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An investigation of the clinical nutritional practices of oncologists and the management of cancer-related malnutrition in inpatient care

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Abstract. – OBJECTIVE: Malnutrition in oncology patients has been consistently associated with poor clinical outcomes. Despite the existence of nutrition guidelines and recommendations that emphasize the role of nutrition in cancer care and despite the prevalence of nutrition care needs in oncology units, nutrition interventions are not always implemented. As a result, malnutrition is not adequately assessed or managed. The aims of this study were to investigate current nutrition practice and management, determine the awareness of cancer-related malnutrition among oncologists and healthcare professionals and identify the barriers that prevent proper nutrition management.

SUBJECTS AND METHODS: A total of 141 medical health professionals working in hospitals with cancer care units in Saudi Arabia were recruited using an online questionnaire.

RESULTS: Most of the participants (65%) rated the role of nutrition in cancer treatment as crucial. The most common diagnostic criterion for cachexia was weight loss. 33% responded that they did not know how to conduct nutritional assessments. Only 14% evaluated patients' nutritional status by using validated screening tools. In most institutions (72%), nutritional support was delivered by clinical nutritionists or dieticians. The most frequent barrier preventing oncologists' from including nutritional care was a lack of clear guidelines.

CONCLUSIONS: Our survey highlights a high level of awareness among oncologists regarding the critical role of nutrition management in cancer care. However, there is a need for applicative, and reliable nutrition guidelines. The integration of standardized nutrition assessments and intervention protocols is essential for better implementation. A key step forward is improving the communication and referral processes between dietitians and oncologists within cancer units, thereby promoting a more cooperative and effective approach to patient care.

Key Words:

Malnutrition, Oncology, Medical health professionals, Nutrition practice, Cachexia.

Introduction

Malnutrition is a common health issue in patients with cancer. Depending on the type of cancer and the stage of the tumor, up to 80% of cancer patients experience malnutrition[1]. Unlike starvation-related malnutrition, cancer-associated malnutrition is caused by the local effects of the tumor and its treatment. Pro-inflammatory cytokines and tumor factors cause systemic inflammation, anorexia, and metabolic dysregulation, which lead to a multifactorial syndrome called cachexia. Cancer cachexia is characterized by the severe involuntary loss of skeletal muscle mass and functional decline[1].

Malnutrition in patients with cancer has consistently been associated with poor clinical outcomes. Studies[2] have demonstrated that cancer patients with poor nutritional status have increased rates of postoperative complications, prolonged lengths of hospital stays, and an increased risk of mortality[3]. It has been estimated[4] that 20% of cancer deaths are due to malnutrition. Nutritional care is central to combating the adverse effects of malnutrition[5]. Indeed, early detection and the management of nutrition and metabolic impairments help to minimize the adverse consequences of malnutrition.

Healthcare professionals, particularly oncologists and nurses, are responsible for supporting cancer patients throughout every phase of the cancer continuum, as they are in positions to monitor patients' conditions continuously and systematically. Therefore, it is highly important to evaluate their attitudes and practices towards cancer-associated malnutrition.

Despite the existence of nutrition guidelines and recommendations that emphasize the role of nutrition in cancer management, existing studies[6-11] have indicated that cancer-associated mal-

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nutrition is not adequately assessed or managed. Therefore, malnourished patients are either not properly identified or are not promptly provided nutritional support. For example, results from three surveys[7] obtained data from 14 countries around the world found that 61-77% of cancer patients did not receive any medical intervention for cancer cachexia before reaching stage IV. A cross-sectional study[12] of 126 cancer patients conducted at a cancer unit in Saudi Arabia revealed that more than half of the patients (52%) were malnourished in various degrees of severity. The study also reported that, as of the present time, there is no known screening protocol for evaluating the nutritional status of patients receiving chemotherapy in Saudi Arabia.

As many studies from different countries have reported[11], a lack of awareness regarding cancer patients' nutritional status, which is not routinely assessed in hospitals or ambulatory oncology centers as part of standard procedures, remains a concern.

Identifying why current evidence-based nutrition practices are not routinely implemented in oncologists' clinical practice requires an examination of their awareness and practice toward nutrition therapies. Therefore, the aims of this study were to investigate current nutrition management, practice, and attitude to gain insights into the awareness of cancer-related malnutrition and identify the barriers preventing the implementation of proper nutrition management among healthcare professionals working in cancer care units in Saudi hospitals.

Subjects and Methods

This cross-sectional study was conducted between September 2022 and December 2022 to examine the nutrition practices and perceptions of cancer-related malnutrition among healthcare professionals working in cancer care units. These professionals were working across various units that provide services for patients with cancer, including but not limited to Medical Oncology, Hematology, and Cancer Rehabilitation Units, across several healthcare institutions in Saudi Arabia.

Ethical approval was obtained from the Biomedical Ethics Research Committee at King Abdulaziz University in Jeddah, Saudi Arabia (Reference No. 51-22).

An online questionnaire was distributed by data collectors in multiple hospitals in Saudi Arabia with cancer care units. The target sample was oncology providers currently seeing cancer patients, including medical doctors, nurses, and other members of clinical care teams directly involved in cancer care. Clinical dietitians were not included in the study. An initial question was included in the survey to eliminate respondents who were not currently managing patients with cancer. Informed consent and a statement of anonymity and confidentiality were provided to each participant.

The tool used for this study was an online questionnaire comprising 19 questions divided into three sections. The first section included questions about demographic data, such as age, gender, profession, specialization, type of institution, region, and years of specialty. The second section included 11 questions adapted from previously published studies[8,9] that were modified and reviewed by experts in the field. This part of the questionnaire aimed to assess healthcare professionals' practices regarding, attitudes towards and perceptions of malnutrition among patients with cancer. The first two questions evaluated the significance of the assessment of nutritional status and nutritional support. The next two questions concerned how to assess malnutrition in oncology patients. Questions 5-10 were used to evaluate nutrition support management at the institution. Question 11 asked about the best strategies to improve nutrition support management.

The third section included two follow-up questions to determine healthcare professionals' opinions on the diagnostic criteria for cancer cachexia. The last question asked for an assessment of the barriers that prevent proper nutrition management for oncology patients' care.

Statistical Analysis

The sample size was calculated using the Epi Info sample size calculator provided by the Division of Health Informatics and Surveillance and the Centre for Surveillance, Epidemiology and Laboratory services[13]. Based on data obtained from the Saudi General Authority for Statistics (2017), the calculated sample was around 130 (80% confidence interval, 5% margin of error, and design effect of 1).

Descriptive statistics were used to summarize the participants' demographic characteristics and survey question answers. The data were expressed as numbers and percentages using SPSS software (Version 23.0; IBM Corp., Armonk, NY, USA).

Results

Sample Characteristics

The questionnaire, distributed across Saudi Arabia's regions and institutions, was completed by 141 healthcare professionals working in cancer units. As shown in Table I, approximately 37% of the participants came from the western region of the country, and 35% were from the central region. Most of the participants were male (64.5%). Consultants accounted for 41% of the participants. The most frequent specializations among the participants were surgery (24%), medicine (17%), internal medicine (16%) and oncology (15%). Of the participants, 54% had more than 5 years of specialty experience. Participants worked mostly in public hospitals (63%) and university hospitals (29%).

Table I. Participant characteristics (N = 141)*.

Variable	Category	Number	%
Age	20-30	62	44.0
	31-40	44	31.2
	41-50	24	17.0
	> 50	11	7.8
Gender	Male	91	64.5
	Female	50	35.5
Region	Northern	9	6.4
	Southern	15	10.6
	Eastern	16	11.3
	Western	52	36.9
	Central	49	34.8
Profession	Consultant	58	41.1
	Nurse	6	4.3
	Pharmacist	2	1.4
	Fellow	12	8.5
	Medical intern	30	21.3
	Resident	33	23.4
Specialization	Surgery	34	24.1
	Medicine	24	17.0
	Internal Medicine	22	15.6
	Oncology	21	14.9
	Pediatric	21	14.9
	Nursing	8	5.7
	Other	11	7.8
Years of specialty	< 5	65	46.1
	> 5	76	53.9
Institution type	Public	89	63.1
	Private	11	7.8
	University Hospital	41	29.1

*Frequency statistic of the responders.

Nutritional Practice and Perceptions of Malnutrition among Oncologists

Role of nutritional status and support

Most of the participants (65%) believed that the nutritional status of patients is crucial in practice, while 23% viewed it as "rather important, often decisive".

More than half of the participants (57%) reported that, after cancer diagnosis, nutritional assessment and support are integral parts of the therapeutic program, while 30% reported that assessments play an important role but are not performed regularly.

Identification of malnutrition

Of the participants, 35% believed that nutritional assessments should be performed at the first visit and at all follow-up appointments, while 22% thought that assessments should be performed only when weight loss is reported and/or there is a reduction in food intake.

14% of the participants reported that nutritional assessments should be performed using validated screening tools such as the Nutritional Risk Screening 2002 (NRS-2002), Mini Nutritional Assessment (MNA), Malnutrition Universal Screening Tool (MUST), Subjective Global Assessment (SGA), and Nutritional Risk Index (NRI), while 33% responded that they did not know how to conduct a nutritional assessment.

Management of Nutritional Support

In 72% of institutions, nutritional support is provided by clinical nutritionists or dieticians. Among the participants, 62% knew how to refer patients to the clinical nutritionist or dietician at their institution or to those at other hospitals with whom they collaborated. However, 16% said that while there was a clinical nutritionist or dietician at their institution, they did not have contact information, and 18% did not know how to refer patients to the clinical nutritionist or dietician.

Of the participants, 62% reported that those with impaired nutritional status or who were at risk of malnutrition as a result of cancer treatments should be prescribed nutritional support, and 65% declared that their units provided many types of nutritional assistance.

The prescription and activation of at-home artificial nutritional support was managed by clinical nutritionists or dieticians at 54% of the institutions, while 20% reported that it was the responsibility of the healthcare professionals work-

ing in the oncology unit. 24% did not know who was responsible for the nutritional follow-ups of patients receiving artificial nutrition at home.

Strategies for Improving Nutritional Support Management

Of the respondents, 43% reported that educational programs, shared care institutional protocols, and shared care regional and national protocols provide useful strategies for improving nutritional care practices for cancer patients. Table II displays the questionnaire data.

The most frequent barrier to proper care mentioned by the participants was a "lack of clear guidelines" (56%). Other barriers are listed in Figure 1.

Finally, the participants were asked which symptoms they considered to be part of the diagnostic criteria for cancer cachexia. The most popular answers were weight loss (36%) and loss of muscle mass (32%) (Figure 2).

Discussion

In this exploratory study, we intended to identify the current nutritional practices and management of cancer-related malnutrition among Saudi Arabian healthcare professionals and to contribute to the ongoing effort to improve cancer patients' nutritional status by suggesting necessary actions that may improve the quality of patient care.

The majority of health professionals in this cohort believed that nutritional status is essential in determining the tolerability of a treatment plan for cancer patients. Also, as nutrition assessment is considered to be important, its involvement should be integral to therapeutic programs. This indicates the high awareness that Saudi Arabian oncologists have about the importance of nutritional status among cancer patients. Similarly, several studies[9,10,14,15] that included oncology practitioners found that most participants were aware of the importance of nutritional status and the dangers of malnutrition in cancer patients.

Table II. Practice and attitude regarding malnutrition among healthcare professionals.

Question	Response	Number	%
The role of nutritional status and support			
1. How would you rate the role of nutritional status in the practicability of and tolerance for cancer treatment?	Crucial	92	65.2
	Little importance, rarely decisive	11	7.8
	Rather important, often decisive	33	23.4
	Useless	5	3.5
2. What role do nutritional assessment and support play in cancer patients' daily care?	Nutritional assessment plays a secondary role compared to cancer treatments.	6	4.3
	Their role is important, but they aren't routinely performed.	42	29.8
	They play an integral role in the therapeutic program after diagnosis	80	56.7
	None at all	5	3.5
	I don't know	8	5.7
Identification of malnutrition			
3. When should a nutritional assessment take place?	On the first visit and all follow-up visits	50	35.5
	On the first visit, and if the patient reports weight loss and/or a decrease in food intake	42	29.8
	Only on the first visit	8	5.7
	Only if the patient reports weight loss and/or a decrease in food intake	31	22.0
	Never	10	7.1
4. How are nutritional assessments conducted in your workplace?	Measuring BMI*	13	9.2
	Measuring BMI, discussing unintentional weight loss, assessing food intake, and using instrumental evaluations (e.g., body composition, handgrip strength)	49	34.8
	Assessing recent unintentional weight loss	10	7.1
	Using validated screening tools (e.g., NRS-2002, MNA, MUST, SGA and NRI)**	20	14.2
	No nutritional assessments are performed	2	1.4
	I don't know	47	33.3

Continued

Table II *(Continued)*. Practice and attitude regarding malnutrition among healthcare professionals.

Question	Response	Number	%
Management of nutritional support			
5. How is nutritional support provided in your institution?	Referring the patient to a clinical nutritionist or dietician working in the institution	102	72.3
	Referring the patient to a clinical nutritionist or dietician working outside the institution	10	7.1
	Referring the patient to a general practitioner upon the patient's request	1	0.7
	Directly by the healthcare professionals working in the cancer unit	22	15.6
	Nutritional support is not provided	6	4.3
6. For which patients is nutritional support provided?	Patients having difficulties with spontaneous feeding	11	7.8
	Patients suffering from an advanced-stage disease	5	3.5
	Patients who have an impaired nutritional status	29	20.6
	Patients who have impaired nutritional statuses or are at risk of developing them during cancer treatments	88	62.4
	No nutritional support is provided	8	5.7
7. What kind of nutritional support is provided?	Nutritional counselling	12	8.5
	Nutritional counselling and oral nutritional supplements	11	7.8
	Nutritional counselling, oral nutritional supplements, and enteral nutrition	21	14.9
	Nutritional counselling, oral nutritional supplements, enteral nutrition, and parenteral nutrition	92	65.2
	No nutritional support is provided	5	3.5
8. Who is responsible for the prescription and activation of at-home artificial nutritional support?	A clinical nutritionist or dietician working outside the institution	9	6.4
	A clinical nutritionist or dietician working in the institution	76	53.9
	The general practitioner	4	2.8
	The healthcare professionals working in the cancer unit	28	19.9
	I don't know	24	17.0
9. Who is responsible for the nutritional follow-up of patients receiving at-home artificial nutrition?	The clinical nutritionist or dietician working outside the institution	10	7.1
	The clinical nutritionist or dietician working in the institution	62	44.0
	The general practitioner	9	6.4
	The healthcare professionals working in the cancer unit	26	18.4
	I don't know	34	24.1
10. Do you know how to refer patients to your institution's clinical nutritionist or dietician or to other hospitals with whom you are collaborating?	Yes	87	61.7
	There are no clinical nutritionists or dieticians in our institution	7	5.0
	There is a clinical nutritionist or dietician in my institution, but I do not have contact information	22	15.6
	I do not know how to refer patients	25	17.7
Strategies for improving nutritional support management			
11. Which of the following strategies could be useful in improving nutritional care practices for cancer patients?	Educational programs	7	5.0
	Shared care institutional protocols	18	12.8
	Shared care regional and national protocols	43	30.5
	All the above	61	43.3
	I do not know	12	8.5

*BMI, Body Mass Index. **NRS 2002, Nutritional Risk Screening 2002; MNA, Mini Nutritional Assessment; MUST, Malnutrition Universal Screening Tool; SGA, Subjective Global Assessment; NRI, Nutritional Risk Index.

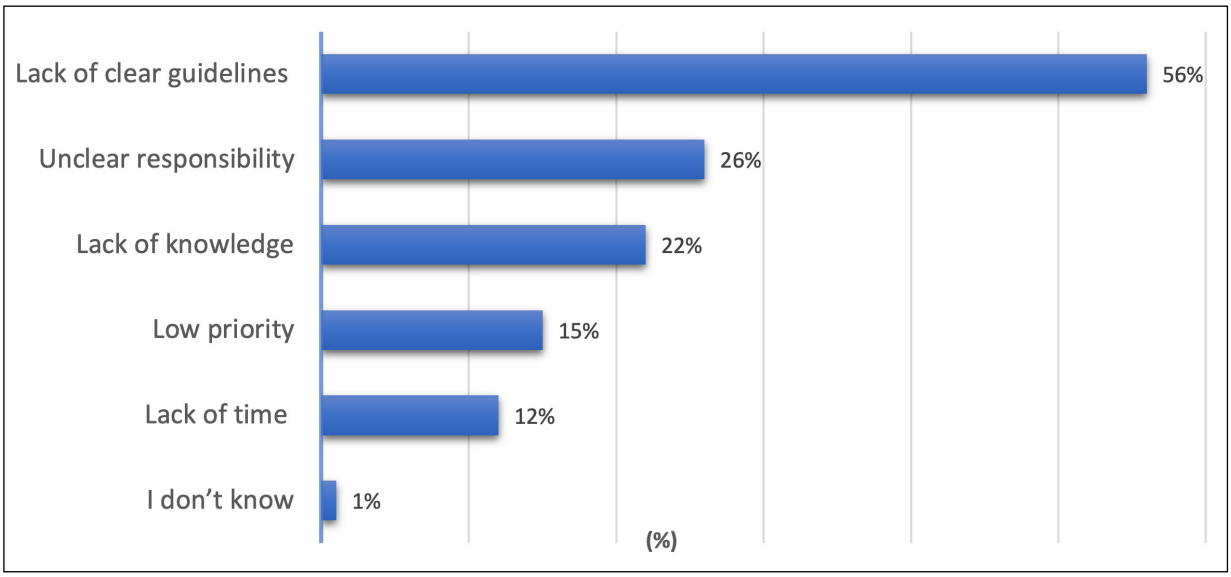

Figure 1. Barriers that prevent the inclusion of nutrition in oncologists' patient care.

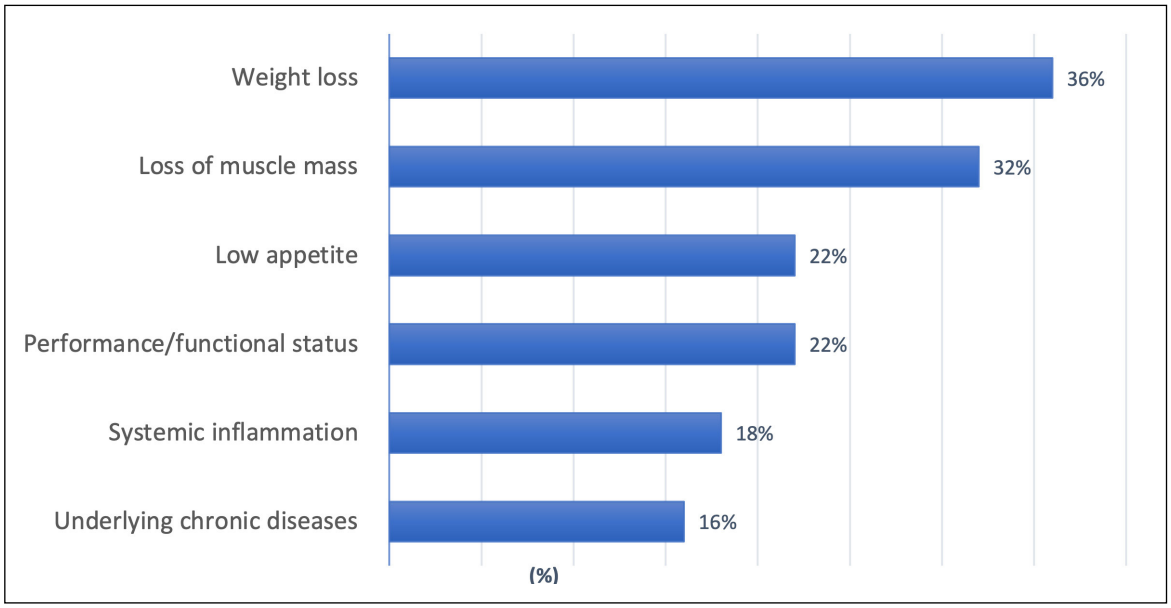

Figure 2. Responses to the question "Which of the following do you consider to be part of the cancer cachexia diagnostic criteria?".

However, we found that only 14% evaluated patients' nutritional status by using validated multi-dimensional screening tools, such as the SGA, NRS 2002, and MUST, and a considerable proportion of the participants (33%) stated that they did not know how a nutritional assessment is performed. Similarly, a study[10] in the UK reported that oncologists were aware that nutritional status is important but lacked confidence in their ability to identify malnourished patients. This could be due to limited knowledge about nutrition practices among medical staff[15]. A previous study by Aldubayan et al[16] investigated Saudi physicians' knowledge of clinical nutrition and found that medical curricula do not adequately integrate nutrition; therefore, primary care physicians require further nutrition education.

According to our survey, 72% of subjects reported that nutritional support is managed by a clinical nutritionist or dietician at their institution, and 16%

reported that nutritional support is provided directly by the oncology team. However, the results showed that 24% of the oncologists did not know who was responsible for the nutritional follow-up of patients receiving home artificial nutrition. Also, 33% of respondents did not have the contact information of their clinical nutritionist or dietician within their institution or did not know how to refer patients to them. Other studies[17,18] have shown that poor communication and low awareness of dietitians' roles in an institution prevent dietitians from effectively contributing knowledge to healthcare teams. A referral to a dietitian at the earliest sign of malnutrition could reduce malnutrition-associated outcomes[18].

In the current study, a lack of clear recommendations and guidelines was considered the biggest barrier to sufficient nutritional management. According to a national cross-sectional study[12], there are currently no standardized protocols regarding nutritional status in patients undergoing chemotherapy in Saudi Arabia.

An important first step in detecting malnutrition is to conduct nutritional risk screenings at the time of hospital admission. It should be imperative that a patient's condition is identified using a systematic and standardized approach. According to the European Society for Clinical Nutrition and Metabolism (ESPEN)[1], recommendations are to screen for nutritional risk immediately upon diagnosis and to perform a comprehensive nutritional assessment when a risk exists.

Regarding the definition of cancer cachexia, the results of this survey showed that the most agreed-upon diagnostic criterion for cachexia was weight loss. Indeed, low body weight or Body Mass Index (BMI) and a history of weight loss are traditionally used as significant markers of malnutrition among cancer patients. However, given the increased rate of obesity and the fact that metabolic changes occur well before any measurable change in body weight occurs, a weight-based approach has become increasingly insufficient. Recent evidence[19-21] shows that anorexia, markers of systemic inflammation, and changes in body composition are very important as well as the are early indicators of malnutrition in patients with cancer.

The latest ESPEN expert group recommendations[1] for cancer presented some practice updates and recommended increasing nutrition assessment measures to include the assessment of the presence and severity of inflammation and loss of muscle mass in cancer patients.

The presence of a systemic inflammatory response can be measured by the Glasgow Prognostic Score (GPS)[20], which is a highly predictive score derived from serum concentrations of C-reactive protein (CRP) and albumin. The GPS has been validated in clinical practice for predicting patients' survival and prognosis[20]. A computed tomography (CT) scan at the lumbar vertebrae (level 3-4) can quantify whole body composition, measure the quantity and quality of skeletal muscle, and specify the amount and type of fat in the body. CT can detect small changes in body composition and has been used[3,19] to detect cachexia in its early. More recently, studies[22] have shown that loss of muscle mass in patients with cancer is associated with an increased risk of postoperative complications, increased length of hospital stay, and mortality.

Recommendations

Overall, our survey confirms that there is high awareness among oncologists about the importance of nutritional screening and intervention for cancer patients. Nevertheless, to improve the management of nutritional practices and to ensure optimal nutrition care in oncology units, the following recommendations should be addressed:

- Clear and practical policies for oncologists regarding the nutritional management of cancer patients must be implemented. Recently, ESPEN[1] issued practical guidelines that could be used as examples or references to guide us in forming our own national recommendations. In addition, it is important for oncologists to be aware of updated nutritional practices for cancer patients. For example, clinicians should be aware of the latest diagnostic criteria for cachexia, as this will facilitate malnutrition diagnosis and management. Therefore, it is necessary to integrate nutrition into medical education as well as to provide continuous nutrition education sessions.
- Routine communication and interaction between oncologists and dietitians are essential. The contact information of the dietitians responsible for the oncology units should be available to facilitate referrals.
- A standardized protocol to identify patients at nutritional risk must be applied to every patient at hospital admission, as this allows for early intervention and better clinical outcomes. For example, validated nutrition risk screening tools, such as MUST or NRS 2002, could be applied. Finally, nutritional therapy should be considered and prescribed promptly, when indicated, for all nutritionally malnourished patients with cancer.

Limitations

Despite the importance of the present study in providing information about the current nutritional practice in oncology units in Saudi hospitals, the study has some limitations. First, the study relied on self-reported data from healthcare professionals, which may be subject to bias. Second, the cross-sectional design of the study provides a snapshot of the situation at a specific time. It may not account for changes in awareness, attitudes, or practices that could occur over time. Finally, while the study sought the views of professionals, it did not include the perspectives of the patients themselves, who might have provided additional insights into the quality and effectiveness of nutritional management in their care. However, to our knowledge, this is the first study that assess the nutritional practice among oncologist in Saudi Arabia.

Conclusions

The findings of this study underline the urgent need for a standardized national nutrition strategy, specifically aimed at enhancing the assessment and management of malnutrition in cancer patients in Saudi Arabia. While our study confirmed that awareness of the critical role of nutrition in cancer care is high among oncologists, it also revealed gaps in the systematic assessment and treatment of malnutrition among this patient group. These gaps indicate that even with high levels of awareness, translating knowledge into practice requires clear guidelines and protocols. Therefore, a comprehensive strategy should focus on establishing standardized methods for assessing malnutrition and deploying effective nutritional interventions in oncology units.

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Ethics Approval

Ethical approval was obtained from the Unit of Biomedical Research Ethical Committee at King Abdulaziz University, Jeddah, Saudi Arabia (Reference No. 51-22).

Informed Consent

Informed consent was obtained from all participants before starting the survey.

Conflict of Interest

The author declares no conflict of interest.

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Data Availability

The datasets generated during the current study are available from the author upon reasonable request.

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