DIETARY PRACTICES AND NUTRITION STATUS OF ADULT CANCER PATIENTS: A CASE OF TEXAS CANCER CENTER, KENYA

ABSTRACT

Background: Cancer remains a significant public health challenge globally, with profound impacts on patients' nutritional status and dietary practices. Despite the critical role of nutrition in cancer care, there is a notable research gap regarding the specific dietary practices and nutritional status of cancer patients in Kenya. Therefore, this study focused on adult cancer patients at the Texas Cancer Center in Kenya, examining their dietary practices and nutritional status.

Methods: The study employed an analytical cross-sectional research design, recruiting a sample of 384 adult cancer patients through systematic sampling, at an interval of two participants.Nutrition status was assessed using the BMI score,whiledietarypracticewasassessedusingadietary diversity score, food frequency questionnaire, and meal frequency. Weighing scales and height boards were used to obtain the body mass index (BMI). Analysis was conducted using STATA version 17, incorporating descriptive statistics such as mean, mode, and percentages. Inferential statistics (Pearson's chi-square) and logistics regression were used to test for associations between nutrition status and dietary practices, with a p-value of <0.05 indicating existing statistical significance at 95% confidence interval. Bivariate regression (Crude odds ratio- COR) was done to establish, and dietary factors with a p-value of <0.05 were subjected to multivariate regression (Adjusted odds ratio- AOR) to establish the predictors of dietary practices and nutrition status.

Results: The findings revealed that only 41% (n=157) of participants exhibited optimal nutrition status, with more than half of the respondents being malnourished. The overweight respondents accounted for 28%, while those underweight and obese were at 17% and 14% respectively. Among the respondents, 96% (n=369) had three meals or more per day, with only 15 (4%) having less than three meals a day, hence 104 respondents (27%) had a low dietary diversity score. Dietary patterns (AOR=0.55; CI, 0.15-1.13; p- value= 0.032) had a significant association with the nutrition status of the respondents.

Conclusion: This study established the need for healthcare professionals to be diligent in assessing the nutrition status of all cancer patients to enhance their healthcare management. It also brought forth the significance of regular nutrition screening for individuals undergoing cancer treatment.

INTRODUCTION

Cancer, a broad term encompassing various diseases, arises from the rapid formation of abnormal cells that exceed their normal boundaries and can metastasize to other body parts or organs (WHO, 2017). It can originate from any part of the body and when unchecked, disrupts normal cell function, hindering optimal bodily processes (American Cancer Society, 2015). Globally, cancer stands as the leading cause of death, claiming 10 million lives annually, representing one in six deaths (WHO, 2020). In 2020, there were 18.1 million cancer cases worldwide, with 9.3 million occurring in men and 8.8 million in women. Africa reported 1.1 million new cancer cases and 711,429 cancer-related deaths. Malnutrition in cancer patients differs from starvation-induced malnutrition, often presenting as anorexia, cachexia, and sarcopenia, exacerbated by pro-inflammatory cytokines produced by tumors or immune cells, leading to systemic inflammation (Maasberg et al., 2017). The landscape of dietary practices in the realm of cancer is riddled with challenges, mirroring the dynamic nature of the disease and its treatments. Factors such as changes in appetite, digestive issues, weight fluctuations, and dietary restrictions collectively contribute to the complexity of maintaining optimal nutrition during this demanding period. Cancer and its treatments often exert a profound influence on appetite, manifesting as a loss of appetite, nausea, or alterations in taste perception. Negotiating these challenges demands a thoughtful approach, with strategies ranging from consuming smaller, more frequent meals to selecting foods that are well-tolerated (Lis,Gupta, Lammersfeld, Markman & Vashi, 2012). The gastrointestinal repercussions of cancer treatments, particularly those affecting the digestive tract, can manifest as nausea, vomiting, diarrhea, or constipation. The dietary landscape undergoes significant modifications to accommodate these symptoms, necessitating adjustments to manage these challenges effectively. Weight fluctuations, encompassing both loss and gain, are commonplace among cancer patients. While some treatments precipitate unintentional weight loss, others may contribute to weight gain. Nutritionists collaboratively work with patients to forge tailored dietary plans that adeptly address specific weight management needs (Nourissat et al., 2008; Borges et al., 2010).

METHODS

Study site

This research was carried out at the Texas Cancer Center. It was selected based on the characteristicsofthestudypopulationandtheobjectivesofthestudy. This location was purposively selected because the facility is accessible to a wide population. This facility has also reported an increasing number of patients through the years, as it acts as the main private cancer referral facility in Kenya, thus serving a lot of cancer patients. The estimated number of patients treated monthly in this facility is 900 patients. TexasCancer CenterislocatedatMbagathiWay,NairobiWestinNairobiCounty. Currently, the center offers laboratory and diagnostic procedures, cancer screening, prevention, treatment services, and palliative care. Treatment services include surgery, physiotherapy, chemotherapy and radiotherapy. Moreover, this facility comprises all medical cadres and thus provides a holistic multidisciplinary approach to patient care.

Research design

The study was conducted using an analytical cross-sectional study design to examine the relationship between dietary practices and the nutrition status of the study participants.

Target population

This study targeted over 18-year-old cancer patients undergoing all forms of cancer treatment at Texas Cancer Center, with any type or stage of cancer.

Inclusioncriteria: In-patient and outpatient adult cancer patients at Texas Cancer Center who consented.

Exclusioncriteria: Critically ill patients and those who met the criteria for inclusion but could not be part of the study based on the individual's alternative commitments.

Sample size

ThesamplesizewascalculatedusingCochran'sformulaforsamplesizecalculationinan infinite population. The sample size used in this study was 384 participants.

Sampling technique

Purposivesamplingwasusedtoselectthestudysite.A systematic random samplingmethod was employed to select cancer patients who participatedinthestudy.Thesamplemembersofthestudypopulationwereselectedata randomstartingpointfollowedbyafixedperiodicintervalofeverysecond participantuntil the sample size was achieved. Given that the average number of patients who attend Texas Cancer Center daily is 30, and the data for this study was to be collected in 30 days, 13 study participants were to be interviewed daily.

Datacollectioninstruments

A semi-structured questionnaire was used in data collection. The questionnaire assessed the food frequency, meal frequency,anddietary diversity of the study participants. Weight measurements were obtained through the weighing scale, while the height was obtained using a height board, following which the body mass index was obtained.

Datacollectionprocedures

Dietary practices were assessed using food frequency, dietary diversity, and meal frequency. Meal frequency was captured by assessing the number of meals one had in a day- inclusive of any snacks taken in between the meals, which was obtained through unquantified 24-hour recall. Times in which the meal was consumed were also obtained. Food frequency and dietary diversity focused on collecting data on the consumption of foods from all the food groups that is cereals, white tubers and roots, vitamin A-rich vegetables, dark leafy vegetables, vegetables, fruits, organ meats, flesh meats, eggs, fish and sea foods, milk and its products, legumes, oils, sweets, and beverages. The food frequency comprised of foods taken in the past 7 days, while the dietary diversity was obtained through the standardized Food and Agriculture Organization guideline for measuring household and individual dietary diversity for the general population (FAO, 2011).

Nutrition status was determined using body mass index (BMI), which was obtained from weight and height measurements. Weight was determined using a seca scale to the nearest 0.1kg- participants had minimal clothing on and were barefooted. Three measurements were taken, and an average of this was obtained. Height was determined using a height board- participants stood facing straight, and their back, buttocks, and

back of their heels were in contact with the wall. Three measurements were taken and an average of this was obtained.

Validityandreliabilityofdatacollectiontools

Alldatacollectiontoolsweretestedwithatestgroupwhowerecancerpatientswhofit the characteristics from the sampling criteria but would not participate in the study. Pre-testing of the tool was done to a group with similar characteristics attendingKenyatta National Hospital (KNH),to assessthevalidityand reliability of the tools. The pilot study comprised of 39 participants (10%) of the sample size. KNH was used as it acts as the main referral public health facility for cancer patients. This allowed modifications on the questionnaires to be done, by correcting mistakes eliminating ambiguous questions, and ensuring clarity to elicit the required information therefore enhancing reliability.

Validity of the data collection tools.

Thevalidityofthedata collection tool was assessed by a panel of experts including oncologists and university supervisors. All aspects of validity such asface validity and content validity were considered.

Reliability of the data collection tools.

The reliabilityof this tool was tested using the test-retest method. The questionnaire was administered twice to non-participating cancer patients who fall in the inclusion criteria but attending Kenyatta National Hospital. Theintervalbetweenthetwotestswastwo weeksandthe questionnaire was reliable given that the results from the two tests by the same individuals had a correlation coefficient (r) greater or equal to 0.70 i.e., $r \geq 0.70$ (Cortina, 1993).

Dataanalysis and presentation

The data obtained from the respondents was reviewed to check if all items in the questionnaires were answered. Questionnaires that were not well answered, as well as incomplete ones were termed as spoilt. Data was presented in the form of percentages through tables and Graphsthatfacilitated the descriptionandexplanationofthestudyfindings. Nutrition status was either classified as normal (BMI of 18.5-24.9kg/m2), underweight (BMI of less than 18.5kg/m2), over-weights (BMI of 25-30kg/m2) or obese (BMI of over 35kg/m2). QuantitativedatawasenteredandanalyzedusingSTATA version 17.Inferential analysis (Pearson's chi-square), and logistics regression were used to test for associations. A P value of <0.05 was used as the criterion for statistical significance.

Ethicalconsiderations

The study sought ethical approval from the Mount Kenya Institutional, Scientific, and Ethical Review Committee (MKU/ISERC/2685).Besides,IsoughtpermissionfromTexasCancerCentermanagement, toapproveresearchpatientsseekingtreatmentfromtheirfacility. I also sought the NACOSTI Research Permit (Reference number: 247263) to carry out health-related research. Informed written consentwas sought from the respondents and confidentiality of the respondent's information was maintained throughout the research process by use of serial numbers on the questionnaires to maintain anonymity and employing standard data protection guidelines. Names and other means of identity were not used during the data collection process. The study was voluntary, and respondents had the right to withdraw at anypoint in thestudyif theywished to.

The use of any unacceptable language was avoided in the formulation of research interview guides. Iacknowledgedtheworksofotherusers by referencing them appropriately. The researchassistantwastrainedbeforetheresearchactivitiessothatshemaintainedthe highest level of objectivity during the data collection period.

RESULTS

The response rate of the respondents

The response rate of this study was 100% (n=384) of the minimum expected sample size without non-response adjustments.

Dietary practices of the respondents

Respondents had varied meal patterns whereby the majority of the respondents 89% (n=341) had three meals a day. Only 1% (n=5) of the respondents had one meal a day and this was the least representation. The average meal frequency was 3 meals ± 1SD.

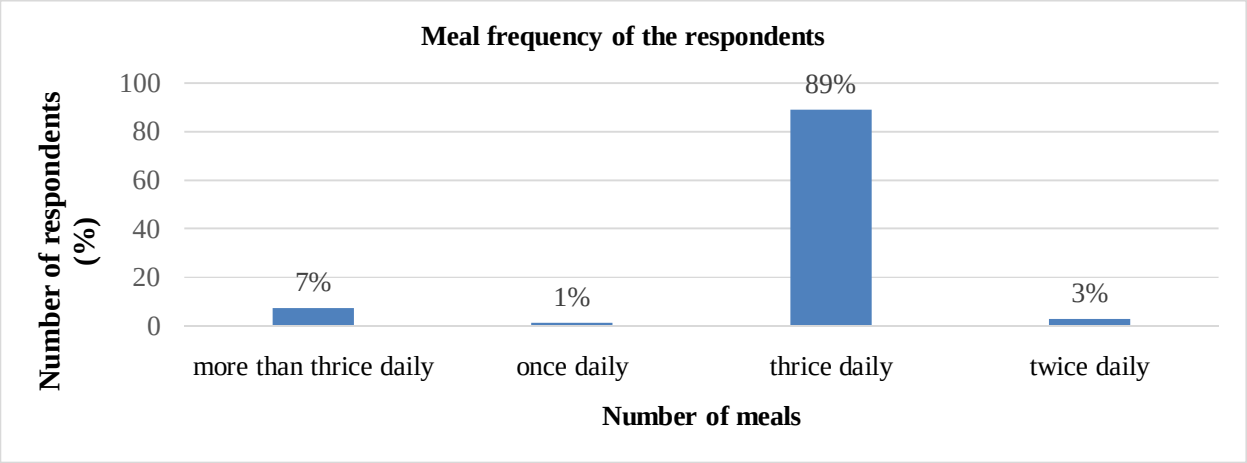

Figure 1. Meal frequency of the respondents

A dietary diversity score was attained following the number of food groups consumed by the study participants. Low dietary diversity score represented <3 food groups consumed, medium dietary diversity score represented 4-5 food groups consumed, while high diversity score represented six or more food groups consumed. Nearly half of the respondents 48% (184) had a high diversity score, the least representation being ninety-six participants (25%) who had a medium dietary diversity score. The mean dietary diversity score was 3 ± 1SD.

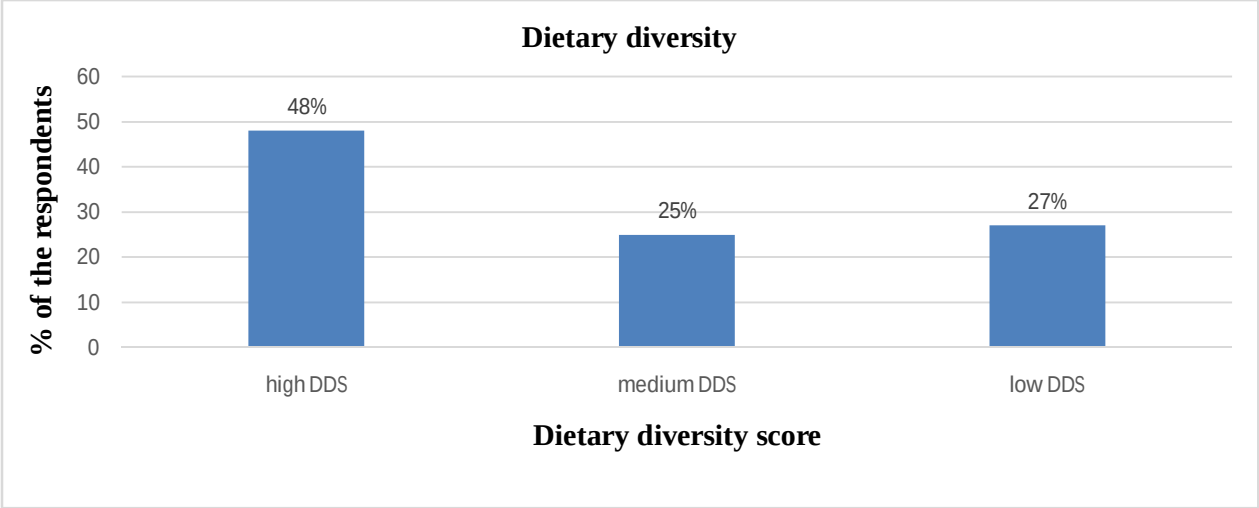

Figure 2. Dietary Diversity scores of the Respondents

Among the 384 respondents who were interviewed, cereals and white tubers and roots were the most consumed food groups (97%), with fish and seafood being the least consumed as represented by 38%.

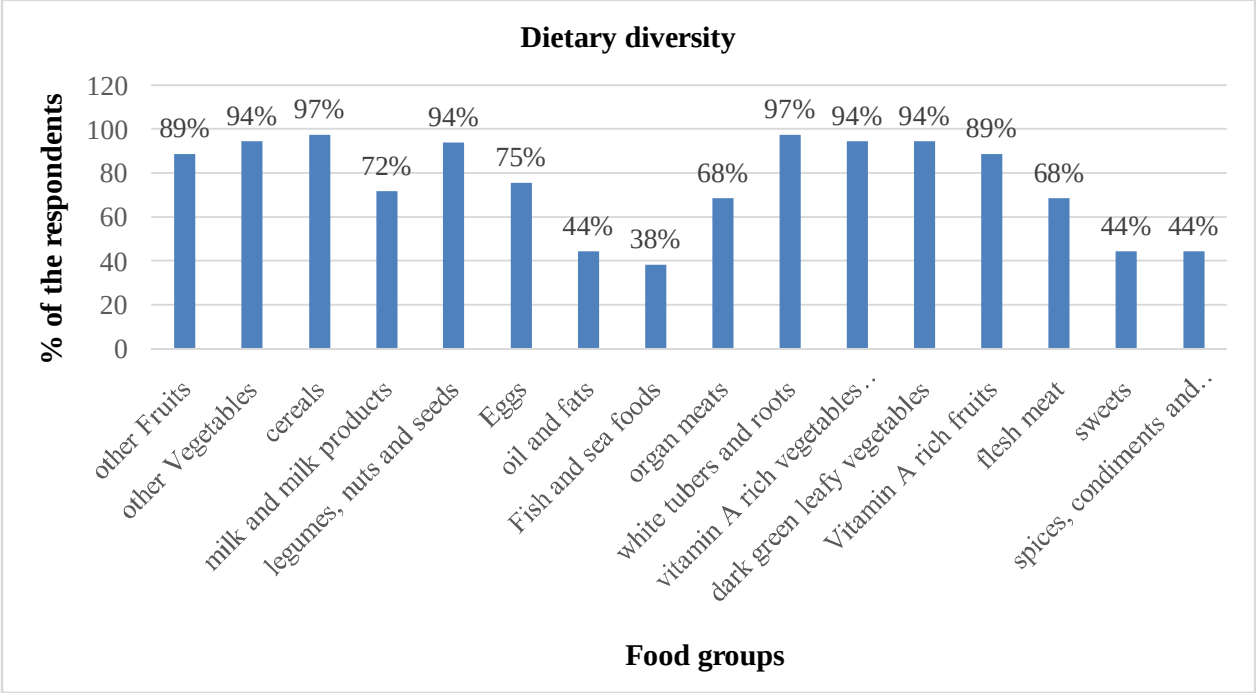

Figure 3. Dietary diversity of the respondents

Nutrition status of the respondents

Among the study participants, a significant 59% (n=227) were identified as malnourished, with an average BMI of 25.0kg/m2 ± 4.25SD.

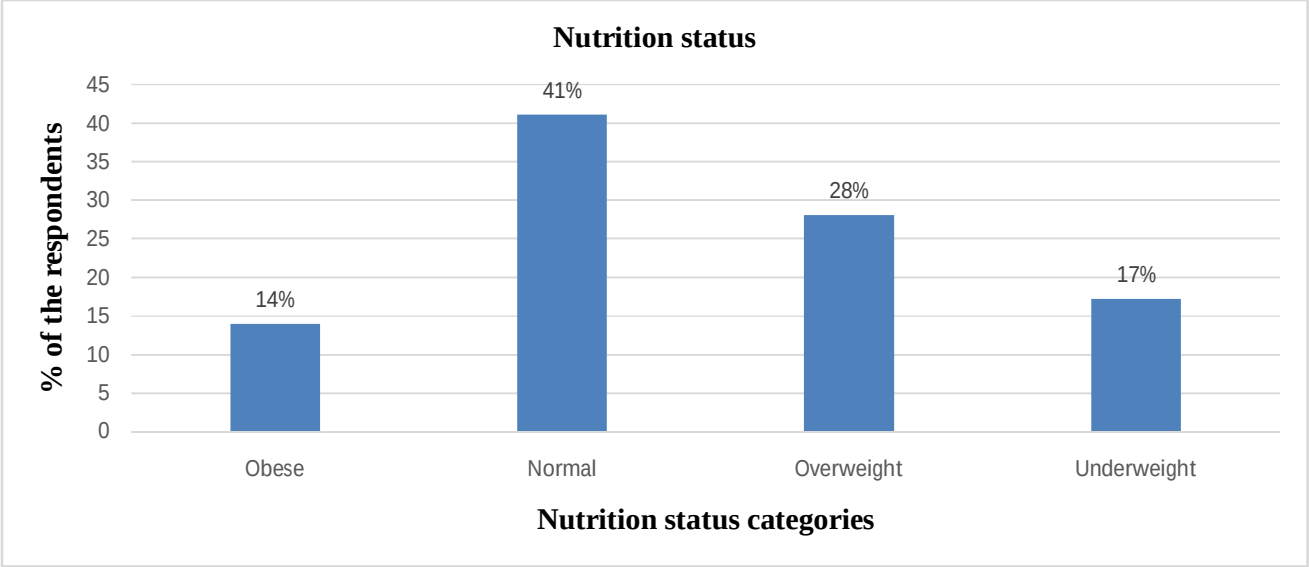

Figure 4. Nutrition status categories of the respondents

Nutrition status of the study participants was broadly classified as being normal or malnourished (Figure 5).

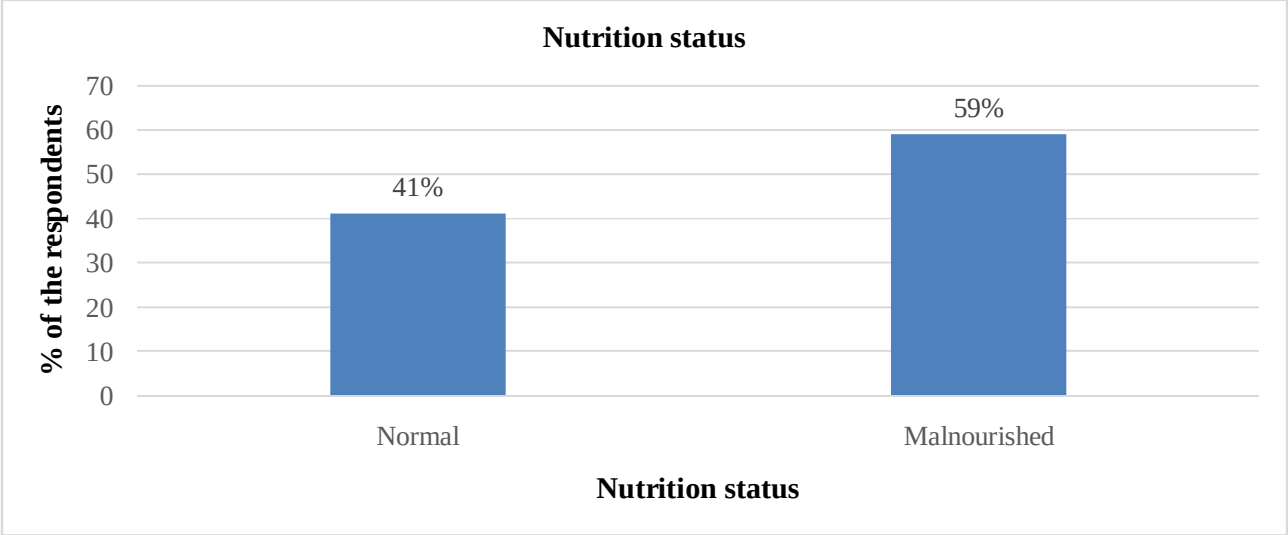

Figure 5. Nutrition status of the respondents

Relationship between nutrition status and dietary practices

A significant association was found between nutrition status and consumption of dark green vegetables (AOR=0.55; 95% CI=0.15,1.13), other fruits (AOR=0.51; 95% CI=0.21,1.09), fish and sea foods (AOR=1.59; 95% CI=1.13,3.02), legumes, nuts and seeds (AOR=2.47; 95% CI=1.02,4.28), and sweets (AOR=1.59; 95% CI=1.13,3.02) at p- values of 0.032, 0.051, 0.009, 0.003, and 0.035 respectively.

Table 1.Relationship between nutrition status and dietary practices- dietary diversity

Food Group	Malnutrition		COR (95%CI)	P Value	AOR (95%CI)	P Value
	Yes	No				
Cereals	22	14	1.00		1.00	
White tubers and roots	24	4	0.66(0.41,2.02)	0.079	0.58(0.36,1.40)	0.197
Vit A rich vegetables and tubers	11	2	0.63(0.50,2.33)	0.409	0.94(0.49,1.91)	0.761
Dark green vegetables	37	16	0.68(0.33,1.30)	0.302	0.55(0.15,1.13)	0.032
Other vegetables	41	12	0.55(0.35,1.10)	0.157	0.51(0.21,1.09)	0.051
Vit A rich fruits	10	15	0.61(0.33,1.03)	0.132	0.77(0.31,1.34)	0.320
Other fruits	4	3	0.51(0.24,1.18)	0.188	0.54(0.23,1.15)	0.178
Organ meat	6	4	0.72(0.31,1.54)	0.469	0.63(0.36,1.46)	0.219
Flesh meats	1	2	0.88(0.45,1.66)	0.850	0.66(0.23,1.66)	0.418
Eggs	42	15	0.46(0.20,1.06)	0.054	0.41(0.15,1.02)	0.493
Fish and sea foods	1	9	1.51(1.01,2.33)	0.004	1.59(1.13,3.02)	0.009
Legumes, nuts and seeds	2	15	2.04(1.36,3.36)	0.001	2.47(1.02,4.28)	0.003
Milk and milk products	4	16	9.25(1.18,91.62)	0.023	2.54(0.46,33.72)	0.522
Oil and fats	7	4	1.67(1.17,3.38)	0.026	1.55(0.35,3.22)	0.119
sweets	6	9	1.51(1.01,2.23)	0.004	1.59(1.13,3.02)	0.035
Spices, condiments and beverages	9	17	1.20(1.12,2.34)	0.044	1.18(0.36,2.32)	0.446

No association was established between meal frequency and nutrition status

Table 2.Relationship between nutrition status and dietary practices-meal frequency

Variables	Malnutrition		COR (95%CI)	*P*value	AOR (95%CI)	*P*value
	Yes	No				
Meal frequency						

Less than 3	10	54	1.00		1.00	
3 or more	217	103	0.70(0.24,1.26)	0.526	0.49(0.19,1.26)	0.138

A significant association was established between dietary diversity and nutrition status (p value=0.003; AOR=0.46; 95% CI=0.46,1.44).

Table 3. Relationship between nutrition status and dietary diversity scores

Variables	Malnutrition		COR(95%CI)	P Value	AOR(95%CI)	P Value
	Yes	No				
Low DDS	47	57	1.00		1.00	
Medium DDS	31	65	0.63(0.27,1.47)	2.197	0.8(0.27,2.41)	1.984
High DDS	112	72	1.28(0.36,4.49)	1.835	0.46(0.46,1.44)	0.003

DISCUSSION

Relationship between nutrition status and dietary practices

A significant association was found between nutrition status and dietary practices. These study findings were similar to those of a study carried out in Tanzania, whereby the prevalence of stunting was 31%, wasting 6%, and underweight 14%, and the majority of the cancer study population (74%) had a minimum dietary diversity. Therefore, Consumption of a diverse diet was significantly associated with a reduction of stunting, wasting, and being underweight (Abeshu et al., 2016). Similarly, the prevalence of underweight, stunting, and wasting was 38, 41, and 22 %, respectively in a study carried out in India found an association between undernutrition and minimum dietary diversity (Pokhrel et al.,2016). However, these results differed in comparison to a study by Chang, 2018, whereby food insecurity was not significantly associated with nutritional status. The relationship between the nutrition status and dietary practices of the respondents is essential for assessing the overall well-being of cancer patients undergoing treatment. A balanced diet rich in essential nutrients is crucial for maintaining a normal nutrition status. In contrast, poor dietary practices can lead to undernutrition or contribute to overweight and obesity, both of which can have profound implications for the well-being and treatment outcomes of cancer patients. Given that all these studies were carried out in Africa, they depict that dietary practices have an impact on one's nutrition status. Dietary patterns serve as pivotal determinants of the nutrition status of cancer patients, exerting various impacts on nutrient intake, energy balance, and overall health. A comprehensive understanding of dietary choices is crucial, as they play a vital role in providing essential nutrients necessary for immune function, tissue repair, and overall well-being. A diverse and balanced diet not only supports the body's ability to combat cancer but also helps patients endure the rigors of treatment (Samaan et al.,2013). Dietary patterns can significantly influence body weight management, with implications ranging from preserving muscle mass to mitigating

malnutrition-related complications and bolstering treatment tolerance. Moreover, dietary choices extend their reach to gastrointestinal health, hydration status, immune function, and the management of treatment-related side effects. For instance, a diet rich in immune-boosting nutrients like vitamins, minerals, antioxidants, and phytochemicals can fortify the body's defence mechanisms, potentially reducing the risk of infections and treatment-associated complications (Corbella et al., 2021). By offering personalized dietary counselling, nutritional interventions, and comprehensive supportive care measures, healthcare providers can empower cancer patients to make informed dietary choices that not only optimize their nutrition status but also foster resilience, improve treatment outcomes, and elevate overall well-being throughout their cancer journey.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Malnutrition among the cancer patients was high with the majority being overweight.A statistically significant association was established between dietary practices and nutrition status.

Recommendations of the study

This study has brought to light that majority of the cancer patients have a compromised nutrition status. Providing nutrition education to this group of patients is key to ensuring that they are well-nourished. In light of these findings, this study recommends that nutritionists and dietitians be at the forefront of carrying out weekly nutrition assessments on cancer patients to help curb malnutrition.

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