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Factors Associated with Household Dietary Diversity among Internally Displaced Persons in Nakwamekwei Camp, Kenya

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Abstract The objective of this study was to assess factors associated with household dietary diversity score (HDDS) among internally displaced persons (IDPs) in Nakwamekwei IDP camp. A total of 159 IDPs aged≥18 years were recruited in this cross-sectional survey. Participants were recruited using systematic random sampling. Socio-demographic, anthropometric measurements, food security, HDDS, physical health, mental health and social support data were collected using a researcher administered questionnaire. Logistic regression model was used to examine associations between HDDS with factors known to affect HDDS. More than half of the population (55%) were underweight. About 66% of the IDPs had low HDDS, and 94% were food insecure. The prevalence of anxiety and depression symptoms was 45% and 77% respectively. In adjusted analyses, participants with anxiety [OR 1.16 (95% CI 1.10-1.28)] and depression [OR 2.30 (95% CI 1.55-3.40)] symptoms had significantly low HDDS. Additionally, each unit decrease in physical score was significantly associated with 57% increased risk of low HDDS [OR 1.57 (95% CI 1.15-2.14)] while each unit increase in social support score was significantly associated with 8% higher HDDS [OR 0.92 (95% CI 0.86, 0.97)]. Socio-demographic and lifestyle factors were not significantly associated with HDDS. Participants with high anxiety and depression symptoms as well as low physical score had low HDDS. Interventions that focus on improving the food security and socioeconomic status of the IDPS should be strengthened as this will lead to improvement of the IDPs overall health.

Keywords: *household dietary diversity, food security, IDP, social support, mental health, Kenya*

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1. Introduction

Consuming a diverse diet is important in ensuring high quality diets as previous studies have associated dietary diversity with improved diet quality [1]. Dietary diversity refers to the number of different foods or food groups consumed over a given reference period [2]. Dietary diversity is a good indicator of diet quality [1,3,4,5] and is also associated with nutritional status [5,6]. Many studies have shown that the more diverse a person's diet is, which is demonstrated through the inclusion of many food groups in a diet, the more likely the person is able to meet their nutrient requirements [1,7,8]. Dietary diversity is important in meeting both macro and micronutrient requirements of those at risk of nutritional deficiencies and is an indicator of nutrient adequacy and diet quality [10] as well as food security [11].

Unfortunately, vulnerable groups like internally displaced persons (IDPs) have poor nutritional status as a result of inadequate nutrient intake [12,13,14]. Internally displaced persons (IDPs) are at risk of nutritional deficiencies as many of them suffer from food insecurity [12,15,16], poor nutritional status [12,13], poor physical health [16,17,18] and mental health [16,19]. By the end of 2019, 79.5 million people had been forcibly displaced from their homes [20]. Over 50 million people were living in displacement within their own borders by the end of 2020 and of these 90% had been displaced by conflict and violence [21]. In Kenya 162,000 people were displaced by the end of 2020 [21]. During the 2007 post-election violence over 1133 were killed and 600,000 displaced. Although the violence subsided many people remain displaced. The present study sought to assess the determinants of dietary diversity among IDPs in Nakwamekwi IDP Camp, Turkana, Kenya.

2. Methods

2.1. Study Design

This study used a cross sectional survey to assess the determinants of dietary diversity of IDPs in Nakwamekwi IDP Camp, Turkana County.

2.2. Study Setting and Sample Recruitment

A sample of 159 household heads were selected from 400 households in the Nakwamekwi IDP Camp using systematic random sampling.

2.3. Data Collection

Data was collected using a researcher administered questionnaire that had questions on demographics and socioeconomic characteristics, food security and household dietary diversity, physical and mental health. Anthropometric measurements were also collected.

2.3.1. Measures

Demographic measures

Demographic characteristics comprising age, marital status, number of children, number of people in household, employment status, years lived in IDP camp, place of residence before displacement, and level of education were collected.

Anthropometric measurements

Participants' weight and height were taken to calculate their body mass index (BMI). Height was measured using a SECA stand portable stadiometer using standard procedures [27,28]. In addition participants were requested to remove their shoes. The measurements were recorded to the nearest 0.5 cm. Weight was measured using an electronic portable SECA scale that was placed on flat level ground. Weight was calculated to the nearest 0.1 kilogram (kg) and participants were requested to remove their shoes, heavy clothing as well as empty their pockets. BMI was calculated as weight/height^2 (kg/m^2) and classified according to the WHO classification [22].

Household Food Insecurity Access Scale (HFIAS)

The Household Food Insecurity Access Scale (HFIAS) was used to measure household food insecurity. Using the HFIAS guidelines [23] the households were categorized as food secure or food insecure. The HFIAS has been used and validated in several countries [23] and used to measure food insecurity among refugees, IDPS and other conflict affected population [12,16].

Household Dietary Diversity Scale (HDDS)

The Household Dietary Diversity Scale (HDDS) was used to measure nutrient intake. The scale consists of 12 food groups and household was asked if they consumed any of the food groups within and outside the home over the past 24 hours [24]. The HDDS was further categorized into two groups: low HDDS (less than 3) and high HDDS (4 and above).

Mental Health

The participants' mental health was assessed using the Hopkins Symptom Checklist (HSCL). The Hopkins Symptom Checklist (HSCL) consists of 25 items that assess anxiety (10 items) and depression (15) items. All the 25 items are measured on a 4 point Likert scale and scores are summed up and divided by 25 (the number of items) to derive participants' scores. Those with scores of >1.75 are considered to have symptoms of anxiety and depression. This scale has been used among refugees and IDPs [16,25,26].

Physical Health

Physical health was measured using the 7-item short version of the 26 item WHO Quality of Life-BREF (WHOQOL-BREF) tool. These 7 items represent the physical domain of the WHOQOL-BREF. This version has been used among IDPs [16,19]. This item was used using set guidelines and higher scores indicate better physical health while lower scores are an indicator of poor physical health.

2.4. Data Analysis

The Statistical Package for the Social Sciences (SPSS) version 20 (SPSS IBM, New York, USA) was used for statistical analysis. Cronbach alpha was used to assess the internal consistency of the scales used to measure food security (α=0.86) and household dietary diversity scale (α=0.79). Comparisons between groups were performed using the $\chi 2$ test for categorical data and the Wilcoxon rank-sum test for continuous variables. Logistic regression analysis was used to examine cross-sectional unadjusted and multivariable adjusted associations between HDDS, socio economic and demographic, mental and physical health factors. Results are presented as an odd ratio (OR), with 95% confidence interval (CI). Evidence against null hypotheses was considered statistically significant if p values were <0·05. The goodness of fit of the final adjusted logistic regression models was assessed using the Hosmer–Lemeshow statistic.

2.5. Ethical Approval

Ethical approval for this study was provided by the Mount Kenya University Ethical Review Committee. All the study participants provided informed consent.

3. Results

One hundred and fifty-nine household heads, of which 115 (72.3%) were female, participated in the current study. The age of the participants ranged from 18 to 74, and their mean age was 47.8 (SD±18.5). The participants had lived in the camp for an average of 7.8 (SD±2.16) years and majority were unemployed (97.5%) with little or no education (95%). The average household size was 6.7 (SD±3.2) and 93.5% of the participants were food insecure. In addition, 45.9% had symptoms of anxiety, 77.4% had symptoms of depression, while 65.8% had low scores for dietary diversity. Participants' demographic characteristics, BMI, dietary diversity, anxiety and depression status are presented in Table 1.

Table 1. Characteristics of the study population according to the household dietary diversity score

Variables		Household Dietary Diversity Score (HDDS)			p value
		Total population 159 (100%)	Yes 53 (34.2%)	No 102 (65.8%)	
Age (years)					
	18-30	34 (21.9)	8 (23.5)	26 (76.5)	
	31-50	51(32.9)	14 (27.5)	37 (72.5)	0.05
	51-100	70 (45.2)	31 (44.3)	39 (55.7)	
	Mean (SD)	47.8 (18.46)	50.1 (16.56)	46.6 (19.35)	
Gender					
	Male	44 (27.6)	15 (34.1)	29 (65.9)	0.90
	Female	11572.3)	38 (33.0)	77 (67.0)	
Marital status					
	Married	92 (57.9)	28 (30.4)	64 (69.6)	0.36
	Single	67(42.1)	25 (37.3)	42 (62.7)	
Education level					
	High school education and above	7(4.4)	1 (14.3)	6 (85.7)	0.27
	Primary education and below	152(95.6)	52 (34.2)	100 (65.8)	
Employment status					
	Employed	4(2.5)	1 (25.0)	3 (75.0)	0.72
	Unemployed	155(97.5)	52 (33.5)	103 (66.5)	
Household size					
	<5	67(42.4)	24 (35.8)	43 (64.2)	0.24
	6-10	72(45.6)	20 (27.8)	52 (72.2)	
	>10	19(12.0)	9 (47.4)	10 (52.6	
Children in household					
	<5	108(67.9)	34 (31.5)	74 (68.5)	0.47
	>5	51(32.1)	19 (37.3)	32 (62.7)	
BMI					
	Underweight	55(35.0)	17 (30.9)	38 (69.1)	
	Normal	98(62.4)	36 (36.7)	62 (63.3)	0.27
	Overweight/Obese	4(2.5)	0 (0.0)	4 (100.0)	
	Mean (SD)	19.6 (2.94)	19.6 (2.57)	19.7 (3.12)	
Food insecure					
	Yes	149(93.7)	52 (34.9)	97 (65.1)	0.11
	No	10(6.3)	1 (10.0)	9 (90.0)	
Anxiety Symptoms					
	Yes	73(45.9)	24 (32.9)	49 (67.1)	0.91
	No	86(54.1)	29 (33.7)	57 (66.3)	
Depression symptoms					
	Yes	123(77.4)	45 (36.6)	78 (63.4)	0.11
	No	36(22.6)	8 (22.2)	28 (77.8)	

Table 2. Food groups consumed by households

Food Group	Total Number of Households Consuming Food Group (n=159)	HDDS		Main source
		Low (n=106)	High (n=53)	
Cereals	149 (93.7%)	97 (65.1%)	52 (34.9%)	Purchased
Roots and tubers	50 (31.4%)	14 (28%0	36 (72%)	Purchased
Vegetables	85 (53.5%)	37 (43.5%)	48 (56.5%)	Purchased
Fruits	23 (14.5%)	1 (4.3%)	22 (95.7%)	Purchased
Meat	23 (14.5%)	2 (8.7)	21 (91.3%)	Purchased
Eggs	14 (8%)	1 (8.8%)	13 (92.9%)	Purchased
Fish	16 (10.1%)	3 (18.8%)	13 (81.2%	Purchased
Beans, nuts, peas, lentils	94 (59.1%	54 (57.4%)	40 (42.6%)	Purchased
Milk and milk products	60 (37.7%)	16 (26.7%)	44 (73.3%)	Purchased
Foods made with oil, butter or fat	90 (56.6%)	46 (51.1%)	44 (48.9%)	Purchased
Honey or sugar	98 (61.6%)	47 (48%)	51 (52%)	Purchased
Condiments, coffee, tea	63 (39.6%)	26 (41.3%)	37 (58.7%)	Purchased

The overall prevalence of underweight (BMI<18.5kg/m^2) was 34.6%. Mild, moderate and severe malnutrition was observed among 28 (50.9%), 13 (23.6%) and 14 (25.5%) participants respectively. The average BMI was 19.6 kg/m^2 (SD±2.9). The prevalence of underweight was high among female participants (61.8%). The mean HDDS for all the participants was 4.7 (SD±2.6). The prevalence of anxiety and depression symptoms was 46% (n=73) and 77% (n=123), respectively. About 33% (n=53) participants had high, 29% (n=46) had moderate and 38% (n=60) had low dietary diversity scores. The majority of participants with depression and anxiety symptoms had low HDDS (Table 1). A majority (37.7%) of the households consumed less than 3 food groups. The main food groups that were mostly consumed were staples cereals, legumes and vegetables. The majority of the IDPs did not consume fruits, vegetables and animal-sourced foods (Table 2). Cereals (90%) and legumes (41.7%) were food groups mostly consumed by households with low HDDS. Foods consumed were mainly purchased by the households.

In univariate analyses, there was no statistically significant association with socio-demographic factors and dietary diversity score (Table 3).

Associations between dietary diversity score and anxiety, depression, physical health and social support score are summarized in Table 4. In unadjusted analyses, participants with higher levels of anxiety (OR1.27; 95% CI 1.05, 1.55) and depression symptoms (OR 2.16; 95% CI 1.13, 3.74) had significantly low dietary diversity scores. These associations remained significant after multivariable adjustment analyses.

Further, associations between dietary diversity and physical health and social support scores (as continuous variables) are shown in Table 5. Each 1-SD reduction in physical health score was significantly associated with an 8% lower dietary diversity score [OR 1.08 (95% CI 1.01, 1.16)] in unadjusted analysis and a 57% lower dietary diversity score [OR 1.57 (95% CI 1.15, 2.14)] in multivariable adjustment analysis. In contrast, each 1-SD increase in social support score was found to have a 4% higher dietary diversity score [OR 0.96 (95% CI 0.94, 0.99)] in unadjusted analysis and an 8% higher dietary diversity score [OR 0.92 (95% CI 0.86, 0.97)] in multivariable adjustment analysis.

4. Discussion

This current study observed inverse associations between anxiety, depression, social support score, and dietary diversity score in Nakwamekwi IDP Camp, Turkana County. On the other hand, we found a positive association between physical health scores and dietary diversity. There were no associations observed between socio demographic and lifestyle factors and household diversity in this population. The IDPs in this camp had a high prevalence of anxiety (46%) and depression (77%) symptoms compared to IDPs living in other centers around the world [17,27,28]. This may be because the majority of the IDPs were unemployed and had been in the camp for a long time, factors associated with depression and anxiety in this population [16,25].

Table 3. Univariate analyses for household dietary diversity score and socio-demographic factors

Variables		Household Dietary Diversity Score OR (95% CI)	p value
Age years (Continuous)		0.99 (0.97, 1.01)	0.51
Gender			
	Male	1.00	0.59
	Female	1.15 (0.68, 1.95)	
Marital status			
	Single	1.00	0.61
	Married	1.13 (0.70, 1.83)	
Education level			
	High school education and above	1.00	0.07
	Primary education and below	1.57 (0.97, 2.54)	
Employment status			
	Employed	1.00	0.26
	Unemployed	1.29 (0.83, 2.01)	
Household size (Continuous)		1.13 (0.86, 1.50)	0.37
Children in household (Continuous)		0.83 (0.58, 1.19)	0.32
BMI (Continuous)		1.01 (0.90, 1.14)	0.88

Table 4. Associations between anxiety and depression symptoms and household dietary diversity score

	Household Dietary Diversity Score OR (95% CI)		
	Model 1	Model 2	Model 3
Anxiety			
No (Reference)	1.00	1.00	1.00
Yes	1.27 (1.05, 1.55) p=0.01	1.15 (0.88, 1.51) p=0.05	1.16 (1.10, 1.28) p<.0001
Depression			
No (Reference)	1.00	1.00	1.00
Yes	2.06 (1.13, 3.74) p=0.02	2.16 (1.18, 3.94) p=0.01	2.30 (1.55, 3.40) p<.0001

Model 1: Unadjusted. Model 2: Adjusted for age. Model 3: Adjusted for age, BMI, education, marital status, employment status, household size, children in the household and food insecurity.

Table 5. Association between physical health and social support scores and household dietary diversity score

	Household Dietary Diversity Score OR (95% CI)		
	Model 1	Model 2	Model 3
Physical health score (Continuous)	1.08 (1.01, 1.16) P=0.06	1.08 (1.00, 1.16) P=0.001	1.57 (1.15, 2.14) P=0.02
Social support score (Continuous)	0.96 (0.94, 0.99) P=0.02	0.96 (0.94, 0.99) P= 0.02	0.92 (0.86, 0.97) P<.0001

Model 1: Unadjusted. Model 2: Adjusted for age. Model 3: Adjusted for age, BMI, education, marital status, employment status, household size, children in the household and food insecurity.

The household dietary diversity score decreased with an increase in anxiety and depression symptoms. The majority of the participants (93.7%) experienced food insecurity which has been associated with low diet quality [29] as well as depression [30,31] and anxiety [30]. Households mainly consumed cereals, and very few households consumed fruits, vegetables, and fish and dairy products, indicating they had a low intake of proteins, vitamins and minerals. Poor diet has been associated with an increased risk of anxiety and depression [32]. Previous studies have shown that vitamins and minerals, which are commonly found in fruits, vegetables, and fish, play a role in reducing the risk of depression [33-36] and anxiety [36]. At the same time, a high-energy diet is associated with anxiety and depression symptoms [37]. Although the camp is in Lodwar town, where fish from Lake Turkana is sold, the participants may not have been able to afford the fish hence the low consumption of fish. In addition, Turkana County is an arid area and most of its fruits and vegetables are sourced from outside the county and are expensive, which may make them unaffordable to the IDPs.

In this current study, with decreasing physical health scores, the HDDS decreased. Consuming many food groups is an indicator of nutrient adequacy [2,38,39] which is required for good health. As the participants were consuming few food groups their physical health was poor. Sixty nine percent of those who were underweight and 65% of those who were food insecure had low dietary diversity scores. Food insecurity has been found to be a predictor of poor health [16,40] as well as low nutrient intake [41,42]. Inadequate nutrient intake has been associated with poor health and many of the study participants were underweight.

We also found a positive association between social support score and HDDS. An increase in the social support score increased the HDDS. Having social support may have enabled the households to get food when in need from their social networks who may be relatives, neighbors and friends. The participants have been living in the camp for over ten years and it is possible they have been able to have a larger social support network compared to when they first moved into the camp. We only found one study that had looked at dietary diversity and social support among IDP children in Mynamar although the study did not find any association between the two variables [43]. Our findings are supported by other studies that reported increased diet diversity with increased social support [44,45,46]. Social support has also been associated with improved dietary behavior change; thus, social support is important in improving dietary diversity.

There are some limitations to this study. Firstly, this study was a cross-sectional study, so we could not assess the causal effect associations between anxiety and depression symptoms, physical health score and social support and dietary diversity. Secondly, our sample size was relatively small. Thirdly, the study was conducted in one part of the country; hence the findings cannot be generalized to other IDP camps in the country. Despite these limitations, our study has provided data on associations between HDDS and anxiety, depression, physical health and social support, contributing to the literature on IDPs.

5. Conclusion

Our findings show a large proportion of participants had low HDDS and mainly consumed cereals. Household food insecurity prevalence was high, which may be linked to the low HDDS, high numbers of IDPs with anxiety and depression symptoms, as well as poor physical health. Interventions that focus on improving the food security and socioeconomic status of the IDPs should be strengthened. Social support, which had a significant positive association with HDDS may also be increased through these interventions.

Abbreviations

OR-Odds ratio
HDDS-Household Dietary Diversity Score
IDPs-Internally Displaced Persons

Data Availability

Data used in the study is available from the corresponding author on reasonable request.

Conflict of Interest

The authors declare they have no conflict of interest.

Authors' Contribution

CG conceived the study, collected and prepared the data and wrote the first draft. AD made substantial contributions to the analysis and interpretation of the data. DM made substantial contributions to the acquisition and collection of the data. GJ critically revised the manuscript. CG, AD, DM and GJ jointly undertook critical review of the manuscript. All authors approved the manuscript for publication.

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