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Association Between Caregiver's Nutrition Knowledge and Nutrition Status of Children 6 to 23 Months: A Case Study of Narok County Referral Hospital

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ABSTRACT

In Narok County, Kenya, where the challenge of achieving optimal child nutrition persists, particularly in the context of its arid and semi-arid climate, the prevalence of stunting among children is alarmingly high compared to other regions. Addressing this critical issue necessitates an enhancement of caregivers' nutrition knowledge. However, scant information is available on the nutritional knowledge of caregivers responsible for children aged 6 to 23 months, a gap that extends beyond Narok County to encompass broader regions in Africa, including Kenya. Consequently, this study was designed to examine the nutritional knowledge of caregivers within Narok County for children in this age group. All approvals including ethical clearance from Kabarak University Research and Ethics Committee (KUREC), research permit from NACOSTI and permit from Narok County Referral Hospital were sought before commencement of the study. This research adopted a descriptive cross-sectional design, and fisher's formula was used to calculate a sample size of 108 caregivers to children aged 6 to 23 months who were purposively recruited. Data were analysed using SPSS version 25 and ENA SMART soft wares. The results indicate a variation in caregivers' nutrition knowledge levels, with 37.0% demonstrating a high level of knowledge, while 27.8% exhibited low knowledge. Moderate knowledge levels were observed in 14.8% of caregivers, while 9.3% had very low knowledge. Furthermore, there was a low positive correlation observed between nutrition knowledge and Height-for-Age Z-score (HAZ), with a correlation coefficient of r=0.235 and a p-value of 0.014. Significantly, HAZ exhibited a higher percentage of normal scores when compared to stunted children (p-value: 0.05*). In conclusion, the study found significant variation in caregivers' nutrition knowledge across the region, which in turn had an impact on the nutritional outcomes of the children. Therefore, we recommend targeted and continuous nutrition education to care-givers of children in Narok County. Caregivers with better nutrition knowledge tend to provide better nutrition to their children. There is need to train and capacity build community health workers to have necessary knowledge and skills for effective nutrition education.

Keywords: caregivers, children, 6-23 months, nutrition knowledge

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INTRODUCTION

Achieving optimal child nutrition remains a fundamental challenge for improving human development. The limited time and capacity of caregivers, coupled with inadequate access to food, result in many children being unable to obtain the nutrients they need for healthy growth (Food and Agriculture Organization [FAO], 2003). However, nutritional knowledge of caregivers to children can help improve the situation. Global research has shown that addressing malnutrition early on is an effective way to combat the problem (Olack et al., 2011). The United Nations International Children's Fund (UNICEF, 2020) has linked optimal nutrition during childhood to national development and the potential of future generations. As such, a well-nourished population is essential for productivity and improved standards of living.

Malnutrition is a global concern with an estimated 230 million children affected, as reported by UNICEF (2021). Cesare et al. (2021) estimated that 149.2 million children under the age of five years were stunted, 45.4 million were wasted, and 38.9 million were overweight. African Union (2020) estimated that 12.7 million children under the age of 5 years were acutely malnourished, with 3.5 million among them being severely wasted in sub-Saharan Africa. Maternal malnutrition affects fetal development, which leads to malnutrition in children in developing nations (IFPRI /SCN, 2000). Sunuya et al. (2017) conducted research in Tanzania, where they found that adequate training and education on nutrition for caregivers improved the nutritional status of children. Their study recommended continuous training for caregivers in the communities to enhance child nutrition, similar to the results of Kabahenda et al. (2017) in western Uganda.

The level of caregivers' nutrition knowledge in Narok County, Kenya remains a significant yet uncharted concern. According to the Kenya Demographic and Health Survey Report of 2022, the county faces a critical challenge with 5% of children under five years old suffering from wasting, and a staggering 18% experiencing stunted growth. These alarming figures have raised a red flag, categorizing the situation as a nutritional emergency by the World Health Organization (WHO). Despite consistent efforts by the Government of Kenya (GoK) and various development agencies spanning several decades to address this issue, the persistence of acute and chronic malnutrition in the region points to a critical gap in our understanding of the factors contributing to these high rates, particularly concerning caregivers' nutritional knowledge.

Caregivers play a pivotal role in shaping the nutritional well-being of children aged 6 to 23 months. Their level of nutrition knowledge directly impacts the dietary choices and practices they implement for their children. Inadequate caregiver knowledge can lead to suboptimal feeding practices, potentially exacerbating the existing malnutrition crisis in Narok County. It was essential to assess and address this knowledge gap to develop effective strategies that can empower caregivers with the knowledge and skills required to provide optimal nutrition to their children.

Understanding the extent of this knowledge gap in Narok County is crucial for designing targeted interventions to improve child nutrition outcomes. While nutrition interventions have been ongoing, their effectiveness may be hindered if the specific areas of knowledge deficiency among caregivers are not identified and addressed. This study aimed to bridge this knowledge void by comprehensively evaluating the nutrition knowledge of caregivers for children aged 6 to 23 months in Narok County Referral Hospital.

MATERIALS AND METHODS

Study Design

This study adopted a descriptive cross-sectional survey design using a quantitative data collection approach (Simkus, 2021). The design was chosen as it allows for the collection of data at a single point in time from a diverse group of participants. Furthermore, it is suitable for capturing a snapshot of the current state of nutrition knowledge among caregivers for children aged 6 to 23 months in Narok County.

Study Area

The study was carried out at the Narok County Referral Hospital (NCRH) in Kenya, which is the leading Referral Hospital in Narok County and provides healthcare services to a large population in the region. The study was conducted in the paediatric ward, the nutrition unit of the hospital, where kids aged 6-23 months and their caregivers receive nutritional care and maternal child health unit where children aged 0-5 years and their caregivers receive services.

Sample Size Determination

The sample size for this research was determined according to the formula of Fisher et al. (1998) at a prevalence rate of malnutrition 6.8% (SMART,2018). The population of children aged 6-23 months in Narok County is estimated to be 5859 (KHIS, 2021). Therefore, the formula: $n=(z^2*pq)/d^2$ was applied as follows: where Z value of 1.96, q(1-p), 0.05 error and 95% CI and a sample size of 108 was determined.

Sampling Procedure

Purposive sampling techniques was used to select the study location due to subject availability and on the basis of certain considerations such as prevalence of malnutrition (Patton, 1990). Similarly, Purposive Sampling Technique was used to select subjects who qualify the inclusion criteria: Caregivers to children aged 6-23 months and attending Narok County Referral Hospital (NCRH) who gave consent to participate in the study, children aged 6-23 months and attending NCRH whose legal caregivers gave assent to participate in the study and children who were malnourished. Narok County and NCRH was purposively chosen on the basis of high prevalence of malnutrition (County Health Report, 2022). Consistency was maintained to avoid changing standards.

Study Variables

The following were the independent variables: caregiver nutritional knowledge such as food preparation, balanced diet and food handling. Social-economic and demographic data (age of the caregiver, marital status, monthly income, location, child gender and age). The dependent variable was nutritional status as the outcome for children aged 6 to 23 months.

Data Collection

Before data collection, all the requisite approvals were obtained. A pilot survey was carried out to ascertain the accuracy of the questionnaire in Ololulunga Sub-County Hospital. Research assistants were recruited and trained prior to data collection. During the actual data collection, the participants were identified, consented and recruited on the inclusion criteria. A semi-structured questionnaire was administered which included all the study variables used to collect data. The questions covered breastfeeding, complementary feeding, food preparation methods, importance of various food groups and hygiene The data were collected in a private room convenient to ensure subject privacy and confidentiality. All questionnaires were filled and reviewed to ensure that all questions were correctly completed.

Data Management and Analysis

Quantitative data was entered, cleaned and analyzed on SPSS version 25. The data were further analyzed as follows: demographic and socio-demographic characteristics were assessed through descriptive analysis. The overall nutrition knowledge aggregate was transformed into percentages. These percentage scores were then divided into five categories: 0-20% (very low), 21-40% (low), 41-60% (moderate), 61-80% (high), and 81-100% (very high), in line with the approach used by Chege and Kuria (2017). Correlation analysis was done to evaluate the relationship between the carergiver nutritional knowledge and HAZ score for children. Results were presented in form of tables, graphs and charts.

Ethical Considerations

Ethical clearance was obtained from Kabarak University Ethics Committee Ref No KUREC-050623, followed by a research permit from National Council for Science and Technology (NACOSTI) Ref No 135190. Permission was also sought from the County Director of Health, Narok County and Medical Superintendent Narok County Referral Hospital. The participants were informed on the objectives of the study, taken through a detailed informed consent, the eligibility criteria, the risks, benefits and that participation in this study was voluntary and hence they had the right to withdraw at any point during the study.

RESULTS

Demographic and Socio-economic Characteristics of Study Participants

A total of 108 caregivers were surveyed, and their characteristics are described as follows: Regarding the nature of the caregiver, the majority (91.7%) were mothers, emphasizing their central role in child care. Fathers constituted a smaller portion at 2.8%, while grandmothers accounted for 5.6% of the sample. The age distribution of caregivers was diverse, with 44.4% falling in the 19-25 years range, making it the most prevalent group. The 26-35 years age group comprised 35.2%, indicating a significant proportion of young to middle-aged caregivers. The 36-45 years category represented 11.1% of the caregivers, while both the <18 years and >45 years groups accounted for 4.6% each. Marital status among the caregivers varied, with 73.1% being married, indicating a predominantly married caregiver population. Single caregivers constituted 21.3% of the sample, while separated and divorced caregivers made up smaller percentages of 3.7% and 1.9%, respectively. In terms of family size, the study showed a range of family structures. The most common family size was 3 to 5 members, representing 68.5% of caregivers. Family sizes of 0 to 2 members were reported by 13.0%, and larger families with 6 to 10 members constituted 18.5% of the sample. Residential areas of the caregivers were distributed across different settings. Urban formal settlements were the most common, with 35.2% of caregivers residing there. Rural semi-arid areas were home to 26.9% of caregivers, while urban informal settlements and rural highlands were the residential areas for 23.1% and 14.8% of caregivers, respectively. (See table 1 below).

Table 1:
Demographic Characteristics of Caregivers of Children 6 to 23 Months Attending Narok County Referral Hospital

Characteristics	Variable	N(108)	%
Nature of the care giver	Mother	99	91.7
	Father	3	2.8
	Grandmother	6	5.6
Age of caregiver (years)	<18	5	4.6
	19-25	48	44.4
	26-35	38	35.2
	36-45	12	11.1
	>45	5	4.6

Characteristics	Variable	N(108)	%
Marital status	Single	23	21.3
	Married	79	73.1
	Separated	4	3.7
	Divorced	2	1.9
Family size	0 to 2	14	13.0
	3 to 5	74	68.5
	6 to 10	20	18.5
Residential area	Rural Semi-Arid	29	26.9
	Rural Highlands	16	14.8
	Urban Informal Settlement	25	23.1
	Urban formal Settlement	38	35.2

Socio-economic Characteristics of Caregivers of Children Aged 6-23 Months

Table 2 shows the socio-economic characteristics of the study participants. Majority (43.5%) had attained secondary school education while 7.4% had no formal education. 28.7% were housewife's while 9.3% were in formal employment. 46.3% had and household monthly income below KSHS10,000. The source of food was predominantly through purchase (66.7%), with 24.1% deriving food from production and 6.5% utilizing a combination of production and purchase. (See Table 2 below).

Table 2:

Socio-Economic Characteristics of Caregivers of Children 6 to 23 Months

Characteristic	Category	N(108)	%
Educational level	No formal education	8	7.4
	Primary	30	27.8
	Secondary	47	43.5
	Tertiary	23	21.3
Occupation	House wife	31	28.7
	Casual laborer	30	27.8
	Farming	18	16.7
	Small business	19	17.6
	Formal employment	10	9.3
Household monthly income (KSHS)	<10,000	50	46.3
	11,000-15,000	29	26.9
	16,00-20,000	16	14.8
	21,000-25,000	4	3.7
	>26,000	9	8.3
Source of food	Production	26	24.1
	Borrowing	2	1.9
	Purchase	72	66.7
	Production/Purchase	7	6.5
	Borrowing/Purchase	1	0.9

Table 3:
Demographic Characteristics of Children 6 to 23

Characteristic	Category	N (108)	%
Age (months)	6-8	24	22.1
	9-11	25	23.1
	12-17	20	18.5
	18-23	39	36.1
Sex	Male	59	54.6
	Female	49	45.3

The children were well-represented across different developmental stages. Majority (36.1%) were within 18-23 months category, while age groups of 6-8 months, 9-11 months, and 12-17 months accounted for 22.1%, 23.1%, and 18.5% respectively. The mean age was 13.65±5.708. The gender distribution showcased a near-equal split, with 54.6% of the children being male and 45.3% female as shown in Table 3 above.

Nutrition Knowledge Among Caregivers

The findings in table 4 indicate a diverse range of nutrition knowledge levels among participants, with 37.0% demonstrating high knowledge and 27.8% showing low knowledge, necessitating further education. Moderate knowledge levels were exhibited by 14.8% and 9.3% had very low knowledge, revealing potential gaps. Encouragingly, 11.1% showed very high knowledge. These variations underscore the need for tailored interventions. Regarding sources of nutrition knowledge, nutrition programs was significant for 40.7% followed by media at 32.4%. Community health workers played a role for 12.0%, while 4.6% benefitted from combined sources. Social networks contributed to 9.3%, while only 0.9% lacked identifiable sources as shown in Table 4 below.

Table 4:
Nutritional Knowledge Scores and Source Among Caregivers

Variable	N (108)	%
Score %		
0-20 (Very low)	10	9.3
21-40 (Low)	30	27.8
41-60 (Moderate)	16	14.8
61-80 (High)	40	37.0
81-100 (Very high)	12	11.1
Source of nutrition knowledge		
community health worker	13	12.0
Media	35	32.4
nutrition programs	44	40.7
Community health workers/ media/nutrition programs	5	4.6
Family members/Friends/neighbours	10	9.3
None	1	0.9

Height for Age Z Scores

Findings in Table 5 show that 60.1% of children had normal height-for-age z scores, reflecting healthy growth. Among the study children, 16.7% were moderately stunted, and 23.1% were severely stunted. In terms of overall stunting (height-for-age z scores <-2 SD), 39.8% of study children were stunted. Males had a prevalence of 37.3% and females 42.9% of stunting, indicating a higher prevalence among females (see Table 5 below).

Table 5:
Prevalence of Stunting Measured by Height for Age and Z Score and Sex of Study Children 6 to 23 Months

Categorization of nutrition status	Male		Females		Total	
	N (59)	%	N (49)	%	N (108)	%
Normal	37	62.7	28	57.1	65	60.1
Moderate stunting (<-2 ->-3 SD)	10	16.9	8	16.3	18	16.7
Severely stunting (≤-3SD)	12	20.3	13	26.5	25	23.1
Stunting (<-2 SD)	22	37.3	21	42.9	43	39.8

DISCUSSION

According to the findings, majority (93.1%) of the caregivers were mothers underscoring the pivotal role in caregiving responsibilities. The average age of the caregiver/mother was 19-25 (44.4%) years and 26-35 (35.2%). Majority were married (73.1%), this showed a positive influence on the nutritional status of children where both parents shared responsibilities in providing for the family by purchasing food, meal preparation and healthcare expenses. Presence of both parents also enhances family's ability to provide conducive housing, sharing knowledge and emotional support to the breastfeeding mothers (Ochieng et al., 2022).

Most of the caregivers (43.5%) had attained secondary school education and above while 7.4% had a low level of education. Caregiver's education is an integral part in enabling him/her to provide appropriate care to the children especially at the age of 6 to 23 months. Previous studies have proven that caregivers with low education may tend to pay less attention to nutritional education and basic principles such as importance of balance diet, portion size, food groups and nutritional needs of children at different stages of development. Most of the low educated caregivers mainly rely on traditional beliefs, cultural practices or personal preferences when it comes to feeding their children; they also have limited access to reliable, accurate, up-to-date sources of nutrition information thereby contributing to poor decision-making in regards to children's nutrition, food choices and preparation (Verdonschot et al., 2021). These findings were consistent with other studies carried out in similar environment, for instance a study carried out in Malawi established that majority of the care givers were mothers with an average age of 20-30 years and had attained a secondary school education, these factors contributed significantly to the wellbeing of their children (Kuchenbecker et al., 2017).

The study found that there were diverse range of nutrition knowledge levels among the care givers, it was encouragingly to note that 11.1% of the caregivers had very high nutritional knowledge on breastfeeding, complementary feeding, food groups and their importance and 37.0% demonstrated high knowledge. Caregivers nutritional knowledge may influence the variety of foods available in the household and quality of children's diet (Christian et al., 2016). Previous studies have indicated the importance of nutrition knowledge, interventions contribute to their children wellness (Kuchenbecker et al., 2017). A smaller number had moderate knowledge (14.8%) levels, 27.8% had low knowledge, while 9.3% had very low knowledge. A study concurs with a study conducted in Nigeria by Akerodolu et al. (2022) showed that caregivers with low nutrition knowledge, their children nutrition status was associated with stunting. Chege & Kuria (2017) had proven that caregivers with good nutritional knowledge are able to up bring healthy children by embracing good dietary practices while parents with low nutritional knowledge on child feeding usually adopt poor feeding practices.

There was a considerable number of caregivers (37.1%) who had poor nutritional knowledge on infant and young child nutrition, most of them could not determine foods of the same food groups. For example, potatoes and rice was regarded as a balanced diet and a rich source of iron as their knowledge could be influenced by their cultural practices, beliefs and availability of locally produce foods. Previous studies have demonstrated that caregivers with poor nutritional knowledge have inadequate understanding of dietary requirements, lack awareness of balanced diets, practices insufficient breastfeeding, lack knowledge on complementary feeding, have limited awareness of food safety and hygiene and lack knowledge on nutrition related illnesses; this contribute significantly to their children poor wellbeing resulting to stunted growth and disease susceptibility (Motebejana *et al*., 2022). To promote good nutrition among children, provision of nutritional knowledge to the caregivers and other members of the community is very essential as it will prevent malnutrition in children (Ongosi, 2011).

The study found that majority (40.7%) of the caregivers reported that healthcare workers as the source of nutrition information on breastfeeding, complementary feeding, immunization and hygiene, 32.4% reported media as source of nutrition information, 12.0% reported getting information from community health workers during outreaches, church meetings and barazas. These findings emphasize the role of healthcare workers, media, religious leaders, national and county administration in the provision and promotion of quality healthcare services. A study conducted in Ghana by Christiana *et al*. (2019) showed that, when a healthcare workers attach much importance to the need to praise caregivers to motivate and spur them on to continue their good child care practices, results to heathy children. It is therefore important for health care workers to give priority to nutritional knowledge while attending mothers and babies during anti natal and post-natal clinic. Existing information have demonstrated that collaboration between healthcare providers and other partners such as media and religious leaders can significantly improve public health especially in creating awareness, increases the level of information about a health subject, make a health topic more noticeable and also demystify harmful myths and misconceptions, this in return result to a health population (Liu *at al.,* 2018).

The study revealed 60.1% of children who had normal height-for-age z scores, reflecting healthy growth, these finding could have been influenced by the urban nature of the study location. Narok Town is a major business hub in Narok County and a host to major national and county government institutions including Maasai Mara University; other studies have shown that majority of people who reside in urban centers have good monthly income, education, good access to healthcare services, active health insurance and formal employment with good terms compared to their rural counterparts; these features further contributes to having children with normal growth and development (Forh *et al.,* 2022). However, 16.7% of the children were moderately stunted, and 23.1% were severely stunted. Further analysis revealed a notable relationship between caregivers' nutrition knowledge and the occurrence of stunting in children ($\chi 2$=0.245, p-value=0.011). This result underlines a statistically significant connection between these two factors. The small p-value suggests that the observed relationship is unlikely due to chance, highlighting the potential impact of caregivers' nutrition knowledge on the stunting status of children in this age group (Guyatt *et al.,* 2020). There was positive correlation between the nutritional status children and age of a child (r = 0.242*, p = 0.011), time of complementary feeding (r = 0.221*, p = 0.022), nutritional knowledge (r = 0.235*, p = 0.014), food groups (r = 0.279**, p = 0.003), meal frequency (r = 0.065, p = 0.505). These findings were consistent with studies carried out in India and Nigeria, where it was confirmed that children who were born underweight improved their nutritional status as age progressed from 6 to 23 months and other complementary feeding was being undertaken. Training caregivers on nutritional knowledge enabled them incorporate all essential food groups and increase daily meal frequencies thereby improving the health of their kids (Kanjilal *et al.,* 2010; Timothy *et al.,* 2012)

CONCLUSION

The study found a significant variation in caregivers' nutrition knowledge across the region, which in turn had an impact on the nutritional outcomes of the children.

RECOMMENDATION

We recommend a targeted and continuous nutrition education to care-givers in Narok County to equip them with necessary skills and knowledge for breastfeeding, food diversity, sanitation and hygiene in order to prevent child malnutrition.

Conflict of Interest

Authors declare no conflict of interest.

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Author Contributions

SN: Data collection and analysis, manuscript writing and revisions; PC: study supervision and manuscript review and; MW: study supervision and manuscript review.

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