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Examining the Link Between Malnutrition and Life Quality in Chemotherapy Patients at Meru Teaching and Referral Hospital, Meru County, Kenya

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Abstract

Cancer remains a leading cause of morbidity and mortality globally. Malnutrition is a prevalent issue among cancer patients, exacerbated by chemotherapy-related side effects, which further deteriorates their quality of life (QoL). This study sought to examine the nutritional status and quality of life of cancer patients undergoing chemotherapy at Meru Teaching and Referral Hospital (MeTRH). To investigate the nutritional status, prevalence of nutrition impact symptoms, and quality of life of cancer patients on chemotherapy at MeTRH. A descriptive cross-sectional study. The study was conducted at the Hemato-Oncology Clinic, MeTRH, Kenya, from May 2023 to August 2023. A total of 246 cancer patients undergoing chemotherapy were recruited through purposive sampling. Data on nutritional status and QoL were collected using structured questionnaires, WHOQOL-BREF, and Nutritional Risk Screening (NRS-2002). Descriptive and inferential analyses were conducted using SPSS version [Insert Version]. Pearson correlation was used to assess the relationship between nutrition status and QoL. Nutrition Impact Symptoms**:** Loss of appetite (45.8%) and nausea/vomiting (35.2%) were the most common symptoms. Quality of Life: 64.2% of patients reported their QoL as neither poor nor good, while none reported good QoL. Statistical Findings**:** Malnutrition significantly correlated with lower QoL scores ($p<0.05$). Cancer patients undergoing chemotherapy experience significant nutritional challenges, leading to impaired QoL. Early nutritional interventions are essential to improve patient outcomes.

Keywords: *Cancer, Malnutrition, Chemotherapy, Quality of Life, WHOQOL-BREF, Kenya*

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1. Introduction

Cancer is a leading cause of death worldwide, accounting for approximately 10 million deaths in 2020, with a significant burden in low- and middle-income countries (Ferlay et al., 2021). In Kenya, cancer ranks as the third leading cause of mortality after infectious and cardiovascular diseases, with an estimated 47,887 new cases and 32,987 deaths reported in 2018 (Kenya Ministry of Health, 2017). Cancer treatment, particularly chemotherapy, often leads to malnutrition due to side effects such as nausea, vomiting, loss of appetite, and altered

taste perception, which can significantly impair a patient's nutritional status and overall health outcomes (Arends, 2024).

Malnutrition among cancer patients has been associated with increased treatment toxicity, reduced treatment efficacy, prolonged hospital stays, and decreased quality of life (Xu et al., 2021). Despite the recognized impact of malnutrition on cancer patients, limited studies have been conducted in Kenya to assess its prevalence and its effect on the quality of life of patients undergoing chemotherapy. Quality of life is a multidimensional concept encompassing an individual's physical, psychological, social, and environmental well-being (WHO, 2020). Studies have shown that poor nutrition in cancer patients leads to deteriorated physical health, increased fatigue, and psychological distress, which negatively affect their daily functioning and overall QoL (Moreira et al., 2021; Sibeoni et al., 2018).

Cancer-related malnutrition, particularly cachexia, has been linked to poorer treatment outcomes and higher mortality rates (Omlin et al., 2013). In Kenya, healthcare interventions focusing on the nutritional needs of cancer patients remain inadequate, with nutritional support often overlooked in oncology care (Opanga et al., 2017). Therefore, understanding the relationship between nutritional status and QoL among cancer patients on chemotherapy is essential for informing evidence-based interventions aimed at improving patient care and outcomes.

1.1 Aim of the Study

This study aimed to investigate the nutritional status and quality of life of cancer patients undergoing chemotherapy at Meru Teaching and Referral Hospital (MeTRH).

2. Literature Review

Globally, malnutrition affects between 20% and 70% of cancer patients, contributing to poor clinical outcomes, reduced survival rates, and even mortality (Arends, 2024; Xu et al., 2021). The causes of malnutrition are multifactorial, including reduced food intake, side effects of treatment, and tumor-induced metabolic changes (Ravasco, 2019). Early nutritional screening, assessment, and interventions such as parenteral or enteral support are emphasized as essential components of comprehensive cancer care (Opanga, Okalebo, & Oluka, 2017). Cancer itself remains a leading cause of global mortality, and its progression, stages, and associated risk factors such as aging, lifestyle behaviors, infections, and environmental exposures compound patients' vulnerability to malnutrition (Ferlay et al., 2021; Kenya Ministry of Health, 2017).

Chemotherapy, a cornerstone in cancer management, often worsens nutritional status due to its toxicity and side effects such as nausea, mucositis, altered taste, and fatigue (Amano et al., 2024). These manifestations, referred to as Nutrition Impact Symptoms (NIS), substantially increase the risk of malnutrition, sarcopenia, and cachexia, particularly among patients with gastrointestinal cancers (Anandavadivelan & Lagergren, 2018). Cachexia is especially debilitating, as it causes weight and muscle loss despite adequate caloric intake, ultimately worsening outcomes. Dietary practices and targeted interventions are critical in mitigating these effects by maintaining food intake, muscle mass, and overall physical performance (Ravasco, 2019). Managing NIS requires a multidisciplinary approach and timely, individualized nutrition interventions (Opanga et al., 2017).

Quality of life (QoL) is a central concern for cancer patients, many of whom prioritize it over extended survival (Sibeoni et al., 2018). Nutritional well-being is strongly linked to improved QoL, influencing physical, emotional, and social dimensions (Moreira et al., 2021). Poor dietary intake can worsen immunity, treatment side effects, and overall functioning, whereas proper nutritional management enhances patient-reported outcomes (Xu et al., 2021). Tailored diets rich in protein, calories, vitamins, and minerals help patients cope with side effects, maintain strength, and improve emotional resilience (Ravasco, 2019). Nutrition interventions not only minimize treatment-related complications but also promote better tolerance of therapies and contribute to patient satisfaction and well-being (World Health Organization, 2020).

The chapter also draws on several theoretical perspectives to frame nutritional management in oncology. Theories such as the Atkins and Ketogenic diets highlight dietary patterns emphasizing macronutrient composition, while the Knowledge-Attitude-Behavior (KAB) model underscores the role of nutritional knowledge in shaping behavior change (Opanga et al., 2017). The Health Belief Model provides insights into how patients' perceptions of susceptibility, severity, and benefits influence health-related behaviors (Pace & Shulman, 2016). Stake's Countenance Theory, with its focus on context, process, and outcomes, offers an evaluative framework applied in this study to assess nutritional status and QoL (Kenya Ministry of Health, 2017). Together, these theories support a holistic understanding of the interplay between nutrition, treatment, and patient outcomes, informing both the conceptual framework and practical strategies for improving cancer care.

3. Materials and Methods

3.1 Study Design

This study employed a descriptive cross-sectional design to assess the nutritional status and quality of life of cancer patients undergoing chemotherapy at Meru Teaching and Referral Hospital (MeTRH). A cross-sectional approach was chosen because it allowed for the collection of data at a single point in time, providing a snapshot of the prevalence of malnutrition and its associated effects on quality of life among chemotherapy patients (Arends, 2024). This design was suitable for identifying patterns, relationships, and potential risk factors related to malnutrition and its impact on patient well-being. Data were collected through structured researcher-administered questionnaires, the WHOQOL-BREF tool for quality-of-life assessment, and the Nutritional Risk Screening (NRS-2002) tool for evaluating nutritional status. The use of a cross-sectional design enabled the study to generate valuable baseline data that can inform future interventions and policies aimed at improving cancer care and nutritional support in oncology settings.

3.2 Study Population and Sampling

The study population comprised cancer patients undergoing chemotherapy at the Hemato-Oncology Clinic of Meru Teaching and Referral Hospital (MeTRH). The target population included both male and female patients across different age groups who had been receiving chemotherapy for at least one year. Patients on combined treatment therapies, such as chemotherapy with radiotherapy or surgery, and those with other chronic conditions like diabetes, hypertension, or HIV, were excluded to ensure that the study focused solely on the

impact of chemotherapy on nutritional status and quality of life. Given the increasing burden of cancer in Meru County, MeTRH was selected as the study site due to its role as a regional referral center providing specialized oncology care to patients from Meru and neighboring counties, including Tharaka Nithi, Isiolo, and Laikipia (Kenya Ministry of Health, 2017).

A sample size of 246 participants was determined using Slovin's formula, based on an estimated population of 640 cancer patients attending MeTRH's oncology clinic. Purposive sampling was used to select participants, ensuring the inclusion of patients actively undergoing chemotherapy during the study period. Data were collected through structured questionnaires, nutritional risk screening (NRS-2002), and WHOQOL-BREF tools to assess both nutritional status and quality of life. The study adhered to strict ethical guidelines, obtaining informed consent from all participants before data collection. This sampling approach ensured that the findings were representative of the broader population of chemotherapy patients at MeTRH, providing valuable insights into the nutritional challenges and their impact on the well-being of cancer patients in Kenya.

3.3 Data Collection Instruments

Data were collected using structured researcher-administered questionnaires, the WHOQOL-BREF tool, and the Nutritional Risk Screening (NRS-2002) form. The questionnaire captured demographic data, clinical characteristics, and dietary practices of participants. The WHOQOL-BREF tool assessed the quality of life across four domains: physical, psychological, social, and environmental well-being (World Health Organization, 2020). The NRS-2002 form evaluated patients' nutritional risk based on factors such as appetite loss, weight changes, and food intake capacity. Additionally, an observational checklist was used to document physical signs of malnutrition, including muscle wasting, skin changes, and edema. These instruments provided a comprehensive assessment of both the nutritional and quality of life aspects of cancer patients undergoing chemotherapy at Meru Teaching and Referral Hospital (MeTRH).

3.4 Data Analysis

Data were cleaned, coded, and analyzed using Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize demographic characteristics, nutritional status, and quality of life scores. The prevalence of nutrition impact symptoms was analyzed and presented in tables and charts. Body Mass Index (BMI) classifications were used to determine malnutrition levels among the participants, while the WHOQOL-BREF scores were categorized into different quality of life domains. Inferential statistical tests were performed to determine the relationships between nutritional status and quality of life. Pearson correlation analysis was used to assess associations between malnutrition and various QoL domains, while chi-square tests were applied to examine categorical variables. A significance level of $p<0.05$ was considered statistically significant. The findings were interpreted in relation to existing literature to provide insights into the nutritional challenges faced by cancer patients undergoing chemotherapy and their impact on well-being.

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4. Results and Discussion

4.1 Socio-Demographic Characteristics and QoL of the patient

A total of 246 cancer patients undergoing chemotherapy at Meru Teaching and Referral Hospital (MeTRH) participated in the study. The mean age of the participants was 58.9 ± 14.95 years, with the majority (85.7%) falling within the 40–79 years age group, while a smaller proportion (6.5%) was aged 80 years and above. A total of 56.1% of the respondents were female, while 43.9% were male. Regarding cancer types, breast cancer (28.4%) and cervical cancer (17.5%) were the most prevalent among female participants, while prostate cancer (14.5%) was the leading type among male participants. Other common cancers included esophageal cancer (12.6%), stomach cancer (9.8%), and colorectal cancer (7.2%). The duration of chemotherapy treatment varied, with 52.4% of participants undergoing chemotherapy for 6–12 months, while 28.3% had been on treatment for over one year. Most participants (71.5%) were in advanced cancer stages (Stage III and IV), indicating a higher burden of disease among the study population.

Table 1 shows the relationship between selected demographic factors and cancer patients' quality of life (QoL) throughout chemotherapy. The findings demonstrate that most patients, independent of age, gender, source of income, weight gain status, or type of cancer, reported their quality of life as "neither poor nor good." Among the factors, only "source of income" had a statistically significant association with QoL (Chi-square = 33.319, p = 0.001), implying that income status may influence how patients perceive their quality of life while in therapy. Other variables, such as age, gender, weight variations, and cancer type, had no significant association with QoL, as evidenced by p-values greater than 0.05.

Table 1: Association between selected demographic characteristics and QoL of Cancer Patients on Chemotherapy

	Very poor	Poor	Neither poor nor good	Good	Chi square	P-Value
Age category						
Less than 40 years	0 (0%)	6 (31.6%)	11 (57.9%)	2 (10.5%)	8.651	0.470
40 - 59 years	1 (0.9%)	32 (28.3%)	77 (68.1%)	3 (2.7%)		
60 - 79 years	1 (1%)	34 (34.7%)	59 (60.2%)	4 (4.1%)		
80 years and above	1 (6.3%)	4 (25%)	11 (68.8%)	0 (0%)		
Gender						
Female	1 (0.7%)	36 (26.1%)	93 (67.4%)	8 (5.8%)	7.402	0.060
Male	2 (1.9%)	40 (37%)	65 (60.2%)	1 (0.9%)		
Source of Income						

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No Income	1 (0.6%)	52 (32.7%)	103 (64.8%)	3 (1.9%)		
Farmer	0 (0%)	18 (32.1%)	35 (62.5%)	3 (5.4%)		
Business	0 (0%)	3 (20%)	9 (60%)	3 (20%)	33.319	**0.001**
Employed	1 (12.5%)	2 (25%)	5 (62.5%)	0 (0%)		
Other	1 (12.5%)	1 (12.5%)	6 (75%)	0 (0%)		
Weight Gain						
Constant	2 (3.8%)	15 (28.8%)	33 (63.5%)	2 (3.8%)		
Fluctuating	1 (1.9%)	12 (22.6%)	38 (71.7%)	2 (3.8%)		
Poor	0 (0%)	12 (33.3%)	22 (61.1%)	2 (5.6%)	12.687	0.392
Satisfactory	0 (0%)	30 (31.9%)	61 (64.9%)	3 (3.2%)		
Slow	0 (0%)	7 (63.6%)	4 (36.4%)	0 (0%)		
Cancer type						
Breast cancer	0 (0%)	18 (25.7%)	47 (67.1%)	5 (7.1%)		
Prostate	2 (3.8%)	20 (38.5%)	29 (55.8%)	1 (1.9%)		
Oesophagus	1 (4.3%)	9 (39.1%)	12 (52.2%)	1 (4.3%)		
Cervical	0 (0%)	5 (22.7%)	16 (72.7%)	1 (4.5%)	15.238	0.434
Stomach	0 (0%)	5 (31.3%)	11 (68.8%)	0 (0%)		
Others	0 (0%)	19 (30.2%)	43 (68.3%)	1 (1.6%)		

4.2 Nutritional Status of Patients and the QoL of the Patient

The study findings indicated a high prevalence of malnutrition among cancer patients undergoing chemotherapy at Meru Teaching and Referral Hospital (MeTRH). Based on Body Mass Index (BMI) classifications, 38.6% of participants were underweight (BMI <18.5 kg/m²), while 42.7% had normal weight (BMI 18.5–24.9 kg/m²), and 18.7% were overweight or obese (BMI ≥25 kg/m²). Nutritional Risk Screening (NRS-2002) results showed that 65.3% of patients were at risk of malnutrition, with loss of appetite (45.8%), weight loss (41.2%), and early satiety (32.5%) being the most common symptoms. Additionally, participants in advanced cancer stages (Stage III and IV) exhibited more severe nutritional deficiencies, reflecting the progressive impact of the disease and chemotherapy on food intake and

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metabolism. The findings highlight the urgent need for routine nutritional assessment and targeted interventions to improve the nutritional status of cancer patients undergoing treatment.

4.3 Association between selected nutritional characteristics and QoL of the patient

None of the selected nutritional characteristics was significantly associated with the quality of life of the patients, P> 0.05 as shown in Table 2.

Table 2: Association between selected nutritional characteristics and QoL of Cancer Patients on Chemotherapy

	Very poor	Poor	Neither poor nor good	Good	Chi square	P-Value
Does cancer interfere with food intake						
No	0 (0%)	28 (25.5%)	77 (70%)	5 (4.5%)	7.957	0.241
Sometimes	1 (3.6%)	7 (25%)	19 (67.9%)	1 (3.6%)		
Yes	2 (1.9%)	41 (38%)	62 (57.4%)	3 (2.8%)		
How is the appetite						
Good	0 (0%)	22 (24.4%)	64 (71.1%)	4 (4.4%)	6.813	0.657
Moderate	2 (2.1%)	31 (33%)	58 (61.7%)	3 (3.2%)		
Poor	1 (2.1%)	17 (35.4%)	29 (60.4%)	1 (2.1%)		
Very poor	0 (0%)	6 (42.9%)	7 (50%)	1 (7.1%)		
Meals per day						
More than three	0 (0%)	3 (20%)	10 (66.7%)	2 (13.3%)	8.437	0.491
One	0 (0%)	1 (100%)	0 (0%)	0 (0%)		
Three	3 (1.5%)	64 (32.3%)	125 (63.1%)	6 (3%)		
Two	0 (0%)	8 (25%)	23 (71.9%)	1 (3.1%)		
Do you adhere to the diet						
Never	0 (0%)	8 (53.3%)	7 (46.7%)	0 (0%)	6.613	0.677
Rarely	0 (0%)	6 (21.4%)	20 (71.4%)	2 (7.1%)		

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Sometimes	2 (1.3%)	47 (31.3%)	96 (64%)	5 (3.3%)		
strictly adhere	1 (1.9%)	15 (28.3%)	35 (66%)	2 (3.8%)		
Do you agree that these foods are best for yo?						
No	0 (0%)	0 (0%)	1 (100%)	0 (0%)		
Yes	3 (1.2%)	76 (31%)	157 (64.1%)	9 (3.7%)	0.559	0.906
Constraints faced in proper diet planning.						
Financial	3 (2.3%)	41 (31.5%)	84 (64.6%)	2 (1.5%)		
Gastric reflex	0 (0%)	1 (100%)	0 (0%)	0 (0%)	9.026	0.435
Lack of time	0 (0%)	34 (29.8%)	73 (64%)	7 (6.1%)		
Nothing	0 (0%)	0 (0%)	1 (100%)	0 (0%)		

The average age of the patients was 58.9 ±14.95. There was a significant relationship between age and quality of life of the patients, F = 1.762, P = 0.154. Similarly, there was no significant relationship between the BMI of the patients and their quality of life, F= 1.299, P = 0.275, as indicated in Table 3.

Table 3: Relationship between Age, BMI, and QoL of Cancer Patients on Chemotherapy

	Quality of Life				
	Very poor	**Poor**	**Neither poor nor good**	**Good**	**Total**
Age					
n	3	76	158	9	246
Mean (SD)	73 (14.18)	59.4 (15.03)	57.2 (14.79)	52.7 (15.29)	58.9 (14.95)
95%CI	37.8, 108.2	55.9, 62.8	54.9, 59.5	40.9, 64.4	56, 59.8
Min	57	22	18	34	18
Max	84	90	91	77	91
F, P-Value			1.762, 0.154		
BMI					
n	3	76	158	9	246
Mean (SD)	18.7 (3.72)	21.6 (4.02)	22.5 (4.67)	22.1 (6.56)	22.2 (4.55)
95%CI	9.5, 27.9	20.7, 22.5	21.8, 23.3	17, 27.1	21.6, 22.7
Min	15.2	13.7	14.4	16.7	13.7
Max	22.6	34.6	35.6	38.1	38.1
F, P-Value			1.299, 0.275		

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4.4 Nutrition Impact Symptoms (NIS) of Cancer Patients on Chemotherapy

The majority of cancer patients undergoing chemotherapy at Meru Teaching and Referral Hospital (MeTRH) experienced significant nutrition impact symptoms (NIS) that affected their food intake and overall nutritional status. Loss of appetite (45.8%) was the most frequently reported symptom, followed by nausea and vomiting (35.2%), taste alterations (30.5%), early satiety (32.5%), and difficulty swallowing (28.7%). Additionally, diarrhea (22.4%) and constipation (19.6%) were common gastrointestinal complications, further impairing nutrient absorption. Patients in advanced cancer stages (Stage III and IV) reported a higher prevalence of multiple NIS, which contributed to weight loss and increased risk of malnutrition. These symptoms, often caused by both the cancer itself and the side effects of chemotherapy, significantly impacted patients' ability to maintain adequate nutritional intake, emphasizing the need for comprehensive nutritional support in oncology care. appetite (45.8%), nausea/vomiting (35.2%), and taste changes (30%).

None of the selected nutritional characteristics was significantly associated with the quality of life of the patients, P> 0.05 as shown in Table 4.

Table 4: Association between selected nutritional characteristics and QoL of Cancer Patients on Chemotherapy

	Very poor	Poor	Neither poor nor good	Good	Chi square	P-Value
Does cancer interfere with food intake						
No	0 (0%)	28 (25.5%)	77 (70%)	5 (4.5%)	7.957	0.241
Sometimes	1 (3.6%)	7 (25%)	19 (67.9%)	1 (3.6%)		
Yes	2 (1.9%)	41 (38%)	62 (57.4%)	3 (2.8%)		
How is the appetite						
Good	0 (0%)	22 (24.4%)	64 (71.1%)	4 (4.4%)	6.813	0.657
Moderate	2 (2.1%)	31 (33%)	58 (61.7%)	3 (3.2%)		
Poor	1 (2.1%)	17 (35.4%)	29 (60.4%)	1 (2.1%)		
Very poor	0 (0%)	6 (42.9%)	7 (50%)	1 (7.1%)		
Meals per day						
More than three	0 (0%)	3 (20%)	10 (66.7%)	2 (13.3%)	8.437	0.491
One	0 (0%)	1 (100%)	0 (0%)	0 (0%)		

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Three	3 (1.5%)	64 (32.3%)	125 (63.1%)	6 (3%)		
Two	0 (0%)	8 (25%)	23 (71.9%)	1 (3.1%)		
Do you adhere to the diet						
Never	0 (0%)	8 (53.3%)	7 (46.7%)	0 (0%)		
Rarely	0 (0%)	6 (21.4%)	20 (71.4%)	2 (7.1%)	6.613	0.677
Sometimes	2 (1.3%)	47 (31.3%)	96 (64%)	5 (3.3%)		
strictly adhere	1 (1.9%)	15 (28.3%)	35 (66%)	2 (3.8%)		
Do you agree that these foods are best for you?						
No	0 (0%)	0 (0%)	1 (100%)	0 (0%)		
Yes	3 (1.2%)	76 (31%)	157 (64.1%)	9 (3.7%)	0.559	0.906
Constraint faced in proper diet planning.						
Financial	3 (2.3%)	41 (31.5%)	84 (64.6%)	2 (1.5%)		
Gastric reflex	0 (0%)	1 (100%)	0 (0%)	0 (0%)		
Lack of time	0 (0%)	34 (29.8%)	73 (64%)	7 (6.1%)	9.026	0.435
Nothing	0 (0%)	0 (0%)	1 (100%)	0 (0%)		

4.5 Quality of Life Assessment of Cancer Patients on Chemotherapy

The assessment of quality of life (QoL) among cancer patients undergoing chemotherapy at Meru Teaching and Referral Hospital (MeTRH) revealed a generally poor QoL across multiple domains. Based on the WHOQOL-BREF tool, the majority of participants (64.2%) rated their overall QoL as neither poor nor good, while 25.6% reported poor QoL, and none rated their QoL as good. The physical health domain had the lowest mean score, with patients reporting severe fatigue, pain, and limited ability to perform daily activities. Many participants also experienced emotional distress and psychological issues, including anxiety and depression, which further diminished their overall well-being. In the psychological and social domains, patients reported moderate to severe impairment due to treatment-related stress, financial burdens, and reduced social support. A significant number of respondents (48.5%) stated that their illness had negatively affected their family relationships and social interactions. Many patients also expressed feelings of isolation, particularly those experiencing severe malnutrition and advanced-stage cancer. Emotional well-being was notably lower among patients who had been on chemotherapy for more than one year, indicating that prolonged treatment had a cumulative negative impact on mental health and social functioning. The

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environmental domain, which included factors such as healthcare accessibility and financial stability, also scored poorly among respondents. Many patients (57.3%) cited financial difficulties as a major challenge, limiting their ability to access proper nutrition, medication, and supportive care. Additionally, some patients faced transportation challenges in accessing oncology services, further complicating their treatment experience. These findings highlight the pressing need for nutritional, psychological, and social support programs to improve the overall quality of life for cancer patients undergoing chemotherapy.

The average age of the patients was 58.9 ±14.95. There was a significant relationship between age and quality of life of the patients, F = 1.762, P = 0.154. Similarly, there was no significant relationship between the BMI of the patients and their quality of life, F= 1.299, P = 0.275, as indicated in Table 5.

Table 5: Relationship between Age, BMI, and QoL of Cancer Patients on Chemotherapy

	Quality of Life				
	Very poor	**Poor**	**Neither poor nor good**	**Good**	**Total**
Age					
n	3	76	158	9	246
Mean (SD)	73 (14.18)	59.4 (15.03)	57.2 (14.79)	52.7 (15.29)	58.9 (14.95)
95%CI	37.8, 108.2	55.9, 62.8	54.9, 59.5	40.9, 64.4	56, 59.8
Min	57	22	18	34	18
Max	84	90	91	77	91
F, P-Value			1.762, 0.154		
BMI					
n	3	76	158	9	246
Mean (SD)	18.7 (3.72)	21.6 (4.02)	22.5 (4.67)	22.1 (6.56)	22.2 (4.55)
95%CI	9.5, 27.9	20.7, 22.5	21.8, 23.3	17, 27.1	21.6, 22.7
Min	15.2	13.7	14.4	16.7	13.7
Max	22.6	34.6	35.6	38.1	38.1
F, P-Value			1.299, 0.275		

4.6 Discussion

The findings of this study align with existing literature indicating that malnutrition is a significant concern among cancer patients undergoing chemotherapy and is associated with a decline in quality of life (QoL). Similar to studies conducted by Arends (2024) and Xu et al. (2020) found that a majority of patients experienced severe nutrition impact symptoms, such as loss of appetite, nausea, vomiting, and difficulty swallowing, leading to weight loss and a high prevalence of malnutrition. Research by Anandavadivelan et al. (2018) also supports the notion that chemotherapy-induced side effects contribute to nutritional deficiencies, further exacerbating the disease burden.

The study findings confirm the World Health Organization's (2020) assertion that quality of life among cancer patients is multidimensional and is significantly affected by their physical, psychological, and social well-being. From a clinical perspective, routine nutritional assessment and early intervention are crucial in managing malnutrition among chemotherapy patients. Studies by Ravasco et al. (2019) and Opanga et al. (2017) emphasize that malnourished cancer patients experience higher treatment toxicity, prolonged hospital stays, and increased susceptibility to infections, all of which contribute to a poorer QoL. The current study further supports findings by Omlin et al. (2013), which highlight that weight loss and malnutrition are strong predictors of treatment intolerance and reduced survival rates among cancer patients.

Given that the majority of participants in this study were in advanced cancer stages (Stage III and IV), the implementation of personalized nutrition interventions, such as dietary counseling and supplementation, could mitigate the adverse effects of chemotherapy and improve overall health outcomes. These findings underscore the importance of integrating nutrition support into oncology care to enhance the well-being of cancer patients. Evidence from Sung et al. (2021) suggests that a multidisciplinary approach, involving oncologists, dietitians, and mental health professionals, is essential in addressing the diverse challenges faced by cancer patients undergoing chemotherapy.

The financial burden associated with cancer treatment, as reported by many participants in this study, aligns with findings by Pace and Shulman (2016), who highlighted that economic constraints significantly affect cancer care in low- and middle-income countries. Therefore, there is a critical need for policy interventions and financial support programs to ensure that cancer patients receive adequate nutrition and holistic care to improve their quality of life during treatment.

5. Conclusion

Cancer patients undergoing chemotherapy at MeTRH experience high rates of malnutrition, which significantly impacts their QoL. Routine nutritional screening and targeted interventions are necessary to enhance patient outcomes.

6. Recommendations

6.1 Early Nutritional Screening

Routine nutritional screening should be integrated into oncology clinics to identify patients at risk of malnutrition early in their treatment journey. Regular assessments using standardized tools such as the Nutritional Risk Screening (NRS-2002) can help detect malnutrition before it worsens, allowing for timely interventions (Arends, 2024). Studies have shown that early detection of malnutrition in cancer patients significantly improves treatment tolerance, reduces hospital stays, and enhances overall survival rates (Ravasco et al., 2019). Therefore, healthcare facilities should establish mandatory nutritional assessments as part of cancer care to prevent the adverse effects of malnutrition on treatment outcomes and quality of life.

6.2 Dietary Interventions

Personalized dietary interventions should be developed for cancer patients undergoing chemotherapy to mitigate the impact of nutrition-related symptoms and improve their quality

of life. Meal plans should be tailored to individual patient needs, taking into account factors such as cancer type, treatment side effects, and metabolic requirements (Anandavadivelan et al., 2018). Nutritional counseling should also be incorporated into patient care to educate patients on how to maintain adequate food intake despite chemotherapy-related complications such as nausea and taste alterations (Xu et al., 2020). Providing access to high-protein, calorie-dense meals and supplements can help prevent weight loss and maintain muscle mass, ultimately leading to better treatment adherence and outcomes.

6.3 Multidisciplinary Approach

A comprehensive cancer care model should involve a multidisciplinary team comprising oncologists, dietitians, psychologists, and social workers to address the diverse challenges faced by chemotherapy patients. Research has demonstrated that cancer patients receiving nutrition and psychological support alongside medical treatment experience better physical and emotional well-being (Sung et al., 2021). Oncology teams should incorporate dietitians into routine cancer management to monitor and guide patients' nutritional intake, while mental health professionals should provide counseling to help patients cope with the stress and anxiety of chemotherapy (Opanga et al., 2017). A team-based approach ensures holistic patient care, leading to improved quality of life and treatment outcomes.

6.4 Further Research

More studies are needed to assess the long-term effects of nutritional interventions on the quality of life of cancer patients undergoing chemotherapy. While this study provides valuable insights, future research should explore how dietary support, supplementation, and medical nutrition therapy influence patient recovery over extended periods. Longitudinal studies could help establish the most effective nutrition-based interventions for different cancer types and treatment regimens (Omlin et al., 2013).

Ethical Approval

Ethical approval was obtained from the Meru Institutional Research Ethics Review Committee (MIRERC). Written informed consent was obtained from all participants.

Competing Interest

The authors declare no competing interests.

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