



Assessment of scope and quality of nutrition services in patient management in selected health facilities in Tanzania

^{1,2*}MKUMBO A E., ³KIMIYWE J., ²HAIKAEL M D

¹School of Life Science and bioengineering, The Nelson Mandela African Institution of Science and Technology (NM-AIST), P.O. Box 447 Arusha, Tanzania

²Muhimbili National Hospital Mloganzila(MNH-Mloganzila), P.O. Box 65000 Dar es Salaam, Tanzania

³Kenyatta University (KU), P.O Box 100465-00101 Nairobi, Kenya

*Corresponding Author: erastoa@nm-aist.ac.tz

Abstract

Inadequate nutrition services remain a critical barrier to optimal patient care in many low- and middle-income countries, including Tanzania. Comprehensive assessments and specialized interventions are often underutilized in clinical practice. This study evaluates the scope and quality of nutrition service delivery across Tanzanian health facilities, involving 46 participants, including nutritionists, dietitians, and healthcare providers from 28 facilities. Data were analyzed using SPSS version 29.0. The findings demonstrate that basic nutritional assessments (e.g., weight, height, and mid-upper arm circumference) are performed in over 70% of cases, yet advanced assessments like body composition analysis (body fat, muscle mass, and visceral fat) are significantly underused, occurring in less than 30% of cases. Nutrition Diagnostic accuracy was also suboptimal, with only 11% of participants correctly completing the Nutrition Diagnosis using the PES (Problem, Etiology, Symptoms) statement. While over 90% of participants delivered nutrition education and counseling, more advanced interventions such as enteral and parenteral nutrition were available in fewer than 40% of cases. Alarming, a severe shortage of clinical nutrition staff was identified, with one nutritionist covering more than 200 hospital beds. Participants with more than four years of experience, especially those with bachelor's or postgraduate degrees, were significantly more effective in delivering quality nutrition services ($p = 0.019$). It is recommended that targeted efforts to increase human resource allocation, integrate nutrition into broader healthcare quality initiatives, and enhance nutrition continuous professional development. Expanding and fostering evidence-based research are vital to strengthening nutrition services and improving patient outcomes in Tanzania's healthcare system.

Keywords: *Dietitian; Health facility; Hospital Nutrition; Nutritionist; Nutrition services; Quality*

Received: 25/05/24

Accepted: 27/11/24

Published: 13/12/24

Cite as, *Mkumbo et al., (2024). Assessment of scope and quality of nutrition services in patient management in selected health facilities in Tanzania. East African Journal of Science, Technology and Innovation 6 (1)*

Introduction

Nutrition service delivery is a crucial aspect of modern healthcare, encompassing the use of specific diets and nutrients to prevent, manage, and treat diseases. This practice is essential for

disease prevention, patient recovery, and the overall efficiency of healthcare systems (KeMoH, 2010). However, several gaps remain, including lack of standardization, insufficient training and resources, and inadequate integration into healthcare systems (KeMoH, 2020; Laur *et al.*,

2017). The significance of addressing these gaps lies inclusive hospital leadership, enhancing professional competence, and ensuring efficient healthcare delivery (Laur *et al.*, 2015). Inconsistent nutrition care can lead to poor health outcomes and increased healthcare costs, poor medical treatment outcomes and increased hospital overstay (Daigle *et al.*, 2021; Findlay *et al.*, 2020). Clinical nutrition practice has evolved significantly, now recognized globally as an integral component of healthcare systems. The development of guidelines, Standard Operating Procedures (SOPs), and educational materials provides essential frameworks for nutritionists, dietitians, and healthcare professionals (Cederholm *et al.*, 2017; Thibault *et al.*, 2021). The widespread acceptance of SOPs and guidelines in clinical practices, particularly in industrialized nations, underscores their role in standardizing care and ensuring quality and consistency in nutrition service delivery (Grimshaw, 2005; Lewis *et al.*, 2022). In Tanzania, clinical nutrition and dietetics is less developed compared to community-nutrition interventions. Nutrition education/counseling, Vitamin A supplementation, Iron and folic acid supplementation, weight measurement, dietary assessment, and hemoglobin level monitoring emphases were high mostly among children and pregnant women as routine activities in the antenatal clinics (Saronga *et al.*, 2022). The country has made commendable progress in addressing malnutrition, particularly within community settings, with the Ministry of Health (MoH) and the Tanzania Food and Nutrition Centre (TFNC) playing pivotal roles (NMNAP II, 2022). The focus remains on improving basic health services, health promotion, disease prevention, and ensuring equitable access to quality healthcare, aligning with the government's objective outlined in the Health Sector Strategic Plan V (HSSP V) (MOHCDEG, 2021). Despite advancements through the National Multi-Sectoral Nutrition Action Plan (NMNAP I) 2016 to 2021 and NMNAP II 2022-2026, challenges persist especially on nutrition service delivery in the context of patient care in health facilities. There are number of studies shows evidence that adequate nutrition is key in-patient recovery, help to improve the nutritional status of patients and reduce their length of hospital stay (Khalatbari-Soltani and Marques-

Vidal, 2016; TFNC, 2016). Inadequate intake leads to undernutrition during hospitalization, which is associated with the loss of muscle strength and impaired immune function due to increased complications rates, infections, mortality, and malnutrition (DOHC, 2009; TFNC, 2016). Every health practitioner both junior and senior should ensure adequate knowledge and skills (Frost and Baldwin, 2021). For conducting appropriate nutritional assessment, diagnosis, interventions and monitoring and evaluation together with proper documentation of nutrition service or nutrition care process. It is reported that, malnourished patients stay in the hospital for up to 3 more days compared to well-nourished patients and are at higher risk of hospital re-admission within a month (Kisighii and Raymond, 2022; TFNC, 2018; Van Den Berg *et al.*, 2023). In our area of disease management, the most commonly available guideline is the one on Integrated Management Acute Malnutrition (IMAM). In critical care for example, it is important to have dietetics service offered to patients to enhance their recovery and wellbeing. This study was therefore designed to assess nutrition service delivery status in the context of patient's management in selected health facilities in Tanzania.

Materials and methods

Study Description

The study was conducted among nutritionists, dietitians and other health professionals (nurses and doctors) offering nutrition care working in twenty-eight (28) both government and referral faith-based health facilities in Tanzania. The levels of the facilities include were; Muhimbili National Hospital (MNH), a specialized hospital Jakaya Kikwete Cardiac Institute (JKCI), Muhimbili National Hospital-Mloganzila, Muhimbili Orthopedics Institute (MOI), a zonal hospital, Bugando Medical Center (BMC), Benjamin Mkapa Hospital (BMH), Mbeya Regional referral Hospital, Iringa Regional referral hospital, Tabora Regional referral Hospital, Singida Regional referral Hospital, Ilemela district hospitals, Chato district hospitals, Ndanda district hospitals to mention few. The study only included health facilities offering nutrition services.

Data collection tool

The structured questionnaire was coded in kobo data collection tool that consisted of two sections. The first part of questionnaire we asked about demographic information of study participants and their employing health facility and the second section included questions pertaining nutrition services delivery. All questions were adopted from Uganda Health Facility Nutrition Service Delivery Assessment tool with some modifications to answer the objective of the study. The questionnaire was pre-tested after which corrections and revisions were made accordingly. Assessed were the nutrition services available in the health facilities. The study also determined the human resource employed to deliver nutrition services in health facilities. Other important details were obtained from either ministry of health example list of nutritionists and hospital offering nutrition services or individual hospital for example the hospital bed capacity.

Sampling Procedures

We employed convenient sampling based on the nature of study. Here we included all nutritionist, dieticians, and other health care providers who were involved in nutritional management of patient were invited to participate in the study. Participants were informed of the study by telephone and those willing to participate in the research study were contacted and interview appointment was sought.

Sample size

The ministry of Health has a list of 53 nutritionists working in different health facilities in Tanzania. All nutritionists were considered as potential participants for this study. It was expected that all 53 nutritionists would participate in the study but for different reasons only 39 nutritionists, 4 dieticians, 1 nurse and 2 doctors participated making a total of 46 participants

Study design

A cross-sectional study design was employed, with data collection conducted over a four-month period, from September 2023 to December 2023.

Data Analysis

The data was analyzed using the Statistical Package for the Social Sciences (SPSS) Version 29.0 software. Descriptive statistical analysis was summarized by frequencies to describe the profiles of the respondents and health facilities. It was also performed to assess the state of nutrition services for patient management. Nutrition services provided for patient management were rated as follows: provision of fewer than 12 nutrition services were considered average, while greater than 12 services were considered good. The human resources capacity to deliver nutrition services was analyzed using the ratio of hospital bed capacity to the number of nutritionists available in each hospital. Then regression analysis was then conducted to examine the association between the provision of good nutrition services and factors such as education level, profession, health facility level, and years of experience.

Ethical Consideration

Ethical clearance was obtained from National Institute for Medical Research (NIMR) with reference no. NIMR/HQ/R.8a/Vol.IX/4381 dated on 31st July 2023. The study aims and objectives were explained to prospective participants, then they were asked to sign an informed consent form to voluntarily participate in the study. To ensure the confidentiality all personal information were anonymous. Participants had the right to withdrawal from the study at any time.

Results

Demographic Characteristic of the participants and Health facilities

The present study had a total of forty-six (46) participants, of which 26% were male and 74% were female. Moreover, the majority of the study participants were nutritionist (85%) as compared to other professionals in twenty-eight (28) different health facilities as categorized by the Ministry of Health as shown in Table 1.

Table 1*Profile of participants professional, their distribution at facility level and provision of nutrition services*

Variable	Healthy facility level					Total N (%)
	National	Specialized	Zonal	Regional	District	
Professionals						
Nutritionists	5	10	7	13	4	39 (85%)
Dieticians	2	0	0	1	1	4 (11%)
Nurse	0	0	0	0	1	1 (2%)
Medical Doctor	0	0	0	0	2	2 (4%)
Education level						
Postgraduate	1	2	1	7	0	10 (22%)
Degree	6	8	6	8	6	34 (74%)
Diploma	0	0	0	0	2	2 (4%)
Working experience						
≤1	0	0	1	2	6	9 (19%)
2-3	0	4	3	2	0	9 (19%)
≥4	7	6	3	10	2	28 (61%)
Provision of nutrition services						
Good	7	9	4	9	4	33(72%)
Average	0	1	3	5	4	13 (28%)
Total N (%)	7 (15%)	10 (22%)	7 (15%)	14 (30%)	8 (17%)	46 (100%)

Capacity of Health Facilities to Offer Nutrition Services

The study shows among 28 health facilities involved in this study ninety-six percent (96%) of health facilities reported to have established quality improvement teams (QIT) but fifty-nine percent (59%) does not include nutritionist as

part of Quality Improvement Team. Ninety-three percent (93%) of health facilities have general medical continues education sessions and sixty-two percent (62%) includes nutrition topics. About supportive supervision six-five percent

(65%) of health facilities reported to have received feedback of supportive supervision.

Nutrition Services

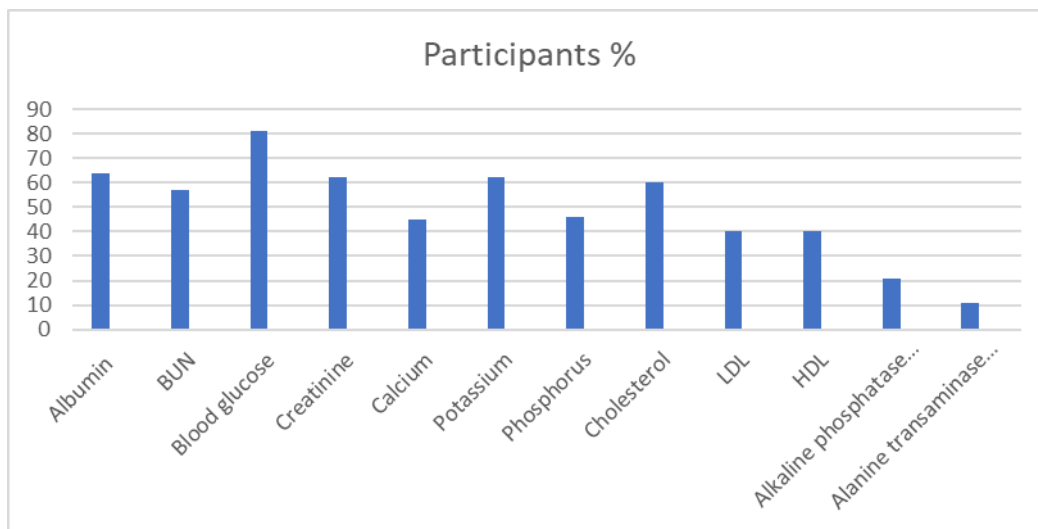
Nutrition Assessments

The study revealed a high prevalence of basic anthropometric measurements, with 93% of healthcare providers reporting routine measurement of weight and 97% measuring height. However, some assessments were less frequently performed. For instance, head circumference was measured by only 2% of participants, and body composition analysis was considerably underutilized: body fat (26%), abdominal fat (26%), muscle mass (22%), fat mass (22%), and visceral fat (20%). Handgrip strength, an indicator of muscle function, was another anthropometric measure assessed by some providers. Biochemical indicators of nutritional status were commonly evaluated, with blood

glucose (81%) and albumin (64%) being the most frequently checked biomarkers. Other less frequently assessed biochemical markers included HbA1c, vitamin D, thiamine, estimated glomerular filtration rate (eGFR), uric acid, urea, sodium, chloride, hemoglobin, total protein, and white blood cell count (Figure 1). In terms of nutrition-focused physical examinations, the most commonly assessed areas were musculoskeletal status (74%), edema (72%), skin (54%), and the abdomen (50%). Providers also reported using various tools to evaluate patients' food and nutrition-related history, including 24-hour dietary recalls, Food Frequency Questionnaires (FFQ), diet diversity scores, and food records with the weighing method. In addition, they assessed socio-economic factors, episodes of vomiting or diarrhea, allergies, medication use, nutritional supplements, and herbal usage.

Figure 1

Proportion of participants able to interpret biochemical assessment value



Nutritional Diagnosis

The findings indicate only 11% of participants demonstrated a clear understanding of the Nutrition Diagnosis and could correctly formulate a complete Problem, Etiology, Signs/Symptoms (PES) statement. This indicates a concerning lack of proficiency, as the majority of practitioners were unable to distinguish between medical and nutrition diagnoses. For instance, while a few participants provided appropriate nutrition diagnoses, such as

“Increased nutrients (calories and proteins) requirements related to hyper metabolism as evidence by disease progression burn injury with TBSA 53%” and “Unintentional weight loss related to inadequate dietary intake as evidenced by 24 hours’ recall data”. Most diagnoses were medical in nature. Common examples included *“Diabetes Mellitus”* and *“Hypertension”* or Incomplete Nutrition diagnosis in PES statement example *“Inadequate food intake”*.

Nutrition Intervention

The study categorized nutrition interventions into four main areas: therapeutic diets, enteral and parenteral nutrition support, nutrition education and counseling, and nutrition supplementation. Below is a summary of the key findings:

Therapeutic Diets

The most commonly prescribed therapeutic diet was a high-protein diet (50%), followed by the Dietary Approaches to Stop Hypertension (DASH) diet (30%). Less frequently prescribed diets included the ketogenic diet (4%) and low-

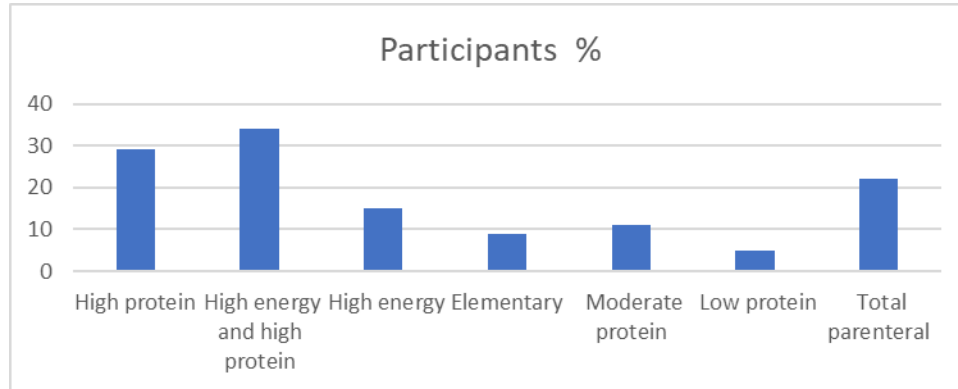
protein diet (4%). Other specialized diets mentioned were liquid diets for post-surgical patients and those requiring tube feeding, as well as neutropenic diets for patients undergoing bone marrow transplants.

Enteral and Parenteral Nutrition Support

Among participants, 34% reported prescribing high-energy, high-protein enteral feeds, while only 22% prescribed parenteral nutrition for patients with clear indications for its use (Figure 2). These findings suggest a limited application of advanced nutrition support, likely due to resource constraints or gaps in expertise.

Figure 2

Proportion of participants prescribes enteral and parenteral nutrition support



Nutrition Education and Counseling

Nutrition education and counseling emerged as the most common intervention, with 91% of participants providing family education, 89% encouraging physical activity, and additional advice including alcohol reduction and smoking cessation. This focus on education reflects the prioritization of preventive and lifestyle-oriented nutrition care in Tanzanian health facilities.

Nutrition Supplementation

The most commonly prescribed oral supplements were multivitamins (61%) and a combination of minerals and vitamins (CMV) (46%). Other frequently prescribed supplements included zinc (45%), iron-folic acid (38%), and vitamin A (33%). However, fortifiers were prescribed less often, at only 7%. Other supplements mentioned were carofit tablets, omega-3, vitamin B complex, and vitamin D.

Monitoring and Evaluation

Approximately 46% of participants reported conducting daily monitoring and evaluation for hospitalized patients, with monthly or tri-monthly follow-ups for outpatients. Critically ill patients were monitored every 24 hours. Regarding documentation, 89% of participants recorded the Nutrition Care Process (NCP) using notebooks, registers, and counter books. Nutrition care plans were communicated to caregivers (96%) and nurses (75%) to ensure continuity of care.

Factors Associated with the Provision of Good Nutrition Services

The quality of nutrition services provided by participants was categorized as either "average" (28%) or "good" (78%) (table 1), based on the Uganda Nutrition Service Delivery Assessment Tool. According to this tool, provisions of nutrition services less than 12 was rated as

average, while 12 or higher was rated as good. In the adjusted odds ratio analysis, participants with more than four years of experience were significantly more likely to provide good nutrition care compared to those with less experience. Specifically, participants with over four years of experience had an odds ratio of 8.17 (95% CI: 1.41, 47.2, $p = 0.019$), meaning they were

eight times more likely to deliver higher-quality nutrition services (table 2). Other factors, such as education level, type of healthcare facility, professional category, and access to continuous nutrition education, were hypothesized to influence the provision of good nutrition services. However, these factors did not show statistically significant associations in this study.

Table 2

Factors associated with provision of good nutrition services

Variables	COR (95% CI)	P-value	AOR (95% CI)	P-value
Level of facility				
District	1			
Regional	4.2(0.66-26.29)	0.13		
Zonal	2.2(0.30-17.63)	0.45		
Specialized	3.3(0.46-24.44)	0.24		
National	1.7(0.22-12.22)	0.62		
Education level				
Undergraduate	1			
Postgraduate	3.6(0.67-19.24)	0.14		
Professional categories				
Others (dietician, nurse, doctor)	1			
Nutritionist	0.5(0.09-3.00)	0.32		
Years of experience				
0-1	1			
2-3	4.67(0.53-40.88)	0.16	22.69(0.54-949)	0.10
4 and above	8.17(1.41-47.2)	0.019	48.70(1.32-1801.50)	0.035
Continue nutrition education				
No	1			
Yes	1.45(0.43-4.89)	0.545		

Discussion

Capacity to offer Nutrition services

Health facilities

The study shows different level of health facilities in Tanzania has made some progress to address clinical nutrition services. We see ninety-six percent (96%) of health facilities have established quality improvement teams (QIT) but only fifty-

nine percent (41%) includes nutritionist as part of Quality Improvement Team. Ninety-three percent (93%) of health facilities have Medical Continues Education with CPD point for other health professionals but nutritionist no, due to lack of council to regulate and provide CPD point to them. This makes nutrition professional less active to participate of continues education. About supportive supervision six-five percent

(65%) of health facilities reported to have received feedback of supportive supervision. Not giving feedback of supportive supervision may compromise improving of nutrition services delivery in health facilities. According to the Uganda MoH, (2015) nutrition services delivery assessment tool, for health facilities with nutrition services termed as fair, health facility with nutrition services and at least two of the following; nutritionist, in charge of nutrition, Quality Improvement team and functional Quality Improvement team was termed as good. For the health facility to be considered as providing excellent nutrition services they must have; nutrition and dietetics experts, in charge of nutrition and at least two (2) of the following; functional quality improvement team including nutrition and dietetics expert in the team, scheduled Continue Professional Development /Continues Medical Education with nutrition topics, nutrition budget and work plan and inventory equipment's (Uganda (2015). Other studies done in developing world says good hospital leadership and management is key for quality and sustainable nutrition services provision (Beck *et al.*, 2002; Laur *et al.*, 2017; Patel *et al.*, 2014). From an extensive literature search on nutrition care and management, and clinical nutrition rotation done at Kenyatta national hospital, Nairobi, Kenya, (from 1st May 2013 to 30th May 2023 a duration of 4 weeks) a summary of findings is provided in Figure 3 which illustrates the components recommended for quality Nutrition Services Delivery (NSD) in Health Facilities in Tanzania.

Human Resource

The study shows that nutrition care is provided to patients by mostly nutritionists and/ or dietitians and in some cases nurses and doctors where nutritionists or dietitians are not available. Results showed evidently that the number of employed nutritionists in health facilities in Tanzania is small compared to the number of patients they are expected to serve. The patient's ratio to hospital bed capacity indicates there the existing big difference between number of nutrition staff and hospital bed capacity at 1:>200 (table 3). This scarcity of professionals creates high work load, inconsistency of nutrition services and lack of specialization. The shortage of nutritionist in hospital settings suggests

potential challenges in ensuring comprehensive and dedicated essential nutritional care for patients (Patel *et al.*, 2014). This warrants further investigation on the capacity and resource allocation strategies to address the imbalance. The reasons behind this scarcity, could be budget constraints, limited awareness of the importance of nutritionists in healthcare, or a lack of prioritization for nutrition-related services when allocating health care workers in hospitals. Another study done in US saw the same challenge, shortage of nutrition professionals in hospitals might signify an existing gap in comprehensive patient care (Patel *et al.*, 2014). Nutritionists play a crucial role in patient recovery, shortening hospital stay and reduce costs as well as improved patients' quality of life and well-being (Laur *et al.*, 2017). There should be a hospital nutrition policy changes or increased advocacy for integrating nutritionists into hospital teams. This also calls for increased funding or incentives to attract more professionals to this field. A study done at King Khalid Hospital (2013) show that nutrition practitioners' important roles in hospital yet staffing fall short on ratio of dieticians and hospital capacity 1:75 (Idris and Al Jannakl, 2013). A study done in Brazil 2012 in 37 hospitals the recommended a minimum ratio nutritionists/dieticians and hospital bed capacity at 1:30 (Agarwal *et al.*, 2012). This allows compressive and quality provision of nutrition services including nutrition screening, assessments, diagnosis, counseling and education, calculation of macronutrients, documentation also provides opportunity for specialization in nutrition care for example renal nutritionist, research nutritionist, neonatal nutritionist, organ transplants, weight managements etc. and recognition or consistent of nutrition services. But still face some challenges such as physician not collaborate, no assistant from the other team group, no nurse to follow the description diet, more work load. However, a study by Ball *et al.*, suggests that general practitioners have played a role in providing nutrition care as lifestyle diseases have increased, though the effectiveness of this care remains unclear (Ball *et al.*, 2013; Cass *et al.*, 2014). Healthcare professionals can work together to optimize patient care, incorporating nutritionists

into multidisciplinary teams and training (Kahn, 2006; Laur *et al.*, 2015, 2017)

Figure 3

Components for quality Nutrition Services Delivery (NSD) in Health Facilities

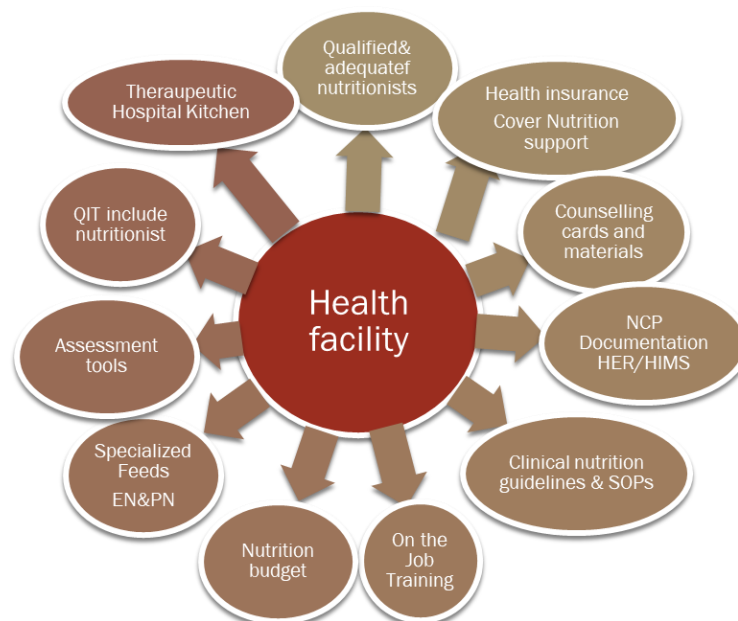


Table 3

Nutritionists to hospital bed capacity ratio

Health facility	No. of Nutritionists	Hospital capacity	bed	Ratio	Standard ratio	Standard no of Nutritionists
MNH- Upanga	7	1,500		1:214	1:30	50
MNH- Mloganzila	4	608		1:152	1:30	20
MOI	3	362		1:121	1:30	12
BMC	5	950		1:190	1:30	32
JKCI	2	150		1:75	1:30	5
ORCI	0	270		undefined	1:30	9
BMH	3	400		1:133	1:30	13
KCMC	5	640		1:128	1:30	21
ZH ^a	2	553*		1:277	1:30	18
RRH ^b	2	400*		1:200	1:30	13
DH ^c	1	255*		1:255	1:30	9

* *Estimated hospital capacity*

^a Represent Zonal Hospitals

^b Represent Regional Referral Hospitals

^c Represent District Hospitals

Nutrition Services

The assessment phase primarily involves anthropometric measurements, study finds the common indices measured were weight, height, and mid-upper arm circumference (MUAC) >70%. However, less commonly practiced measurements, such as head circumference (only 2%) and body composition analysis, although are vital for identifying dietary-related non-communicable diseases like cardiovascular diseases and obesity. This were because of lack of access to necessary equipment and training, particularly for body composition analysis, limits the ability of practitioners to utilize these critical indices effectively. Also, previous study has similar results anthropometric variables, especially weight and height, are widely used in epidemiological studies to assess nutritional status due to their simplicity and ease of collection. In adults, these measures help to determine nutritional status, estimate the size of body compartments (e.g., lean mass and adipose tissue), assess relative body composition (such as fatness), and describe body fat distribution (Willett, 1990). Biochemical indicators, such as blood glucose levels reported by 81% of practitioners, are commonly checked, indicating a focus on diabetes management. Numerous studies have identified dietary biochemical markers, such as vitamins, fatty acids, trace elements, metabolic indicators (e.g., homocysteine, methylmalonic acid), as well as isoflavones and lignans in blood or urine, as important indicators for assessing nutritional status (Jacob and Russell, 1988; Monge-Rojas *et al.*, 2005; Pfeiffer *et al.*, 2009).

Nutritional physical observations, including signs of muscle wasting and edema, further support the identification of micronutrient deficiencies. The collection of food and nutrition-related history through methods like 24-hour dietary recall and food frequency questionnaires were essential for understanding patient characteristics and nutritional needs. It is important to utilize various dietary assessment methods, both direct and indirect (including prospective and retrospective approaches)

(Chakraborty, 2021; Trumbo, 2021). This diversity is essential for making informed clinical decisions and formulating standard operating procedures (SOPs) and guidelines to address diet-related diseases.

Nutrition Diagnosis, the study indicates that only 11% of practitioners correctly formulated nutrition diagnoses using the PES statement. It has been also shown often confusing nutritional issues with medical diagnoses (Hakel-Smith and Lewis, 2004). The barriers to proper nutrition diagnosis stem from insufficient on-the-job training in NCP and a lack of emphasis on the entire NCP framework, which includes monitoring and evaluation. Accurate nutrition diagnosis is crucial for identifying problems related to food intake, clinical conditions, and behavioral factors influencing dietary habits (Karen Lacey and Ellen Pritchett, 2003). As noted by (Hoffinger *et al.*, 2003), effective documentation of nutrition diagnoses is vital for establishing clear links between nutritional problems and their underlying causes (ADA, 2006).

Nutrition Interventions, the interventions applied predominantly focus on high-protein diets, reflecting a common therapeutic approach, with only 4% of practitioners prescribing ketogenic diets, typically reserved for specific medical conditions. This trend suggests a general tendency among practitioners to provide standard nutrition education rather than tailored dietary interventions that meet individual patient needs, potentially compromising patients' quality of life. Previous study shows hospital diets across Europe and globally are inconsistent, often prescribed without proper evaluation of the patient's nutritional status, and sometimes based on arbitrary choices (Thibault *et al.*, 2021). They advocate for personnel responsible for hospital kitchens, as well as for nutritionists, physicians, dietitians, and nurses to prescribe therapeutic diets according to individual nutritional needs, allergies, and conditions like dysphagia, diabetes, and obesity, with the goal of improving patient safety, quality of life, nutritional care, and reducing malnutrition, dietary related non

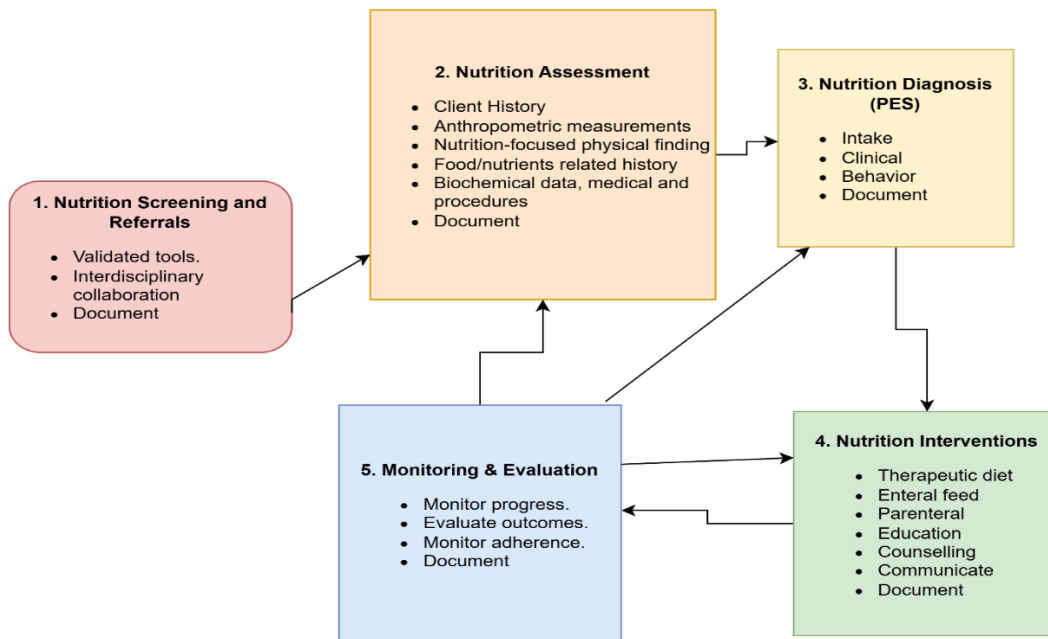
communicable and its complications (Thibault *et al.*, 2021).

Furthermore, enteral and parenteral nutrition supports are infrequently utilized, with prescriptions at 34% and 22%, respectively mostly done at national and specialized hospitals. Barriers include limited availability of nutritional products and practitioners' knowledge gaps regarding the indications and administration of these therapies. Literature shows therapeutic diets, such as liquid diet or gluten-free are associated with underfeeding and increased malnutrition risk (KeMoH, 2010), for patients to get adequate nutrients need to supplemented with enteral feeds. Parenteral nutrition support should be initiated in patients who are malnourished, Altered Gastrointestinal function or have not been able to tolerate oral/ enteral feedings within 5 to 7 days to ensure to meet body nutrients demand (Cederholm *et al.*,

2017; KeMoH, 2010, 2020). Primary interventions often involve nutrition education and counseling aimed at addressing lifestyle factors contributing to non-communicable diseases. Oral nutrition supplementation, in managing severe acute malnutrition, locally made supplements like F-75 and F-100 are widely used 75%, accompanied by vital micronutrients. A previous study indicates that additional materials required for managing acute malnutrition include iron, folic acid, deworming agents, oral rehydration solutions (ORS), ready-to-use therapeutic food (RUTF), as well as other micronutrients and food supplements (Danaei *et al.*, 2016; TFNC, 2018). However, fortifiers, which could enhance the nutritional content of breast milk or specialized formulas for premature infants, remain underutilized 7%. Increased awareness and utilization of fortifiers can significantly improve nutritional support for vulnerable populations in health facilities (KeMoH, 2010, 2020).

Figure 4

Shows steps of Nutrition care process (nutrition services)



Monitoring and evaluation, the final phase of NCP figure 4, reveals varied practices among nutrition practitioners. Daily evaluations for inpatients are conducted by 46% of practitioners, while outpatient follow-ups are less frequent due to socioeconomic constraints, compounded by

the lack of health insurance coverage for nutrition services. Although 89% of participants document nutrition care, the documentation often fails to encompass the entire NCP framework, resulting in data loss and poor communication among healthcare professionals (Lewis *et al.*, 2022).

Standardized documentation practices, such as utilizing the International Dietetics and Nutrition Terminology (IDNT), can enhance clarity and streamline communication across multidisciplinary teams (Lövestam *et al.*, 2017, 2019)

The study's findings indicate that experienced nutrition professionals deliver superior services (p-value 0.019) table 1 and table 2, underscoring the importance of continuous professional development and educational qualifications in enhancing the quality of nutritional care. Another study done by (Laur *et al.*, 2016; Saronga *et al.*, 2022) indicates the same finding. The research highlights the need for comprehensive training in all aspects of the NCP and advocates for the integration of nutrition data into electronic health records to improve service delivery and patient outcomes.

Study limitation

The limitations of this study were the sample size and the inclusion of various levels of health facilities with different characteristics and/ or levels. This opens opportunities for future research to include larger sample sizes and involves hospitals with similar characteristics and levels for example zonal hospitals, aiming to understand the specific nutrition services as presented in that level of health facilities and to provide recommendations best practice for that level of health facility.

References

- ADA. (2006). Nutrition diagnosis: a critical step in the nutrition care process. American Dietetic Association.
- Agarwal, E., Ferguson, M., Banks, M., Batterham, M., Bauer, J., Capra, S., & Isenring, E. (2012). Nutrition care practices in hospital wards: Results from the Nutrition Care Day Survey 2010. *Clinical Nutrition*, 31(6), 995-1001. <https://doi.org/10.1016/j.clnu.2012.05.014>
- Ball, L., Ball BAppSc, L., Johnson BBiomedSc, C., & Desbrow, B. (2013). *Journal of primary health care*, Volume 5 Number 1, March 2013, 59.
- Beck, A. M., Balknäs, U. N., Camilo, M. E., Fürst, P., Gentile, M. G., Hasunen, K., Jones, L., Jonkers-Schuitema, C., Keller, U., Melchior,

Conclusion

The study revealed a shortage of nutritionists and dietitians in Tanzanian healthcare facilities, limiting the delivery of quality nutrition services. Most interventions were basic, focusing on nutrition assessments and education, while advanced tools, nutrition supplements, enteral, and parenteral support were underutilized. Major barriers included poor documentation, inadequate nutrition diagnoses, insufficient job training, and a lack of job aids and nutritional guidelines. The study recommends enhancing training, integrating the Nutrition Care Process (NCP) into electronic health records, and adopting standardized documentation practices. These steps, alongside increased investment in human resources, equipment, and supplies, will optimize nutrition care. Additionally, policy advocacy, fostering partnerships, and promoting research are vital to advancing innovative approaches in nutrition care.

Acknowledgement

Appreciation is extended to Muhimbili National Hospital Mloganzila, The Africa Center for research Agricultural, advancement, Teaching Excellence and sustainability, Ministry of Health, Health care facilities, The Nelson Mandela African Institution of Science and Technology, National Institute of Medical Research and all study participants.

- J. C., Mikkelsen, B. E., Pavcic, M., Schauder, P., Sivonen, L., Zinck, O., Øien, H., & Ovesen, L. (2002). Practices in relation to nutritional care and support - Report from the Council of Europe. *Clinical Nutrition*, 21(4), 351-354. <https://doi.org/10.1054/clnu.2002.0555>
- Cass, S., Ball, L., & Leveritt, M. (2014). Australian practice nurses' perceptions of their role and competency to provide nutrition care to patients living with chronic disease. *Australian Journal of Primary Health*, 20(2), 203-208. <https://doi.org/10.1071/PY12118>
- Cederholm, T., Barazzoni, R. O. C. C. O., Austin, P., Ballmer, P., Biolo, G. I. A. N. N. L., Bischoff, S. C., ... & Singer, P. (2017). ESPEN guidelines on definitions and terminology of clinical nutrition. *Clinical nutrition*, 36(1),

- 49-64.
<https://doi.org/10.1016/j.clnu.2016.09.004>
- Chakraborty, A. (2021). Dietary Diversity Final. 1-4.
- Daigle, K., Subach, R., & Valliant, M. (2021). Academy of Nutrition and Dietetics: Revised 2021 Standards of Practice and Standards of Professional Performance for Registered Dietitian Nutritionists (Competent, Proficient, and Expert) in Sports and Human Performance Nutrition. *Journal of the Academy of Nutrition and Dietetics*, 121(9), 1813-1830.e55. <https://doi.org/10.1016/j.jand.2021.04.018>
- Danaei, G., Andrews, K. G., Sudfeld, C. R., Fink, G., McCoy, D. C., Peet, E., Sania, A., Smith Fawzi, M. C., Ezzati, M., & Fawzi, W. W. (2016). Risk Factors for Childhood Stunting in 137 Developing Countries: A Comparative Risk Assessment Analysis at Global, Regional, and Country Levels. *PLoS Medicine*, 13(11). <https://doi.org/10.1371/journal.pmed.1002164>
- DOHC. (2009). Food and Nutritional Care in Hospitals Guidelines for Preventing Under-Nutrition in Acute Hospitals Published by the Department of Health and Children.
- Findlay, M., Rankin, N. M., Shaw, T., White, K., Boyer, M., Milross, C., Lourenço, R. D. A., Brown, C., Collett, G., Beale, P., & Bauer, J. D. (2020). Best evidence to best practice: implementing an innovative model of nutrition care for patients with head and neck cancer improves outcomes. *Nutrients*, 12(5). <https://doi.org/10.3390/nu12051465>
- Frost, J. C., & Baldwin, A. J. (2021). "Food for thought": The importance of nutrition to patient care and the role of the junior doctor. *Clinical Medicine, Journal of the Royal College of Physicians of London*, 21(3), E272-E274. <https://doi.org/10.7861/CLINMED.2020-0707>
- Grimshaw, J. M. (2005). Evidence-Based Quality. 138-150. <https://doi.org/10.1377/hlthaff.24.1.138>
- Hakel-Smith, N., & Lewis, N. M. (2004). A standardized nutrition care process and language are essential components of a conceptual model to guide and document nutrition care and patient outcomes. *Journal of the American Dietetic Association*, 104(12), 1878-1884. <https://doi.org/10.1016/j.jada.2004.10.015>
- Handu, D., Moloney, L., Rozga, M., & Cheng, F. W. (2021). Malnutrition Care During the COVID-19 Pandemic: Considerations for Registered Dietitian Nutritionists. *Journal of the Academy of Nutrition and Dietetics*, 121(5), 979-987. <https://doi.org/10.1016/j.jand.2020.05.012>
- Hoffinger, R., Lopez, R., Katzen, T. J., Wong, D., Drewnowski, A., Warshaw, H., Doucette, M. M., & Myers, S.E. (2003). Weight Management Matters from Bench to Broadcast: Part I: "Changing the Conversation about High Fructose Corn Syrup" Beyond the Handout: Motivational Interviewing Skills for Behavior Change. In *J Am Diet Assoc* (Vol. 103). www.wmdp.org.
- Idris, S. M., & Al Jannakl, N. (2013). The Role of Dietitian in Nutrition Service at King Khalid Hospital: Case Study. In *International Journal of Science and Research* (Vol. 2, Issue 5). www.ijsr.net
- Jacob, A., & Russell, M. (1988). Dietary intakes and biochemical indicators of nutritional status in elderly, institutionalized population. *Communications-surveys Dietary intakes and biochemical indicators of nutritional status in an elderly, institutionalized.* May 2014. <https://doi.org/10.1093/ajcn/47.3.524>
- Kahn, R. F. (2006). Continuing Medical Education in nutrition. <https://academic.oup.com/ajcn/article-abstract/83/4/981S/4649354>
- Karen Lacey & Ellen Pritchett. (2003). Nutrition care process and model: ADA adopts road map to quality care outcomes management.
- KeMoH. (2010). Republic of Kenya Ministry of Medical Services Kenya National Clinical Nutrition and Dietetics Reference Manual First Edition. February.
- KeMoH. (2020). Republic of Kenya, Kenya clinical nutrition and dietetics manual (second edition), A Reference manual for Nutrition and Dietetics professionals.
- Khalatbari-Soltani, S., & Marques-Vidal, P. (2016). Impact of nutritional risk screening in hospitalized patients on management, outcome and costs: A retrospective study.

- Clinical Nutrition, 35(6), 1340–1346.
<https://doi.org/10.1016/j.clnu.2016.02.012>
- Kisighii, H. A., & Raymond, J. (2022). Context-specific optimal dietary guidelines for managing cancer for hospitalized patients in Tanzania. <https://doi.org/10.1108/NFS-01-2022-0020>
- Laur, C., Marcus, H., Ray, S., & Keller, H. (2016). Quality nutrition care: Measuring hospital staff's knowledge, attitudes, and practices. *Healthcare (Switzerland)*, 4(4), 1–13. <https://doi.org/10.3390/healthcare4040079>
- Laur, C., McCullough, J., Davidson, B., & Keller, H. (2015). Becoming food aware in hospital: A narrative review to advance the culture of nutrition care in hospitals. *Healthcare (Switzerland)*, 3(2), 393–407. <https://doi.org/10.3390/healthcare3020393>
- Laur, C., Valaitis, R., Bell, J., & Keller, H. (2017). Changing nutrition care practices in hospital: A thematic analysis of hospital staff perspectives. *BMC Health Services Research*, 17(1). <https://doi.org/10.1186/s12913-017-2409-7>
- Lewis, S. L., Miranda, L. S., Kurtz, J., Larison, L. M., Brewer, W. J., & Papoutsakis, C. (2022). Nutrition Care Process Quality Evaluation and Standardization Tool: The Next Frontier in Quality Evaluation of Documentation. *Journal of the Academy of Nutrition and Dietetics*, 122(3), 650–660. <https://doi.org/10.1016/j.jand.2021.07.004>
- Lövestam, E., Boström, A. M., & Orrevall, Y. (2017). Nutrition Care Process Implementation: Experiences in Various Dietetics Environments in Sweden. *Journal of the Academy of Nutrition and Dietetics*, 117(11), 1738–1748. <https://doi.org/10.1016/j.jand.2017.02.001>
- Lövestam, E., Steiber, A., Vivanti, A., Boström, A. M., Devine, A., Haughey, O., Kiss, C. M., Lang, N. R., Lieffers, J., Lloyd, L., O'Sullivan, T. A., Papoutsakis, C., Peersen, C., Thoresen, L., Orrevall, Y., Corish, C., Eisenbraun, C., Hanning, R., Kristiansen, I., & MacLean, A. K. (2019). Use of the Nutrition Care Process and Nutrition Care Process Terminology in an International Cohort Reported by an Online Survey Tool. *Journal of the Academy of Nutrition and Dietetics*, 119(2), 225–241. <https://doi.org/10.1016/j.jand.2018.09.002>
- MOHCDGEC. (2021). *United Republic of Tanzania Ministry of Health, Community Development, Gender, Elderly and Children Health Sector Strategic Plan Leaving No One Behind*.
- Monge-Rojas, R., Barrantes, M., Holst, I., Nuñez-Rivas, H., Alfaro, T., Rodríguez, S., Cunningham, L., Cambroner, P., Salazar, L., & Herrmann, F. H. (2005). Biochemical indicators of nutritional status and dietary intake in Costa Rican Cabécar Indian adolescents. *Food and Nutrition Bulletin*, 26(1), 3–16. <https://doi.org/10.1177/156482650502600101>
- NMNAP II. (2022). *United Republic of Tanzania Prime Minister's Office*.
- Olufson, H. T., Young, A. M., & Green, T. L. (2022). The delivery of patient centred dietetic care in subacute rehabilitation units: A scoping review. *Journal of Human Nutrition and Dietetics*, 35(1), 134–144. <https://doi.org/10.1111/jhn.12940>
- Patel, V., Romano, M., Corkins, M. R., DiMaria-Ghalili, R. A., Earthman, C., Malone, A., Miller, S., Sabino, K., Wooley, J., & Guenter, P. (2014). Nutrition screening and assessment in hospitalized patients: A survey of current practice in the united states. *Nutrition in Clinical Practice*, 29(4), 483–490. <https://doi.org/10.1177/0884533614535446>
- Pfeiffer, C. M., Schleicher, R. L., Osterloh, J. D., Jain, R. B., Wong, L., & Sampson, E. J. (2009). National Report on Biochemical Indicators of Diet and Nutrition in the U.S. Population 1999-2002. *The FASEB Journal*, 23(S1). https://doi.org/10.1096/fasebj.23.1_supplement.551.26
- Saronga, N., Mosh, I. H., Stewart, S. J., Bakar, S., Sunguya, B. F., Burrows, T. L., Leyna, G. H., Adam, M. T. P., Collins, C. E., & Rollo, M. E. (2022). A Mixed-Method Study Exploring Experiences and Perceptions of Nutritionists Regarding Use of an Image-Based Dietary Assessment System in Tanzania. *Nutrients*, 14(3). <https://doi.org/10.3390/nu14030417>

- TFNC. (2016). *National Guidelines for Nutrition Care and Support of People with HIV*. Dar es Salaam, Tanzania.
- TFNC. (2018). *Integrated Management of Acute Malnutrition*.
- Thibault, R., Abbasoglu, O., Ioannou, E., Meija, L., Ottens-Oussoren, K., Pichard, C., Rothenberg, E., Rubin, D., Siljamäki-Ojansuu, U., Vaillant, M. F., & Bischoff, S. C. (2021). ESPEN guideline on hospital nutrition. *Clinical Nutrition*, 40(12), 5684–5709.
<https://doi.org/10.1016/j.clnu.2021.09.039>
- Trumbo, P. R. (2021). Dietary Assessment. In *Vitamin B-6 Metabolism in Pregnancy, Lactation, and Infancy*.
<https://doi.org/10.1201/9781003210368-2>
- Uganda MoH. (2015). *Nutrition Service Delivery Assessment Tool for National Referral, Regional Referral, and General Hospitals*.
- Van Den Berg, G., Vermeulen, H., Conroy, T., Van Noort, H., De Van Der Schueren, M., & Huisman-de Waal, G. (2023). Factors influencing the delivery of nutritional care by nurses for hospitalised medical patients with malnutrition; a qualitative study. *Journal of Clinical Nursing*, 32(15–16), 5147–5159. <https://doi.org/10.1111/jocn.16614>
- Willett, W. C. (2006). 21 Diet and Nutrition. *Cancer epidemiology and prevention*, 405.