structured and semi-structured questionnaires were used to collect data. Data was then cleaned and analysed using SPSS version 26.0. Level one analysis involved the use of descriptive statistics whereas level 2 analysis entailed both bivariate and multivariate regression analysis. Acute malnutrition affected a third 127(32.9%) of under 5 OVC residing in Garbatulla sub county whereas 48(12.5%) were stunted. Underweight was noted to be 20(5.2%). Negative attitudes towards health workers increased the odds of malnutrition by 3.51 times with COR 3.51 (95% CI 1.74, 7.46). In addition, the lack of medicines and vaccines in the health facility increased the odds of malnutrition by 3.66 times: COR 3.66(95 CI 1.60, 9.14). Lastly, sickness in the previous month increased the chance of malnutrition in OVC by 58% COR 1.58 (95 CI 1.01, 2.50). The age group affected most is aged 2 to 5 years. In conclusion, negative attitudes towards healthcare workers, lack of basic medicines and immunization services and sickness in the previous 1 month increase the chance of malnutrition. Provision of basic preventive and curative services at health facilities, teaching the community about the role of healthcare work in community health and prompt treatment of common ailments are recommended to mitigate the effect of malnutrition on those under 5 OVC.

INTRODUCTION

It is estimated that globally close to 166 million children have lost both or one of their parents with the most common cause of such loss being HIV/AIDS and a majority of these children, 80% are from Africa south of the Sahara (UNICE, 2017). Locally in the country close to 3.6 million children are orphaned and vulnerable (Lee et al, 2014), with as many as half of them orphaned as a result of the HIV/AIDS pandemic. Under 5 Orphan and Vulnerable Children (OVC) are approximated at 1.2 million forming a significant percent. Further statistics from Kenya indicate that close to 700 children are rendered orphans on a daily basis, with a third of this resulting from HIV and AIDS (Afwai et al, 2013). According to Kenya's population-based HIV Impact Assessment (Lee et all, 2014) average prevalence of HIV among adults is 4.9% in the country. Isiolo County has a HIV prevalence of 3.2% (NASCOP, 2019), which is the highest among the North-Eastern Counties, and this means that Isiolo is likely to have a high number of OVC since it has been established that HIV/AIDS is a core predictor of OVC occurrence.

Malnutrition is one of the major preventable threats facing under 5 children. The short and long-term effects of undernutrition are enormous. While the risk of disease and death increases in the short term, there is a drastic reduction in reaching the personal potential of the affected child in the long term unless interventions to thwart malnutrition are done promptly. Worldwide, approximately a quarter of under 5 years of age children are stunted and chronically malnourished (KNBS, 2017). Research shows that half of all deaths in children under 5 are attributable to undernutrition. Further studies from UNICEF show that undernutrition puts children at greater risk of dying from common infections, increases the frequency and severity of such infections, and delays recovery (UNICEF, 2017). In Kenya, 26 percent of those under 5 are suffering from chronic malnutrition (KNBS. 2017). At the same time, acute malnutrition is also rampant throughout the country. In Isiolo County, approximately 1 in 5 children are either underweight or stunted and also a good number have acute malnutrition (SMART survey Isiolo County, 2020). Orphans and vulnerable children are more affected by the problem of malnutrition than the general population because of reduced financial support.

Orphans Refer to children below eighteen years who have lost one or both parents. On the other hand, vulnerable children are those who reside in settings perceived to be high-risk (Akwara et al, 2010). Vulnerable children for the purpose of this study include children with physical deformities and developmental and behavioural problems. A child raised by a teenager(s) less than 18 years and aged parent(s) over 60 years without regular

financial support or income. A child whose parents are alive but separated currently or raised by a single parent for whatever reason with no regular sources of income. History of undernutrition in the household for the last five years. Children are known to be suffering from chronic diseases like HIV/AIDS, TB, epilepsy or any other chronic health problem. Children whose parent(s) are suffering from physical deformity, psychiatric illness or any chronic disease such that they are not able to fend for their family.

MATERIALS AND METHODS

Research design

The research adopted a cross-sectional analytical type of method that was administered at the community level; wards in Garbatulla Sub-County of Isiolo. Data was collected from under 5 OVC and their caregivers. The proposed research design was deemed suitable for this research because it entails the collection of information on variables of interest at a given point in a time as a means of assessing nutrition and its determinants of under 5 OVC in the Garbatulla Sub-County.

Study variables

Independent variables

Morbidity profile and health system factors that influence nutritional status of under 5 OVC.

Dependent variables

The dependent variable for this research was the nutritional status of under 5 OVCs.

Study location

This research was done in Garbatulla Sub-County of Isiolo County, one of the three Sub-Counties of Isiolo County. Most of the populations in the proposed study location reside in rural contexts compared to other Sub-Counties of Isiolo County: Isiolo and Merti Sub-County (Eregae et al, 2019). The Sub-County borders Merti and Isiolo Sub-Counties and is located in the Northern part of Isiolo

town, approximately 78 kilometres away. It has three (3) administrative wards; Kinna, Sericho, and Garbatulla. It was estimated that the number of under 5 years OVC in the Sub-County was 6082 (KNBS, 2017). Major economic activity in the area is pastoralism- whereby it was estimated that close to 80% of the population partake in this activity.

Target population

The study targeted under 5 years OVC drawn from Garbatulla Sub-County, Isiolo County, Kenya. The first five years of life is a time of rapid child growth and development. Adequate nutrition is needed for children to have good health and reach their potential in future because malnutrition at this early stage of life is likely to have lifelong effects on children both physically as well as mentally.

Inclusion criteria

The study included all OVC aged 59 months and below residing in Garbatulla for at least a month and available at the time of assessment in the study area of Garbatulla Sub-County, Isiolo County. Orphans and vulnerable children whose caretakers agreed to consent to take part in research were all included.

Exclusion criteria

A child who was acutely sick and who may need emergency immediate intervention in an inpatient setting was excluded. Children whose caregivers do not consent and all children above 59 months of age were also excluded.

Sample size determination

Z is statistics corresponding to the level of confidence, that is 1.96;

d is precision level and the study adopted a level of precisions of ±5%.

p is supposed to be the estimated proportion of OVCs in Garbatulla Sub-County. However, there was no prior information on this data. In such instances, we use p=q=½ to obtain a conservative estimate of the required sample size. Therefore,

$$n = \frac{Z^2 pq}{d^2}$$

$$n = \frac{1.96^2 (0.5)(0.5)}{0.05^2}$$

$$n = \frac{3.8416 \; x \; 0.25}{0.0025}$$

$$n = 384$$

The estimated total population of OVC in Garbatulla Sub-County is 6082 (KNBS, 2017). Since the total population is less than ten thousand (10,000), to get the current finite sample 'n' the following formula is used.

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Where,

n_0 = initial sample calculated as per large sample, which is 384.

N= population size, which is 6082

$$n= \frac{384}{1 + \frac{(384 - 1)}{6082}} = 358$$

To cater for non-response, the study added 10% (36) respondents; hence, the study's sample size was 394 respondents.

Sampling technique

A sampling frame was obtained from the Isiolo County Children's Department, which provided statistics on the distribution of OVC in all 3 wards of Garbatulla Sub-County; Kinna (108), Sericho(143), and Garbatulla(143). Sampling was done proportionately to get the required number of participants from each ward and then villages.

Simple random sampling was used to sample individual sample respondents from each village. Each eligible OVC from each of the three wards was allocated a unique number. Thereafter, the Stat Trek random number generator was then used to sample individual respondents to get the needed sample size in each ward and respective villages. Information from Isiolo County Children's Department further provided precise residences of the sampled respondents from each ward, where data collection instruments were administered.

Research instruments

The research developed and adopted a structured and semi-structured, pre-tested research-administered questionnaire, which was used to collect information on the study variables. The questionnaire used in the research is structured as per the given objectives.

Researcher administered questionnaire

The questionnaire was numbered as per the research-specific objectives. First, the nutritional status assessment of the under 5 OVC was assessed. The second part of the questionnaires covered information on disease profiles affecting under 5 OVC. Lastly, the questionnaire gathered information on health system factors affecting the nutrition status of the child. The questionnaire comprised preliminary sections for consenting and explaining the risks and benefits the participants may draw from the study. The questionnaire was administered in the local language to ease understanding of the information needed and assure the accuracy of the responses.

Key Informant Interview Schedule

A KII schedule was developed and utilized to collect qualitative data from 20 KIs mainly comprised of experts in child services, health care providers, and administrative personnel (chiefs and sub-chiefs). The KII was in-depth and gathered information on whether available structures, especially health systems factors available in the

study area enhance satisfaction of the nutritional needs of OVC. The KII also gathered information on the perceived status of OVC nutritional needs and whether these needs were met or not.

Pre-testing of research instrument

Before the actual study commenced, pre-testing of the research instrument was done on 10% (36) of respondents in three wards of Garbatulla. The pre-test study helped in making sure that the study was relevant, valid and can be relied on.

Testing for validity of research instrument

The content validity of data collection instruments was checked by three experts in public health and nutrition issues of concern to OVC; two university supervisors and a child services expert. The three assessed the data collection tools for the relevance of content and identified gaps and vague questions. The pre-testing also helped in identifying gaps in questionnaires and their relevance for timely correction. Any gap identified was corrected and research tools were then adjusted accordingly.

Testing for reliability of research instrument.

Test re-test approach whereby the data collection tools were administered to 10% of the study population (36 respondents) and repeated after a period of two weeks before the anticipated study period was used. The results from the two tests were compared to determine the precision of the responses obtained from a similar respondent probed on the study variables twice. The scores of correlation of more than 70% were considered acceptable.

Procedures of data collection

Nutrition assessment data

The left mid-upper arm circumference was measured using a tape measure. Weight was measured using a salter and bathroom scale whereas height/ length was measured using a height board stadiometer. A child less than 2 years old was measured lying down while an older child was measured standing.

Health system data

Here we focused on health system factors that enhance or hinder access to nutritional health care needs of the respondents including the type of facility nearby, distance to the facility, availability of child-friendly services, staff attitude, staff and essential basic medicine available all the time.

Morbidity profile data

Here information on the morbidity status of the child in the last month was inquired for. These included diarrheal disease, Tuberculosis, respiratory tract infection, urinary tract infection, HIV/ AIDS or any other disease the child had suffered from.

Method of research data analysis and presentation

Information collected using the structured questionnaire was then cleaned, coded, entered and analysed using SPSS version 26.0. Level one analysis entailed the use of descriptive statistics whereby measures of central tendency; mean, median, mode and standard deviation (SD) are then used to describe the study population. Level two analysis included the use of inferential statistics and; the Chi-square test for association between categorical dependent and independent variables (at $\alpha = 0.05$) whereas continuous variables were analysed using Pearson correlation. Independent variables showing association with the outcome variable at bivariate analysis underwent a binomial logistic regression model to examine the degree of how the variables are related as indicated by Odds Ratio (OR). Data was then presented in tables and figures (bar graphs, pie charts, and histograms) highlighting the major findings from the study.

Ethical Considerations

The study sought approval from the School of Graduate Studies, Mount Kenya University and

clearance from the Mount Kenya University Ethical Clearance Committee. Authority to carry out the research was further sought from the National Commission for Science, Technology and Innovation (NACOSTI). Permission to carry out the research was also requested from the County commissioner, County director of health services and sub-county medical officer of health. In addition, permission to undertake the research was sought from administrative personnel in the study area; chief and village elders. Participants were given necessary information in the language they understand well (Borana)- the purpose of the study, study procedures and any risk involved if any. They were also told about the benefit of the study as individual participants or as the community at large. Participants were also explained any available alternative procedures or options. They were told that their participation was voluntary and they could withdraw at any point in the study without suffering any negative consequences. In the process of consenting before they sign the consent form, their comprehension was tested to check their level of understanding and any query they asked answered to make sure that they understood all necessary information. All details and facts shared by participants were kept secret with the uttermost confidentiality it deserves. No personal details were connected to the data for analysis. A unique coded number was used instead of names during the interview sessions. Moreover, only the researcher and his supervisors had access to the information gathered during the study.

RESULTS AND DISCUSSION

Nutritional status of under 5 OVC

Acute malnutrition

Table 1 Acute malnutrition.

Age in moths	None		At risk		Moderate		Severe		Total	
	n	%	n	%	n	%	n	%	n	%
0-6 months	10	6.4	1	1.0	0	0.0	1	1.9	12	3.1
7-23 months	58	36.9	21	20.6	21	28.8	17	31.5	117	30.3
24-59months	89	56.7	80	78.4	52	71.2	36	66.7	257	66.6
Total	102	100.0	102	100.0	73	100.0	54	100.0	386	100.0

Out of the 386 children assessed, almost a third 127(32.9%) were suffering from acute malnutrition. Of which 73 had a moderate form of malnutrition whereas 54 were severely malnourished. The age cohort affected most was those above 24 months as shown in the table above.

Chronic malnutrition/ Stunting

Table 2 chronic malnutrition or stunting

Age in moths	None		At risk		Moderate		Severe		Total	
	n	%	n	%	n	%	n	%	n	%
0-6 months	12	4.4	0	0.0	0	0.0	0	0.0	12	3.1
7-23 months	87	31.6	20	31.7	6	21.4	4	20.0	117	30.3
24-59months	176	64.0	43	68.3	22	78.6	16	80	257	66.6
Total	275	100.0	63	100.0	28	100.0	20	100.0	386	100.0

On stunting, 28 (7.3%) children were found to have a moderate form of stunted growth whereas 20 (5.2%) were severely stunted. As in the case of acute malnutrition, the age group commonly

affected were above 2 years old children as shown in the table above.

Underweight

Children with a combined form of malnutrition having both features of acute and chronic form of malnutrition were noted to be 20(5.2%).

Health system factors that may influence OVC nutritional health

Table 3 Health Systems Factors Influencing Nutritional Health

Attributes		n	%
Level of facility child attending to get health services	HC/Hospital	164	42.5
	Dispensary	207	53.6
	Community level	15	3.9
	Total	386	100.0
Minutes are taken to reach the facility-coded	<= 15	105	27.2
	16 - 40	253	65.5
	41 - 69	19	4.9
	70 - 94	1	0.3
	95+	8	2.1
	Total	386	100.0
Rate the attitude health care workers	Good	345	89.4
	bad	41	10.6
	Total	386	100
Rate the availability of medicines and immunization services for the young child at the health facility all the time	Good	360	93.3
	Bad	26	6.7
	Total	386	100.0

More than half of the respondents get their health services from dispensaries compared to those seeking health services from health centres or at a community level. The majority of the community members take less than 40 minutes to reach the health facility. This is because health facility is normally built in highly populated centres that the majority of the population can access. Health services providers were present most of the days and generally majority of the community members were satisfied with the services provided at the facilities as shown.

Morbidity factors affecting under 5 OVC nutritional status

Table 4 Morbidity Profile of under 5 OVC

Attributes		n	%
The child has been sick in the last (1) month	Yes	277	71.8
	No	109	28.2
	Total	386	**100.0**
The illness the child suffered from	Worm infestation	3	1.1
	Urinary tract infections	14	5.1
	Malaria	2	0.7
	Fever	37	13.4
	Diarrhea	40	14.5
	Cough/RTI	180	65.2
	Total	277	**100.0**
The child sought medical attention	Yes	274	98.9

Attributes			n	%
	No		3	1.1
	Total		277	**100.0**
For yes, where the child sought medication	Traditional herbal medicine		1	0.4
	Over-the-counter medicine from a shop or chemist		1	0.4
	Nearby health facility		272	99.3
	Total		274	**100.0**
Whether sickness affected the child's appetite	Yes		260	93.9
	No		17	6.1
	Total		277	**100.0**
For yes how sickness affected the child's appetite	decreased appetite		256	98.5
	Increased appetite		4	1.5
	Total		260	**100.0**

More than half of the respondents suffered from one of the common ailments in the last 1 month. The common ailments included cough/RTI, diarrhoea, fever, worm infections and lastly malaria. A child might have suffered from multiple ailments but the most significant one was recorded. The majority of the children who were sick sought medical attention at the locally available public health facility. In almost all cases, ailments affected the appetite of the involved child.

Relationship between health service factors, morbidity profile and nutritional status of under 5 OVC

Table 5 Factors associated with malnutrition

1. **Health system factors**

	Description	malnutrition		Bivariate analysis		Multivariable analysis	
		No	Yes	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Level of health facility	**Community**	9	6	*Reference*			
	Dispensary	110	97	**1.32 (0.46, 4.07)**	**0.608**		
	HC/Hospital	112	52	**0.70 (0.24, 2.17)**	**0.513**		
Time to facility	**NA**			**1.00 (0.98, 1.01)**	**0.996**		
Attitude of health worker	**Good**	219	126	*Reference*			
	bad	12	29	**3.51 (1.74, 7.46)**	*<0.001*	**1.98 (0.91, 4.48)**	0.091
Availability of medicine and immunization services all the time	**Good**	223	137	*Reference*			
	Bad	8	18	**3.66 (1.60, 9.14)**	*0.003*	**1.87 (1.35, 2.68)**	0.037
2. **Morbidity factors**							
Illness in the last one month	**No**	73	36	*Reference*			
	Yes	158	119	**1.53 (0.96, 2.45)**	**0.074**	**1.57 (0.95, 2.65)**	**0.085**
Sickness affected the child's appetite.	**No**	7	10	*Reference*			
	Yes	151	109	**1.58 (1.01, 2.50)**	*0.045*	**0.55 (0.34, 0.93)**	0.056

On the health services factors the study from regression analysis showed that negative attitudes towards health workers increased the odds of malnutrition by 3.51 times with crude OR 3.51 (95% CI 1.74, 7.46). A lack of medicines and vaccines in the health facility increased the odds of malnutrition by 3.66 times: crude OR 3.66(95 CI 1.60, 9.14) compared to facilities that did not lack medicine and immunization services. After an adjustment for confounders, this was found to be still significant (p=0.032). The above findings reinforced the perception of community members as indicated by KII who said that staff were available all the time to give uninterrupted services at the facility. The availability of basic services like immunization and basic medicines at the facility and the perceived good attitude of health caregivers by the community members can have a positive health impact on healthcare consumers enhancing the utilization of available services. The availability of staff motivates the community to maximally use the facility when in need and to treat common ailments that may negatively impact nutrition in case infections are not treated on time.

Long distances limit the ability to seek nutritional health services. As many as 90% of the KII respondents showed that most of the population is living in the main settlement area between 0.5 and 2.5km away from a health facility. However, other community members are pastoralists living far away from the main settlement area where the distance ranges from 10-30km. The only means of transport for them is a motorbike which is said to be expensive and most people cannot afford it. The only road connecting Kinna and Garbatulla is tarmacked. This can pose a great challenge in times of emergency, especially during the rainy season when the roads are impassable. These results agree with a study conducted by Abinya (Abinya et al, 2017) which studied the prevalence of malnutrition and related factors among children aged 6-59 months admitted at Siaya County referral hospital paediatrics wards who found that the attitude of

healthcare workers, availability of medicines and immunization services for the young children influenced nutritional status. A study by Moyo (Moyo et al, 2018) looked at sanitation practices as a health system factor. The sanitation practices investigated were water, sanitation and hygiene (WASH). The study found that these factors which are part of health strengthening and preventive protocol significantly influenced the nutritional status of under 5 children.

Likewise, results of the study showed that nutritional status among under 5 years orphans and vulnerable children was significantly explained by whether the child suffered from any illness the previous month. Children whose appetite was affected by sickness in the last month were 58% more likely to develop malnutrition compared to their counterparts: crude OR 1.58 (95 CI 1.01, 2.50). A study by Bore (Bore et al, 2019) on the assessment of determinants of under-nutrition and food security in the Moiben sub-county, Uasin Gishu County agreed with the study findings that sickness in the previous month(s) is positively related to malnutrition (chi-square =291.731, df=6, p-value=0.001). Similar findings were from a study by Abinya (Abinya et al, 2017) which indicated that the illness a child suffered from previous months was significantly associated with nutritional status among children admitted at the Siaya County referral hospital.

Study limitation

The main limitation is that while the needs of orphans and vulnerable children are diverse including health, housing, education and many others, the current study looks only at morbidity profiles and health system factors as determinants of under 5 OVC nutrition status.

CONCLUSIONS

From the research findings on the quantitative data analysis the following can be summarized: Acute Malnutrition in OVC is rampant in Isiolo County. As many as 127(32.9%) were either moderately or

severely malnourished. Moderate and severe stunting was found to be at 12.5%. The main age group affected is 24-59 months. Malnutrition is rare in under 6 months in exclusively breastfed children. In short research findings showed that negative attitude towards healthcare workers, unavailability of basic curative and preventive services like immunization and sickness in the previous 1 month was associated with adverse nutrition.

Recommendations

Recommendations for practice

Engaging in outreach services and community education on hygiene and prevention of common ailments like respiratory tract infections and diarrheal disease. This can be done by health workers at public places like markets and chief barazas.

Strengthening of level one community health services and training of community health volunteers on the danger of malnutrition and timely referral to health facilities.

Food diversification through animal rearing and crop farming to reduce the rampant level of malnutrition in the local community.

Expanding and strengthening monetary support of underprivileged and poor members of the community through cash transfers by the national government.

Community capacity building. The authority through the relevant ministries should educate community members on acquiring basic income-generating skills: Business skills, agricultural skills, and building and construction skills. This will increase income-generating activities and food diversification which is lacking in the current setting.

Recommendation for the research

This topic provides opportunities for further research to enhance determinants of nutritional status among under 5 years orphans and vulnerable children in both rural and urban communities. Similar studies should be rolled out in other counties to allow comparative analysis of similar studies.

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