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COMPARATIVE STUDY ON NUTRITIONAL STATUS FOR INSTITUTIONALISED AND HOME-DWELLING RESIDENTS AGED 70+ IN INFORMAL SETTLEMENTS OF NAIROBI CITY COUNTY, KENYA

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ABSTRACT

This was a comparative study on nutritional status for institutionalised and home-dwelling residents aged 70+ in informal settlements of Nairobi City County, Kenya. The study employed a cross-sectional analytical design. A mixed-methods approach was used which integrated both qualitative and quantitative data. Census sampling was done in the homes for the aged institutions due to the small number of registered older person's who met the inclusion criteria. Primary data was sourced from consented anthropometric measurements of the older adults, observational ethnographical notes from the physical excursions, recorded structured questionnaire interviews, KIIs , FGDs and formal write-ups from the city and the care homes. The study concluded that many elders depended on well-wishers, aid and routine food baskets to eat a diverse diet. The study indicated that widowed older individuals had significant lower odds of good nutritional status compared to their married counterparts. There was positive correlation between people in Home for the aged who had a lower mean or median value for the MUAC, suggesting potential nutritional deficiencies. The study recommended that Nairobi County Social Development Department should collaborate with the private sector nursing homes/ aged care facilities to improve their in-house modelling of older persons' nutrition to better the public homes situation.

Keywords: *Geriatric Nutrition, Urban Nutrition, Anthropometric Comparisons, Nursing Care*

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INTRODUCTION

Older adults represent the fastest-growing demographic segment in Kenya's population, as highlighted by the National Council for Population and Development (NCPD, 2022). Despite this rapid growth, there is limited research and data on the nutritional status of individuals aged 70 and above. In 2019, this age group was estimated at 2,740,040, reflecting a 41% increase since 2009, indicating a significant aging trend in the country.

This study aimed to compare the nutritional status of 70+-year-olds living in institutional care homes with those residing in community settings. Data analysis using R involved linear regression and ANOVA to identify differences between these groups. Results showed notable disparities in nutritional status. Among those categorized as malnourished, 54.6% lived in institutions, whereas 45.5% were in their own homes. Conversely, a higher proportion of those at risk of malnutrition (75.9%) and with normal nutrition (56.5%) lived in community settings, compared to 24.2% and 43.5% respectively in care homes.

The Chi-square test of independence revealed a significant association between residence type and nutritional status ($\chi^2 = 25.56$, $p < 0.001$, $df = 1$, $n=453$). Further analysis showed significant links between nutritional status and demographic factors such as sex ($\chi^2 = 11.202$, $p = 0.004$) and income level ($\chi^2 = 36.801$, $p < 0.000$). The Mann-Whitney U test indicated a significant difference in MUAC (mid-upper arm circumference) values between home-dwelling elders and those in institutions ($p = 4.328e-07$), supporting the conclusion that nutritional status varies between these groups.

Water source also significantly impacted nutritional status ($\chi^2 = 38.355$, $p < 0.000$). However, housing material and access to clean water did not show significant differences in nutritional scores. About 23.84% of respondents owned land in Nairobi, either presently or in the past, with a weak association to nutritional status (OR = 1.394, $p = 0.007$). Logistic regression identified sex and marital status as significant predictors: males had lower odds of good nutrition than females (OR = 0.342, $p < 0.002$), and widowed elders were less likely to have good nutritional status compared to married individuals (OR = 0.347, $p = 0.045$). Age and income level did not show significant associations.

Additionally, the type of housing material was linked to nutritional status ($\chi^2 = 17.764$, $p = 0.001$). These findings suggest that residence environment, water access, sex, and marital status are important factors influencing the nutritional health of Kenya's elderly population.

Geriatric nutrition is a critical area of study, given the unique nutritional needs and challenges faced by the aging population. Establishing the nutritional status of older persons, whether residing in homes for the aged or living in community settings, is essential for understanding the complex relationship between nutrition and health outcomes in this demographic. Malnutrition in the elderly is often linked to a spectrum of conditions, including obesity and geriatric anorexia. Geriatric anorexia, characterized by reduced food intake, can lead to significant physiological changes such as decreased muscle mass and increased fat mass, contributing to obesity and further health complications (Landi et al., 2016).

Moreover, malnutrition among older adults is influenced by various psychological, economic, and social factors. These challenges are encapsulated in the nine "D's": dementia, dysphagia, diarrhea, dysgeusia, depression, disease, dysfunction, drug dependency, and poor dentition (Rasheed & Woods, 2014). Each of these factors can impair appetite, food intake, or nutrient absorption, thereby exacerbating nutritional deficiencies and compromising overall health. Understanding these multifaceted issues underscores the importance of assessing and addressing nutritional status in the elderly to promote healthy aging, prevent disease, and improve quality of life. This foundational knowledge informs targeted interventions that can mitigate the adverse effects of malnutrition and support the well-being of older persons across diverse care settings.

Study Objectives

- To determine the anthropometric measurements differences using MUAC and Calf
- Circumference of the aged persons in the households' care versus the ones in the homes for the aged institutions in Nairobi City County.
- To determine the demographic factors influencing nutritional status amongst the older population both at the households and in the homes for the aged institutions.
- To assess the environmental factors influencing the nutritional status of the aged persons both at households and in the homes for the aged.
- To establish the level of nutritional knowledge for the caregivers of the 70+ year olds in Nairobi County

Purpose of Study / Statement of the Problem

The problem is that nutritional screening for older adults is rarely conducted in Kenya, with primary healthcare services focusing primarily on acute illnesses rather than routine nutritional assessments. Anthropometric measurements like calf circumference and mid-upper arm circumference are underused, especially for elderly individuals with deformities or musculoskeletal changes, creating a gap in nutritional monitoring. The Kenyan Ministry of Health lacks a systematic tool for collecting data on the nutritional status of the elderly, leading to underreporting of malnutrition, obesity, and over-nourishment until they are severe enough to require referral. This gap is evident in both institutional care homes and community settings, with limited resources, poor sanitation, and water access further exacerbating nutritional challenges. Urbanization and inadequate infrastructure contribute to health issues like gastric infections and diarrhea, which impair nutrition, especially among low-income populations. Additionally, caregivers face a cycle of dependency, limited time, and financial constraints, affecting the quality of care. The study focuses on three registered elderly care homes in Nairobi, where financial and environmental factors significantly impact the nutritional wellbeing of residents.

LITERATURE REVIEW

Nutritional status in older adults is influenced by factors leading to either malnutrition or obesity, with studies showing women are more affected by both extremes. Anthropometric measures such as BMI, waist-to-height ratio, calf circumference, and others are useful in assessing health risks like metabolic syndrome and mortality. Research indicates that calf circumference is in particular a simple, reliable predictor of mortality and nutritional risk among older populations, yet its use remains limited in Kenya. Social determinants, including socioeconomic status, gender, and geographical location—significantly impact older adults' nutrition, especially in Nairobi's slums where poverty, poor sanitation, and limited access to nutritious foods hinder proper nutrition. Despite social protection programs, many older people face barriers to healthcare and nutrition, underscoring the need for targeted education and assessment tools to address these disparities.

METHODOLOGY

This study employed a cross-sectional analytical design to capture data pertinent to all objectives at a specific point in time, offering a rapid and cost-effective approach (Cooper & Schindler, 2009). A mixed-methods approach was utilized, integrating both qualitative and quantitative data through a parallel merger strategy during analysis. Anthropometric measurements, including calf circumference and weight, alongside dietary and WASH (Water, Sanitation, and Hygiene) factors, were assessed among older adults residing in slums and institutional aged care facilities within non-formal settlements in Nairobi. The census sampling was done in the homes for the aged institutions due to the small number of registered older person's who met the inclusion criteria.

The primary data sources were from consented anthropometric measurements of the older adults,

observational ethnographical notes from the physical excursions, recorded structured questionnaire interviews, KIIs , FGDs and formal write-ups from the city and the care homes. This design facilitated the identification of prevalence rates and associated risk factors, providing baseline data to inform targeted interventions and public health strategies. Its practicality makes it particularly suitable for large-scale assessments in resource-limited settings, enabling timely insights essential for guiding immediate response efforts.

FINDINGS

Nutritional Status comparison of the elderly older persons in households versus the homes for the aged institution. The analysis below sought to determine whether nutritional status differs between aged persons living in households and those in institutional care (homes for the aged). Among those categorized as malnourished, a higher proportion (54.6%) resided in institutions, compared to 45.5% in households. Conversely, 75.9% of those at risk of malnutrition and 56.5% of those with normal nutrition were found in household care, compared to 24.2% and 43.5% in institutions respectively. The Chi-square test of independence indicates a statistically significant association between areas of residence and nutritional status ($\chi^2 = 25.56$, p and lt; 0.001).From the findings of the test conducted, there was sufficient evidence to reject the null hypothesis, it is evident that there is statistically significant difference in the nutritional status as measured by anthropometric indicators (MUAC, CALF) between people residing in the homes for the aged and aged persons residing in home dwellings within non-formal neighbourhoods in Nairobi County.

Findings revealed that older adults' income levels varied based on their previous employment. In nursing homes, 14.5% is earned between 0-1000 KES monthly, compared to 10.4% in households. Formal employment prior to retirement was reported by 12.4% of aged care residents—mainly in roles such as clerks, teachers, nurses, and police, while only 9.1% of household dwellers had formal jobs. The majority engaged in informal or casual work, including farming, trading, and day labor, with 48.3% in nursing homes and 40.9% in households. Most respondents (80.5%) experienced prolonged unemployment or unclassified routines near retirement. Income distribution showed outliers, with an overall mean of 6,518 KES and a median of 5,000 KES.

Additionally, female had significantly lower nutrition scores compared to males (OR = 0.719, p = .012), suggesting a gender disparity in nutritional wellbeing. Finally, being in an institutional care setting was strongly associated with improved nutrition outcomes (OR = 2.883, p < .001), possibly due to structured meal planning and support systems in such environments. Other factors such as water source and age group did not show statistically significant associations with nutrition scores in this mode-multivariate regression model.

Majority(83.15%) of the facilities are maintained by paid designated cleaners, which may suggest institutional or organized support in maintaining hygiene for the 3 institutions. For the households only (16.85%) had a paid designated cleaner who cleaned their individual/shared toilets/bathrooms and the surroundings. A significant portion (35.8%) of the household dwelling older persons are maintained by the residents themselves, indicating some level of personal responsibility. However,15.2% of household dwelling older respondents indicated no one maintains the facilities, a clear red flag for public health and sanitation risks, potentially contributing to the spread of illness in these communities.

Based on the Housing Material, the majority live in homes made of brick or stone (58.5%), which typically indicated more permanent and possibly safer housing structures. Iron sheets (37.5%) also constitute a large segment, which may suggest semi-permanent or lower-income housing for the household dwelling older persons. Only a small fraction lives in homes made of wood (4%), which may be more vulnerable to environmental hazards and insecurity. About (23.84%) of the respondents reported to have owned land in Nairobi either in the past or currently (home for the aged(4.86%),household (18.98%). The analysis shows

that housing conditions ,water access does not have a significant impact on MUAC as well as toilet access and their interaction.

Hypothesis (H_0): There is no difference in the mean aligned ranks of MUAC across the levels of [Housing conditions, water access and Toilet/sanitation access].

Alternative Hypothesis (H_1): There is a difference in the mean aligned ranks of MUAC across at least two levels of [housing conditions, water access and Toilet/sanitation access].From the analysis, it is sufficient evidence to reject the null hypothesis. There is an association between the environmental factors of water access and toilet/sanitation access with aged nutritional status in the non-formal areas of Nairobi.

Low nutritional knowledge was more prevalent among caregivers in both settings, but slightly more so in households (72.73%) compared to institutional settings (62.76%). Conversely, moderate knowledge was more common in institutional settings (37.24%) than in households (27.27%). The chi-square test yields a statistically significant difference (p - 0.032) between the two settings, indicating that nutritional knowledge distribution varies significantly between household and institutional caregivers.

CONCLUSION

The FCS score of 70.86 found for the households a big fact that many elders depend on well-wishers, aid and routine food baskets to eat a diverse diet. Protein is mainly plant based, for carbohydrates at <42 was noted at the FCS with low consumption of sugar and oils, which is great for a hypertension-diabetes laden population group. There was positive correlation between people in Home for the aged who have a lower mean or median value for the MUAC, suggesting potential nutritional deficiencies. However, the difference may be influenced by gender or education meaning that the difference might be more pronounced in certain educational level or gender group (p<0.0001).

Regarding marital status, widowed older individuals also exhibited significantly lower odds of good nutritional status compared to their married counterparts (OR - 0.347, p -0.045). This implies that widowhood may be a potential risk factor for poor nutrition among the older people. Other variables, including age group and income level, did not show statistically significant associations with nutritional status in multivariate regression analysis.

The type of housing and material used were part of the environmental factors examined in this study to show a small degree of association with the aged nutritional status. The Aligned Rank Transformation Anova analysis depicted that water access does not have a statistically significant effect on calf-circumference & MUAC whereas toilet access and their interaction do have a significant effect in predicting calf circumference & MUAC.

About 23.84% of the respondents reported to have owned land in Nairobi either in the past or currently (home for the aged at 4.86%,household at18.98%). This had a chance association with nutrition status. A chi-square test was conducted to assess the relationship between the type of housing material and nutritional categories (malnourished, at risk, normal). The result was statistically significant ($\chi^2 = 17.764$, df = 4, p = 0.001), indicating that the type of housing is associated with the nutritional status of the respondents. The association between water source and nutritional status was also examined using a chi-square test, yielding statistically significant results ($\chi^2 = 38.355$, df = 10, p = 0.000). Both the housing material and access to clean water had no statistically significant difference in the nutritional score.

The FGD at Kariobangi and Cheleta revealed that the caregiver's had no standard cues of knowing whether the older persons under their care were losing weight in a period of 3 months. Testing frailty and weight loss are key factors in identifying nutrition related issues and many of the caregivers in both settings.

The KII also revealed that the homes had never had mass screening for any nutrition issues and the

assumption that this study intended to pursue was validated as 'the's nutrition issues-obesity, malnutrition or other deficiencies are picked up at the regular medical consultation visits and rarely do other anthropometric chemical biomarkers are investigated'. The caretakers at least the nurses, social workers and the clinical officers admitted to at least attending one workshop annually to hone their skills in older people's care. None of these centre specifically on nutrition as general or for specific conditions. (Bolyson et al,1996) The modification of food textures for different geriatrics with specific conditions leads to better nutritional status outcomes.

Medications, cognitive status, oral health, mobility and psychological matters are all cumulative issues that lead to nutrition interventions for the aged to be successful (Cherly et al, 2009).

RECOMMENDATIONS, SUGGESTION FOR FUTURE RESEARCH

- The Nairobi County Social Development Department should collaborate with the private sector nursing homes/ aged care facilities to improve their in-house modelling of older persons' nutrition to better the public homes situation. Early planning and logistics for the aged care homes food capitation to be improved as well as sanitation inputs.
- The MoH in Nairobi County to deploy nutritionists for in-reach and outreach campaign exercises in the homes to conduct mass screening for obesity/malnutrition periodically amongst all the older populations in the county.
- More workshops with experts or consultants on geriatric/older nutrition to be done more often in the aged care institution with the inclusion of community caregivers as well. The on -the-job training for the caregivers/nurses and patient attendants to be more frequent to develop their skills.
- The CCO for the social development department could approach policies based on the social protection act to advocate for more resources allocated to the 70+ demography to thin the line that systemic ageism dealt the older persons. The registration of older persons to the SHIF programme, and 'Inua Jamii" program as well as a rapid results initiative to obtain documents for the aged is strongly aligned.

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Table 1: Nutritional Status by area of residence

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Nutritional Status	Home for the Aged	Household	Total
Malnourished	24 (54.6)	20 (45.5)	44 (100)
At Risk	71 (24.2)	223 (75.9)	294 (100)
Normal	50 (43.5)	65 (56.5)	115 (100)
Total	145 (32.0)	308 (68.0)	453 (100)

Pearson Chi-square ($\chi^2(2)$) = 25.56, p < 0.001

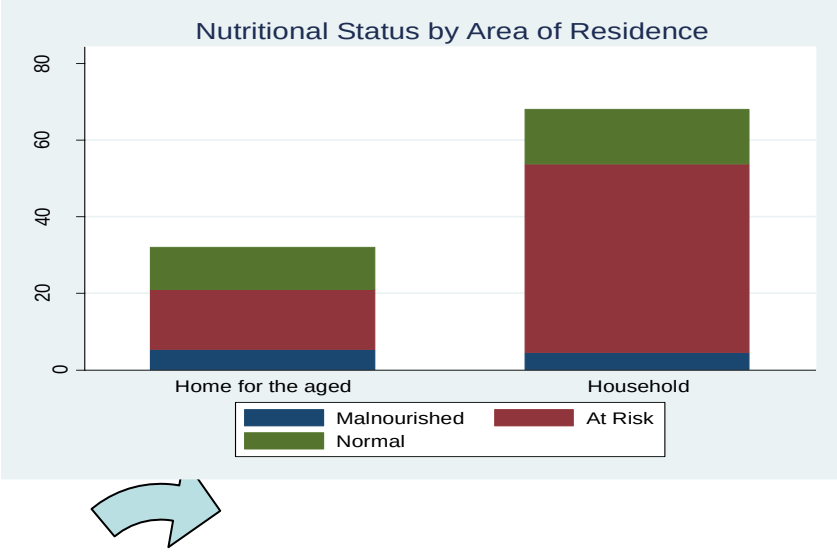

Figure 1: ***Nutritional Status by Area of Residence***

Description for the contents of above table

Figure 1 indicates the nutritional status of older persons based on their area of residence either in a Home for the aged or a Household. It presents percentages of people in three nutritional categories: Malnourished (blue), At Risk (red), and Normal (green). The figure indicates that a larger proportion of the households live in compared to the home for the aged. In both homes for age, a larger proportion compared to the households was malnourished (blue) which was supported by the chi-square test for independence from Table 1. showing significant association between area of residence and nutritional status (p < 0.001).