T.C
YEDITEPE UNIVERSITY
INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF PUBLIC HEALTH

KNOWLEDGE, ATTITUDES, AND PRACTICE OF ONCOLOGY HEALTH CARE PROVIDERS IN PROMOTING HEALTHY EATING HABITS AMONG ONCOLOGY PATIENTS IN NIGERIA

MASTER OF PUBLIC HEALTH THESIS

AISHA KAKUDI ABBA ABUBAKAR

Istanbul-2024

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SUPERVISOR
Dr.ogr Hale Arık Taşyıkan

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Chair of the Jury:	Prof. Dr. Yucel Demiral (Institution) Dokuz Eylul University
Supervisor:	Dr. Ogr. Uyesi Hale Arik Tasyikan (Institution) Yeditepe University
Member/Examiner:	Prof. Dr. Burcu Gemici Basol (Institution) Yeditepe University

APPROVAL

This thesis has been deemed by the jury in accordance with the relevant articles of Yeditepe University Graduate Education and Examinations Regulation and has been approved by Administrative Board of Institute with decision dated ..... and numbered .....

(Signature)

Title, Name-Surname

Director of Institute of Health Science:

Prof. Dr. Bayram Yilmaz

DECLARATION

I now proudly declare that this thesis is a product of my original work. It does not, to the best of my knowledge and belief, contain any material that has been published elsewhere or written by someone else or that has been approved for consideration for any other degree, except places in the thesis where appropriate credit has been given.

Date: 15 May, 2024

Signature:

Name Surname:

Aisha Kakudi Abba Abubakar

DEDICATION

I dedicate my thesis to myself, Aisha Kakudi. I am profoundly proud of the many hours I have spent working hard, overcoming obstacles, and having unwavering faith in my ability, all under the will of Allah. This journey has been significant, demonstrating my perseverance and determination, and I am proud of what I have accomplished.

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Aisha Kakudi Abba Abubakar.

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LIST OF SYMBOLS AND ABBREVIATIONS

Nigerian National Systems of Cancer Registries (NSCR)

Population-Based Cancer Registry (PBCR)

Federal Ministry of Health (FMOH)

World Health Organization (WHO)

Ultra-Processed Foods (UPF)

Knowledge, Attitude, and Practices (KAP)

Healthcare providers (HCPs)

Nutrition Care Process (NCP)

ABSTRACT

Abubakar, A (2024). Knowledge, attitudes, and practice of oncology health care providers in promoting healthy eating habits among oncology patients in Nigeria.

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Diet plays a crucial role in cancer prevention, with research suggesting it can prevent 30-50% of all cancer cases. However, dietary guidelines may only sometimes apply due to different eating habits and food availability. Traditional African diets in Sub-Saharan Africa (SSA) are rich in starches and local foods, unlike Western diets, which are high in processed animal products, refined sugars, and saturated fats. Despite the rising cancer incidence in SSA, few studies have explored the link between diet and cancer risks.

A cross-sectional survey of 200 Nigerian healthcare providers in oncology departments examined their dietary knowledge, attitudes, and practices. The participants, averaging 32 years old, mostly held undergraduate degrees (69.2%), some held graduate degrees (30.2%), and over 84% were employed by government organizations. This study aimed to evaluate healthcare policies and provide quantitative insights into the dietary knowledge and practices within oncology departments, identifying challenges in implementing dietary recommendations and the effectiveness of educational resources.

In Nigeria, cancer care faces numerous challenges, including uncoordinated data, lack of trained staff, poor health infrastructure, political apathy, and inadequate procurement systems. Despite these issues, cancer registries are improving. Early diagnosis, population screening, and managing symptomatic patients are vital for better outcomes, with nutritional interventions being critical for cancer prevention and treatment.

Key Words: Cancer, Diet, Sub Saharan Africa, Healthcare providers, Diagnosis, Health care, Knowledge, Attitudes, Practice, Oncology, Nutritional interventions.

ÖZET

Abubakar, A (2024). Nijerya'daki onkoloji hastalarında sağlıklı beslenme alışkanlıklarını teşvik etme konusunda onkoloji sağlık hizmeti sağlayıcılarının bilgi, tutum ve davranışları.
Yeditepe Üniversitesi, Sağlık Bilimleri Enstitüsü, Halk Sağlığı Anabilim Dalı, Yüksek Lisans Tezi.

Diyet, kanserin önlenmesinde çok önemli bir rol oynamaktadır. Araştırmalar diyetin tüm kanser vakalarının %30-50'sini önleyebileceğini öne sürmektedir. Bununla birlikte, farklı beslenme alışkanlıkları ve yiyeceklere ulaşımdaki farklılıklar nedeniyle beslenme kuralları yalnızca bazen geçerli olabilmektedir. Sahra Altı Afrika'daki (SSA) geleneksel Afrika diyetleri, işlenmiş hayvan ürünleri, rafine şekerler ve doymuş yağların yüksek olduğu Batı diyetlerinin aksine, nişasta ve yerel gıdalar açısından zengindir. SSA'da artan kanser insidansına rağmen, az sayıda çalışma diyet ve kanser riskleri arasındaki bağlantıyı araştırdı.

Onkoloji bölümlerindeki 200 Nijeryalı sağlık hizmeti sağlayıcısının katıldığı bu kesitsel araştırmada, sağlık çalışanlarının beslenme bilgilerini, tutumlarını ve uygulamalarını incelendi. Ortalama 32 yaşında olan katılımcıların çoğunluğu lisans mezunu (%69,2), bazıları yüksek lisans mezunu (%30,2) ve %84'ten fazlası devlet kurumlarında çalışmaktaydı. Bu çalışma, onkoloji departmanlarındaki diyet bilgisi ve uygulamalarına ilişkin bilgiler sağlamayı, diyet önerilerinin uygulanmasındaki zorlukları ve eğitim kaynaklarının etkinliğini belirlemeyi amaçladı.

Nijerya'da kanser bakımı, koordine edilmemiş veriler, eğitimli personel eksikliği, zayıf sağlık altyapısı, siyasi ilgisizlik ve yetersiz tedarik sistemleri dahil olmak üzere çok sayıda zorluklarla karşı karşıyadır. Ancak bu sorunlara rağmen kanser kayıtları iyileşmektedir. Erken tanı, toplum taraması ve semptomatik hastaların yönetimi daha iyi sonuçlar için hayati öneme sahiptir; beslenme müdahaleleri kanserin önlenmesi ve tedavisi için kritik öneme sahiptir.

Anahtar Kelimeler: Kanser, Diyet, Sahra Alti Afrika, Saglik hizmeti saglayicilari, Teshis, Saglik hizmeti, Bilgi, Tutumlar, Uygulama, Onkoloji, Beslenme müdahaleleri

1. INTRODUCTION

Cancer is a type of malignant disease that develops when cells in the body divide uncontrollably, creating masses of tissues. These cells possess the ability to invade nearby or surrounding structures or go to a remote location inside the body, where they can continue to multiply uncontrolled, resulting in a considerable increase in morbidity and death (Brown et al., 2023). It was also shown that cancer cells cause tumor formation and metastasis. Tumors seemed to be produced by or host to cancer cells. These concepts served as the foundation for the standard definitions of cancer that we use today: ‘an unchecked growth or proliferation of cells that have the potential to spread to other parts of the body’(Brown et al., 2023). Human malignancies come in several varieties, and they get their names from the location in the body or the cell that gave them rise. Anal, bladder, bone, breast, cervical, colon, endometrial, kidney, leukemia, liver, lymphoma, ovarian, pancreatic, and so on are a few examples of cancers that people might get. It is impossible to overstate the threat that cancer poses to our society today. It has developed into such a chronic illness that millions of people worldwide lose their lives to it each year. Cancer accounts for about 1 in 6 morbidities, 16.8%, and 1 in 4 mortalities, 22.8%, from noncommunicable diseases globally, making it a significant sociological, public health, and economic issue in the 21st century (Bray et al., 2024). In 177 out of 185 nations, cancer is one of the top three causes of mortality for people in this age range, accounting for three out of every ten premature deaths worldwide from noncommunicable diseases (30.3% in those aged 30-69). Globally, there were 9.7 million cancer-related deaths and 20.0 million new cases in 2022; 49.2% of cases and 56.1% of deaths occurred in Asia (Bray et al., 2024). Because of the distribution of cancer kinds and late-stage diagnosis, cancer mortality is more significant in Africa and Asia. Incidence and mortality from cancer are more significant in Europe; while fewer than 10% of the world's population lives there, Europe accounts for one-fifth of cases and deaths worldwide (Bray et al., 2024).

In Nigeria, cancer is responsible for more than 79,000 deaths, comprising 32,905 males and 46,635 females. The country has an incidence rate of 127,763 cancer cases and over 269,109 prevalent cases (5 years), according to data from the IARC GLOBOCAN publication. The data was collected from three out of the thirty-three cancer registries in Nigeria: Abuja municipal cancer registry, Calabar cancer registry, and Ekiti cancer registry. Common cancers are breast cancer, cervical cancer, prostate cancer, and colorectal cancer. Breast cancer is the

most prevalent among women, while prostate cancer is predominant among men (Bray et al., 2024). The impact of cancer is multifaceted and increasingly prevalent, imposing substantial physical, mental, and financial burdens on patients, their families, friends, society, and the healthcare system. By reducing risk factors and adhering to scientifically recommended preventive measures, approximately 30% to 50% of all cancers could be prevented globally (Bigman et al., 2022). Importantly, mortality from cancer tends to be lower in developed countries than in underdeveloped and developing countries, owing to better medical care systems.

Since the 20th century, research has connected nutrition with cancer. For example, calorie restriction has been shown to delay the growth of breast cancer, whereas red meat has been linked to the development of prostate and colon cancer. There is debate on the correlation between nutrition knowledge and dietary practices, yet certain research indicates that nutrition knowledge plays a critical role in guiding dietary decisions and nutrient consumption (Donaldson, 2004). Nutrition plays a primary role in life for everyone, including people with advanced illness. Adequate nutrition is essential to meet physiological requirements and has additional psychological, spiritual, social, and cultural benefits for patients and caregivers. Strategically addressing these additional aspects is of high importance in the palliative setting. Foods high in sugar, such as refined sweets, candies, fried foods, and junk food, can cause obesity and diabetes, two conditions that increase the risk of developing cancer. Consumption of red and processed meat is associated with mortality and illness recurrence, particularly in survivors of colorectal cancer. Better survival and a lower risk of cancer recurrence are linked to increased exercise and avoiding Western diets. A cautious dietary pattern in the early stages of breast cancer lowers the chance of death from causes unrelated to breast cancer, as red meat is pro-inflammatory and carcinogenic. Malnutrition can result from changes in nutritional metabolism caused by cancer, which can also cause symptoms and abnormalities in the gastrointestinal tract. It is essential to possess the necessary information to manage symptoms both during and after therapy and avoid recurrence (Bazzan et al., 2013).

1.1. Problem Statement

Cancer kills more people globally than HIV, tuberculosis, and malaria combined, with low- and middle-income countries accounting for 70% of all cancer deaths, Moten et al. (2014). Nigeria, with 11% of cancer cases and deaths, faces a significant public health challenge. Several environmental variables, such as physical, chemical, and biological carcinogens, can affect cancer development. Because of a build-up of certain cancer risks and a weakened cellular repair system, aging raises the incidence of cancer. The development of cancer is also influenced by heredity, as inherited genetic flaws bring on certain cancers. Cancer is a complicated, multidimensional problem that has to be carefully managed and prevented. Nigeria is witnessing a concerning surge in the prevalence of cancer, impacting several organs and systems. Breast, cervical, prostate, and liver cancers are among the common malignancies, which are associated with a wide range of risk factors Jedy-Agba et al. (2012).

Since the 20th century, research has associated nutrition with cancer. It has been shown that red meat can induce prostate and colon cancer and that calorie restriction inhibits the growth of breast cancer. Understanding nutrition is critical to making wise food and nutrient choices, and adhering to a healthy lifestyle is necessary to complete therapy. The comprehension in which cancer affects nutritional metabolism is crucial for managing symptoms and preventing relapses, as it can cause symptoms and malnutrition. The outcomes of this study are anticipated to provide significant insight into the implementation of nutritional therapies in treatment for cancer in Nigeria. Addressing dietary factors as part of holistic cancer therapy may help oncologists design culturally sensitive as well as effective solutions. In order to improve cancer care in Nigeria, the study may additionally point to areas that require additional research as well as prospective collaboration between clinicians, dietitians, and legislators.

1.2 Objectives

- To determine the effects of socioeconomic demographic variables on knowledge, attitudes, and practice of oncology health care providers in promoting healthy eating habits among oncology patients in Nigeria.
- To assess the knowledge, attitude, and practice of healthcare providers in promoting healthy eating habits of oncology patients in Nigeria.

2. OVERVIEW

Cancer is a condition in which some of the body's cells multiply uncontrollably. This disease can occur practically anywhere and has the ability to travel in the human body, which is made up of trillions of cells. Cancer is usually considered a chronic health concern, with more than 100 varieties of cancer have been shown to impact people (Brown et al., 2023). Cancer occurs when there is abnormal growth of cells. Cancer has many causes, ranging from chemicals and environmental toxins to genetic problems and metabolic complications. According to WHO, in 2022, there were an estimated 20 million new cancer cases and 9.7 million deaths. The estimated number of people who were alive within five years following a cancer diagnosis was 53.5 million. According to WHO, about 1 in 5 people develop cancer in their lifetime; approximately 1 in 9 men and 1 in 12 women die from the disease. The impact of cancer is multifaceted and increasingly prevalent, imposing substantial physical, mental, and financial burdens on patients, their families, friends, society, and the healthcare system. By reducing risk factors and adhering to scientifically recommended preventive measures, approximately 30% to 50% of all cancers could be prevented globally (Brown et al., 2023). Importantly, mortality from cancer tends to be lower in developed countries than in underdeveloped and developing countries, owing to better medical care systems.

2.1 Cancer Registries in Nigeria

The Nigerian National Systems of Cancer Registries (NSCR) was inaugurated in 2009 through a collaborative effort involving the Federal Ministry of Health (FMOH), the Society of Oncology and Cancer Research of Nigeria, and the Institute of Human Virology of Nigeria. Its foundational objectives encompass providing training, capacity enhancement, surveillance, and furnishing technical and scientific assistance to cancer registries across Nigeria (Zubairu and Balogun 2023). Cancer registries facilitate the systematic collection, storage, analysis, interpretation, and reporting of data on cancer patients. They are valuable for conducting research, planning and implementing cancer control measures, allocating resources for treatment and prevention, and planning other public health programs. These registries provide a foundation for basic research and etiological studies, playing a vital role in cancer prevention.

Additionally, when cancer registries include follow-up information, they can be used to assess patient survival and evaluate efforts to improve survival rates. There are three types of cancer registries: hospital-based, specialized, and the most complex, population-based.

However, there are only two types of cancer registries in Nigeria: hospital-based and population-based registries. Hospital-based cancer registries are primarily located within institutions and focus on recording data about cancer patients attending a specific hospital Omonisi et al. (2020).

The primary goal of these registries is to enhance patient care by providing easily accessible information on cancer patients, their treatments, and their outcomes. A population-based cancer registry (PBCR) is a system that gathers information from various sources on all reportable malignant neoplasms within a specific geographic area. Population-based cancer registries help identify potential causes of cancer in the community and evaluate the effectiveness of cancer control activities. The Population Based Cancer Registry (PBCR), a comprehensive tool that characterizes cancer trends, care, and outcomes, and offers a research database, has a secondary function in cancer control. They are an essential element of cancer control strategies. PBCRs, which were first created to compute incidence rates, have grown to incorporate research on the causes and prevention of cancer. They provide essential data for understanding the community cancer burden, achieving public health goals, conducting etiologic studies, and planning, monitoring, and evaluating national cancer control programs (Omonisi et al., 2020).

Cancer registration began with the establishment of the Ibadan cancer registry in 1960 in Nigeria (Oko-Oboh et al., 2024). Presently, 33 cancer registries (13 population-based and 20 hospital-based) are centrally coordinated by the Nigerian National System of Cancer Registries (NSCR). These registries are unevenly distributed across the country, with two-thirds located in the southern region. Each of the six regions in Nigeria has at least one population-based cancer registry (PBCR), with the South-South region having four and the South-West region having three. Nigeria, encompassing an expansive landmass of 923,770 square kilometers and boasting a population exceeding 200 million distributed across 37 administrative states, represents a formidable terrain for the implementation of Population-Based Cancer Registries (PBCRs) due to its substantial geographic expanse and demographic magnitude. The boundaries for population-based cancer registries (PBCRs) are not well defined. Consequently, these areas are usually determined by the locations of PBCRs or referral health facilities, which are predominantly situated in urban regions. However, the cancer cases documented by these registries often originate from the entire sub-national area or even from outside these regions. Thus, it is essential to correlate reported cancer cases with their respective catchment areas to identify under-reported regions and enhance the accurate evaluation of the cancer burden.

The Federal Ministry of Health and Social Welfare and the Nigeria Sovereign Investment Authority (NSIA) have partnered to enhance cancer care in six federal tertiary hospitals in Nigeria. The FMOH Oncology Initiative aims to improve access to high-quality oncology care, early detection, and prevention, paving the way for a healthier future. The N37.4 billion plan includes establishing new oncology centers, upgrading existing facilities, and deploying advanced medical infrastructure, ensuring long-term benefits. The designated hospitals include the University of Benin Teaching Hospital, Ahmadu Bello University Teaching Hospital, Federal Teaching Hospital Katsina, University of Nigeria Teaching Hospital, Jos University Teaching Hospital, and Lagos University Teaching Hospital.

2.3 Causes of Cancer

Cancer has many causes, ranging from chemicals and environmental toxins to genetic problems and metabolic complications. Cancer is caused by various external factors, including prolonged exposure to radiation, chemical carcinogens, and biological infections. Age is a significant predisposing factor in cancer pathogenesis, with an escalation in incidence with advancing age due to age-related risks and diminished cellular repair mechanisms. Hereditary predispositions also contribute to certain cancers, manifesting as inherited genetic aberrations. Hormonal imbalances also played a role in cancer pathogenesis, with elevated testosterone levels in black men and heightened estrogen levels in females correlated with increased prostate cancer incidence. Immunological dysregulation, including autoimmune disorders and immunosuppression, also increases susceptibility to certain cancers affecting the colon, stomach, and liver. Overall, cancer is a complex and multifaceted issue influenced by various factors. There exists a considerable delay between initial exposure to these carcinogens and the emergence of detectable tumors, sometimes spanning up to two decades, contingent upon the intensity of exposure (Raymond, 2007). The World Health Organization (WHO) identifies several modifiable risk factors for cancer, including high body mass index, inadequate fruit and vegetable consumption, sedentary lifestyle, tobacco and alcohol usage, and infectious agents. Contextualizing these risks in Nigeria, solid fuel combustion in households emerged as a predominant contributor to cancer incidence in 2012, followed by tobacco smoking and physical inactivity.

2.4 Nutrition and Cancer

The relationship between diet, nutrition, and cancer has had a complex history. Major contemporary reports often identify diet as a significant cancer risk factor. The connection between food and cancer was proposed as early as the mid-1800s but faced resistance due to the dominant local disease theory. This theory remains deeply entrenched in modern cancer research, influenced by early 20th-century professional societies founded by surgeons. Diet and nutrition play a crucial role in cancer development. A healthy diet rich in fruits, vegetables, and fiber is associated with a reduced cancer risk. In contrast, diets high in saturated fats, red meat, and processed foods increase the risk. Studies suggest a nutritious diet can prevent 30-50% of cancer cases. Regular consumption of fruits and vegetables rich in bioactive compounds (polyphenols, carotenoids), vitamin B12, folic acid, selenium, fiber, and dairy products has been linked to a lower risk of cancers such as colorectal, breast, stomach, prostate, and esophageal. Omega-3 fatty acids in oily fish and nuts also reduce cancer risk. The Mediterranean diet is considered the most beneficial dietary model due to its resemblance to the ideal healthy diet. Its protective effects are attributed to its bioactive components' antioxidant and anti-inflammatory properties, which can induce apoptosis, reduce inflammation, inhibit cell proliferation, and decrease angiogenesis and tumor invasiveness. Numerous studies have shown that consistent adherence to the Mediterranean diet is inversely related to cancer incidence and mortality, particularly for colorectal, breast, prostate, liver, stomach, and head and neck cancers.

Diet plays a significant role in cancer risk, accounting for about thirty to thirty-five percent of risk factors. Tobacco remains the primary contributor to lung and mouth cancer, but dietary factors, especially in Western countries, are significant contributors to overall cancer incidence. Red meat, processed meat, ultra-processed foods (UPF), deep-fried foods, sugar, and refined carbohydrates are all implicated in increasing cancer risk through various mechanisms. Food processing techniques can introduce carcinogenic compounds like N-nitroso compounds and acrylamide, while the consumption of fast food is associated with an elevated risk of colorectal cancer. Tobacco use, in various forms, is strongly linked to increased cancer risk across multiple organs. Alcohol consumption is also associated with several cancers, particularly when combined with smoking. Overall, adopting a balanced diet, reducing intake of processed and fast foods, and avoiding tobacco and excessive alcohol consumption are essential for lowering cancer risk.

2.4.1 Malnutrition, Cachexia, and Sarcopenia in Cancer

Cancer patients frequently have disease-related malnutrition, which can vary based on the kind and location of the tumor, the disease's stage, the type of treatment taken, and the nutrition evaluation technique employed. It is also a significant cause of morbidity and death. Cancer-related malnutrition is mostly caused by reduced food intake and malignant cachexia, which is characterized by weight loss and muscular atrophy. About 15–40% of cancer diagnoses are accompanied by malnutrition, and this incidence rises after therapy, defining 40–80% of patients at this period Bossi et al. (2021). Malnutrition lowers functional ability, affects quality of life, and raises the risk of toxicity in patients. Furthermore, it is inextricably linked to sarcopenia because it deteriorates muscular function, which lowers lean body mass and muscle performance.

Cancer cachexia is a well-known, progressive, and irreversible condition that affects people with advanced cancer. Two of its hallmarks are weight loss and loss of skeletal muscle mass. The absence of appetite, which leads to weight loss, is called anorexia. In addition to severe malnutrition and, worse yet, muscular atrophy, anorexia can be fatal if left untreated. Better known as cachexia, this is a potentially deadly disorder. Intentional loss of weight combined with low calories and abnormal protein balance is known as cachexia. A person's overall poor performance, tissue loss, a decline in quality of life (QOL), and eventual mortality are all contributing causes of cachexia. Refractory cachexia is the most severe kind of nutritional problem among patients, ranging from early anorexia to it. Early intervention has the best benefits, although the success of dietary interventions relies on when support is provided. Given that nutritional status might vary depending on tumor stage, treatment modality, and comorbidities, it is imperative to evaluate cancer patients throughout therapy periodically. The inflammatory, metabolic, and nutritional pathways must be continuously assessed, and interventions can be customized to address specific risk factors.

Sarcopenia is a musculoskeletal condition that, particularly in older people, is characterized by gradual weakness and muscle loss. It has an impact on muscle mass, strength, and function, which makes daily tasks more difficult and raises the risk of complications, death, and morbidity after major surgery (Ardeljan & Hurezeanu, 2023). Sarcopenia in cancer patients is associated with poorer quality of life, depression, and adverse clinical outcomes. Sarcopenia is also associated with severe chemotherapeutic toxicity and changes in body composition, including skeletal muscle mass loss due to non-specific treatments. Sarcopenia is associated with many adverse health outcomes, including low rates of survival, surgical complications,

extended hospital admissions, falls and fractures, metabolic illnesses, cognitive impairment, and death in general populations. Numerous comorbidities, such as diabetes, smoking, malnutrition, excessive sleep duration, and physical inactivity, have been linked to an increased incidence of sarcopenia (Yuan & Larsson, 2023). Survival in older patients with cancer can be affected by increased vulnerability to adverse outcomes, reduced physical reserve, and the impossibility of further cancer-directed treatment. Early assessment could benefit all older patients at risk of developing sarcopenia (Meza-Valderrama et al., 2021).

2.5. Conceptual Framework

The Knowledge, Attitude, and Practices (KAP) model is a widely accepted cognitive framework in health education research. This model posits that the interplay between knowledge, attitudes, and practices significantly influences individual health behaviors. Achieving healthy practices necessitates cultivating positive attitudes and a comprehensive understanding of health-related information.

Chronic lifestyle-related diseases, such as diabetes, cardiovascular diseases, and cancer, represent prevalent health issues that detrimentally affect the quality of life. Preventive strategies for these conditions include:

- Advocating for a nutritious diet.
- Limiting alcohol consumption.
- Ceasing smoking.
- Engaging in regular physical activity.

Behavioral change techniques focused on communication, such as behavioral counseling and motivational interviewing, have demonstrated efficacy in fostering healthier lifestyles.

2.5.1 Knowledge, Attitude, and Practice of Healthcare Providers

The Knowledge, Attitude, Belief, and Practices (KAP) hypothesis, a well-established and widely applied cognitive framework in health education research, emphasizes the importance of accurate and positive attitudes and beliefs. It suggests that the process of forming actions, attitudes, and knowledge is all part of the process of an individual's health behavior. Only when people are well-versed in health-related topics and have accurate and positive attitudes and beliefs will they participate in healthy behaviors (Wu et al., 2020). KAP categorizes changes in human activities into three ongoing processes: information acquisition, belief production, and behavior development. Among these, "knowledge" refers to the comprehension and explanation of necessary knowledge, "attitudes" refers to suitable beliefs and positive attitudes,

and "practice" refers to changing behaviors to accomplish a health objective. Healthcare providers (HCPs) are considered a key group in health promotion due to their significant reach and credibility as credible sources of health information. HCP's lifestyles can significantly increase patient awareness about lifestyle changes, as their habits and interests positively influence their counseling practices and attitudes (Jonsdottir et al., 2011). Nutritional care is a multidisciplinary responsibility of healthcare providers, and its integration within healthcare workforce activities is essential. The nutrition care process (NCP) is a significant issue for dietetics professionals, and there is a rising need for implementation worldwide. Malnutrition is a prevalent global issue affecting patients, families, hospitals, and the healthcare system. All healthcare providers, including dietitians, physicians, and nurses, must collaborate to avoid malnutrition (Shakhshir & Alkaiyat, 2023).

Social influence is a major determinant of eating. Differences in Eastern and Western eating cultures may lead to different knowledge, attitudes, and behaviors toward healthy eating among cancer patients undergoing chemotherapy. Patients with cancer need to acquire knowledge, have positive attitudes, and adopt behaviors to transform unhealthy eating behaviors into healthy eating. Social influence is a significant determinant of eating. Differences in eating cultures may lead to the generation of different knowledge, attitudes, and behaviors toward healthy eating among patients with cancer undergoing chemotherapy. Patients with cancer need to acquire knowledge, have positive attitudes, and adopt behaviors to transform unhealthy eating behaviors into healthy eating (Tang et al., 2023). Oncology healthcare providers work in various settings, including hospitals, ambulatory clinics, private offices, radiation facilities, home healthcare, and community agencies. They provide direct patient care at the generalist level and have expanded their roles with the healthcare system's evolution in cancer care. Oncology providers perform crucial functions such as patient assessment, education, care coordination, direct care, symptom management, and supportive care. They assess patients' physical and emotional status, develop care plans, and educate patients and families before, during, and after therapy. They manage complex technologies and treatments, providing continuous support and early problem recognition. Direct patient care includes administering chemotherapy, ensuring correct dosing, and managing medication errors. Symptom management, particularly for chemotherapy side effects, is a crucial responsibility. In supportive care, they focus on pain management and survivorship, providing education on pain control, managing pharmacologic and non-pharmacologic interventions, and promoting patient comfort and compliance with therapy.

3. MATERIALS AND METHODS

3.1 Study Design

This study was a cross-sectional survey that used a structured questionnaire to obtain quantitative information on healthcare and evaluate healthcare policies. The participants enrolled in the study were healthcare providers in Nigeria.

3.2 Study Setting

This study was conducted using a questionnaire survey regarding the actual status of dietary knowledge, attitude, and practice of healthcare providers in oncology departments in hospitals in Nigeria. Nigeria's healthcare industry has over 400,000 providers, including community health workers, nurses, midwives, pharmacists, doctors, laboratory scientists, technicians, and support personnel. These professionals contribute to the country's healthcare system by providing primary care, patient care, maternal health services, medication management, and counseling. Doctors diagnose and treat patients across various specialties, while laboratory scientists and technicians conduct tests and analyses for accurate diagnosis and treatment planning. Support personnel ensure the smooth functioning of healthcare facilities through administrative and operational roles. It's their collaborative efforts that ensure the delivery of comprehensive healthcare services to the Nigerian population, addressing a wide spectrum of medical needs and contributing to the nation's overall well-being.

3.3 Study Population and Sampling Frame

The study population consisted of healthcare workers in the oncology department who were above the age of 18 years.

3.4.1 Eligibility Criteria

The eligibility criteria included all practicing healthcare workers above the age of 18 years from federal hospitals, government hospitals, private hospitals and clinics in Nigeria.

3.4.2 Exclusion Criteria

Those who were not oncology healthcare workers and those who were not Nigerians.

3.5. Data Collection Procedures

The data collected for the thesis questionnaire was collected through an online questionnaire sent to hospitals and healthcare organizations via emails, WhatsApp, and social media platforms. The demographic section of the questionnaire encompassed gender, age, educational level, profession, affiliated organization, income, years of practice post-internship, and type of practice.

3.6. Knowledge Assessment

The data was collected through an unstructured online questionnaire sent to hospitals and healthcare organizations via emails, WhatsApp, and social media platforms. The demographic section of the questionnaire encompassed gender, age, educational level, profession, affiliated organization, income, years of practice post-internship, and type of practice.

3.6.2 Attitudes Towards Promoting Healthy Eating Habits

The study aimed to assess the attitudes of oncology healthcare providers toward promoting healthy eating habits among cancer patients in Nigeria. A structured questionnaire focused on general dietary habits, familiarity with cancer patients' diet patterns, observing dietary preferences, incorporating nutritional assessments in treatment planning, and collaborating with nutritionists or dietitians. Challenges in incorporating dietary recommendations and the effectiveness of educational resources in conveying dietary information were identified. The study also assessed the influence of cultural beliefs and practices on nutritional choices, the use of traditional/herbal remedies, compliance with nutritional recommendations, and challenges in adhering to prescribed diets. The study also highlighted the link between body fat and cancer progression, the benefits of limiting sugar-sweetened beverages, and the preventability of cancer through diet and exercise. The findings could inform targeted interventions and policy recommendations to improve dietary counseling and overall cancer care in Nigeria.

3.6.3 Quality of Life

A study was conducted through a collaborative effort to evaluate the quality of life of cancer patients in Nigeria using a standardized questionnaire. The questionnaire focused on critical areas such as challenges in maintaining quality of life, effectiveness of healthcare services, accessibility of support services, the importance of effective communication, communication

improvement strategies, effective educational platforms, nutrition program awareness, and additional comments/suggestions from healthcare professionals. The primary areas evaluated included physical discomfort, mental misery, financial burden, social isolation, lack of access to support services, therapeutic side effects, and necessity. The study aimed to understand these factors comprehensively to guide targeted interventions and policy recommendations, ultimately improving the quality of life and patient care for cancer patients in Nigeria. The findings will help guide targeted interventions and policy recommendations to improve cancer patients' quality of life and care, highlighting the importance of our collective efforts in this endeavor.

4. RESULTS

4.1 Sociodemographic Characteristics

The study examined 200 healthcare providers in Nigeria, comprising a diverse representation of professionals within the field. Within this cohort, 69.2% possessed undergraduate degrees, while 30.2% held graduate and professional degrees, reflecting a balanced mix of educational backgrounds among participants.

The average age of the healthcare providers under study was calculated to be 32 years, with a notable spread observed across age brackets. Notably, the youngest respondent fell within the age range of 18 to 24 years, while the oldest surpassed 45 years, illustrating the breadth of age diversity within the sample. Regarding professional experience, participants reported an average tenure of 6 years in practice, indicative of a cohort with varying levels of experience within the field of oncology. Notably, a substantial majority (over 84%) of the healthcare providers were employed within government organizations, suggesting a predominance of government-affiliated healthcare institutions within the study's scope.

Table 1. Sociodemographic Characteristics of the Study Population

	n	%
Gender		
Male	94	47.0
Female	106	53.0
Age		
18-24	21	10.4
25-34	118	58.7
35-44	50	24.9
>45	12	6.0
Education level		
Bachelors	139	69.2
Masters / Professional	62	30.8
Profession		
Medical doctor	79	39.3
Nurse	36	17.9
Dietitian	19	9.5
Others	67	33.3
Organization		
Government	169	84.9
Private	30	15.1
Type of practice they work in		
Hospital-based	184	91.5
Small practice	11	5.5
Large practice	6	3.0
Income per month		
< 200,000 naira	93	46.3
200,000-500,000 naira	71	35.3
>500,000 naira	19	9.5
Years of experience		
<5	107	53.2
5-9	46	22.9

>10	48	23.9

The study population predominantly comprises young, relatively inexperienced healthcare providers, with the majority being employed in government hospital-based settings. The gender distribution among participants is balanced, and a significant majority possess a Bachelor's degree. Participants' Income levels vary, with a substantial portion earning less than 200,000. Medical doctors represent the most significant professional group, followed by other healthcare professionals, nurses, and dietitians.

4.2 Knowledge Assessment

The study assessed healthcare providers' comprehension of the nexus between nutrition and cancer, revealing an average knowledge score of 50.25. This indicative value suggests a moderate proficiency within their respective domains, signifying a foundational grasp of pertinent concepts. Furthermore, an average confidence score of 50.25 was observed among healthcare providers, indicating a balanced self-assurance in dispensing dietary advice to oncology patients. This finding suggests a confident demeanor in the execution of their professional responsibilities. Concurrently, the average awareness level among healthcare workers registered at 40.2, denoting a comparatively diminished awareness or recognition of prevailing cancer-related issues within the general populace of Nigeria. This observation underscores the potential gap in disseminating crucial information and heightening cancer awareness among the broader community.

Table 2. Knowledge Assessment of the Study Population

	n	%
Relationship knowledge of cancer and nutrition		
Poor	22	10.9
Fair	58	28.9
Good	121	60.2
Confidence in providing dietary advice		
Not confident	33	16.4

Somewhat confident	51	25.4
Confident	117	58.2
Awareness of cancer in Nigeria		
Low	114	56.7
Moderate	74	36.8
High	13	6.5
Emphasis on cancer prevention		
Yes	35	17.4
No	126	62.7
Maybe	161	80.1
Continuous Education related to cancer and lifestyle		
Regularly	40	19.9
Occasionally	97	48.3
Rarely	64	31.8
Cancer Prevention strategies with patients		
Always	35	19.3
Never	146	80.7
How familiar are you With Lifestyle factors that contribute to cancer		
Familiar	150	74.6
Neutral	26	12.9
Not familiar	25	12.4
I am familiar with Dietary Guidelines recommended for oncology patients		
Strongly agree	79	38.9
Agree	87	42.9
Neutral	37	18.2

The table provides insight into healthcare professionals' levels of confidence and understanding regarding cancer, diet, and related preventative actions. There are notable gaps in knowledge, ongoing education, and the emphasis on cancer prevention techniques, even while there is

typically strong comprehension and confidence in several areas. By filling in these gaps with focused education and more precise rules, healthcare practitioners may fight cancer more successfully overall.

4.3 Attitudes Towards Promoting Healthy Eating Habits of the Study Population

Findings revealed notable disparities in familiarity with dietary patterns commonly adhered to by cancer patients among healthcare professionals. Expressly, 28.9% of surveyed healthcare workers indicated a complete lack of familiarity with such patterns, while only 1.5% reported needing to be more familiar with them. Furthermore, the integration of nutritional assessment into cancer treatment protocols was found to be relatively low, with only 17.4% of healthcare workers incorporating it into patient care. Collaboration between healthcare providers and dietitians or nutritionists emerged as a significant factor in dietary planning, with a substantial proportion (51.2%) of healthcare workers indicating consistent collaboration. Despite this, a notable portion (42.8%) expressed awareness of specific educational resources that effectively convey dietary information to patients.

Interestingly, a substantial proportion (73.1%) of healthcare providers reported a lack of involvement in or exposure to research studies investigating the impact of dietary patterns on cancer treatment outcomes within the Nigerian context. Additionally, a considerable majority (71.1%) of healthcare workers identified implementing specific dietary recommendations as challenging for patients, citing issues such as food availability.

Moreover, the survey revealed varying levels of knowledge regarding the association between body fat accumulation and cancer progression through insulin, with over 72.6% of respondents demonstrating awareness of this connection. However, awareness of the preventability of cancer through healthy dietary habits and adequate exercise was comparatively lower, with only 48.8% of healthcare workers recognizing that cancer can be preventable up to 30–40% through such lifestyle modifications.

Table 3. Attitudes Towards Promoting Healthy Eating Habits of the Study Population

	n	%
Nutritional Habits of Nigerians		
Good	29	14.4
Fair	91	45.3
Poor	81	40.3
Dietary Patterns Among Cancer Patients		
Not familiar	116	57.7
Moderately familiar	67	33.3
Very familiar	18	9.0
Dietary Preference Among Patients		
Never	183	91.0
Sometimes	18	9.0
Nutritional Assessment As Part Of Cancer Treatment		
Never	85	42.3
Sometimes	49	24.4
Always	67	33.3
Do You Collaborate With Dietitians		
Yes	103	58.5
No	73	41.5
Do You Face Challenges In Incorporating Dietary Recommendations		
Yes	119	73.0
No	44	27.0
Specific Educational resources conveying dietary information		
Yes	86	42.8
No	78	38.8
Participation In Research Studies On Impact Of Dietary Patterns		
Yes	43	21.4

No	147	73.1
Do You Involve Patients In Discussions About Their Dietary Habits		
Never	112	55.7
Sometimes	35	17.4
Always	54	26.9
Are There Specific Dietary Recommendations Challenging Due To The Availability Of Certain Foods		
Yes	143	71.1
No	24	11.9
How Compliant Are Patients With Their Dietary Treatment Plan		
Never	76	37.4
Sometimes	94	46.8
Always	31	15.4
How Often Do Patients Incorporate Herbal Remedy During Treatment		
Never	46	22.9
Sometimes	43	21.4
Always	112	55.7
Are There Similarities Patients Face In Adhering To Prescribed Dietary Patterns		
Yes	121	60.2
No	51	25.4
Can High Body Fat Link To The Progression Of Cancer Through Insulin		
Yes	146	72.6
No	55	27.4
Percentages Of Cancer Preventable By Healthy Diet and Lifestyle		
>10%	51	25.4
30 – 40%	98	48.8

50%	33	16.4
75%	19	9.5

The data in this table indicate that there is a general understanding of the role that diet plays in both preventing and treating cancer. However, it also draws attention to important gaps and challenges that exist in the practice, including barriers to implementing dietary recommendations, low knowledge of dietary patterns among cancer patients, inadequate nutritional assessments, and limited collaboration with dietitians. More resources, multidisciplinary cooperation, and education may be needed to address these problems and enhance nutrition management among cancer patients.

4.3 : Quality of Life

The survey results highlight participants' nuanced perceptions regarding holistic healthcare approaches, service accessibility, and the importance of effective communication within the healthcare context.

Table 4. Quality of Life Knowledge of the Study Population

	n	%
How Effectively Do Healthcare Services Address Holistic Needs Of Patients		
Very effective	24	11.9
Somewhat effective	83	40.9
Not effective	94	46.8
How Accessible Are Support Services To Cancer Patients		
Highly accessible	21	10.8
Moderately accessible	64	32.8
Not accessible	110	56.4
How Important Are Effective Communication Between Healthcare Providers And Cancer Patients In Improving Quality Of Life		
Extremely important	104	52.8
Very important	73	36.5
Slightly important	21	10.7

The data in this table reveals that healthcare services are not fully addressing the holistic needs of cancer patients, with almost half rating them as ineffective. Over half of respondents report that support services are inaccessible, indicating barriers to accessing necessary support. Effective communication between healthcare providers and patients is crucial for improving quality of life, highlighting the need for improved holistic care practices, better accessibility to support services, and prioritization of communication within healthcare services.

4.4 Association Between Knowledge of Healthcare Providers in Promoting Healthy Eating Habits Among Oncology Patients in Nigeria.

Table 5. Association between knowledge of Healthcare Providers and Age

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Age					0.62
18-24	2(9.5)	7(33.3)	12(57.1)	21(100.0)	
25-34	17(14.4)	33(28.0)	68(57.6)	118(100.0)	
35-44	2(4.0)	15(30.0)	33(66.0)	50(100.0)	
>45	1(8.3)	3(25.0)	8(66.7)	12(100.0)	

There is a null hypothesis between healthcare providers' knowledge and their age, as the p-value is more significant than 0.05.

Table 6. Association Between Knowledge of Healthcare Providers and Education

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Education					0.12
Bachelors	16 (11.5)	34 (24.5)	89(64.0)	139(100.0)	
Masters / Professional	6(9.7)	24(38.7)	32(51.6)	62(100.0)	

- There is a null hypothesis between the knowledge of healthcare providers and their level of education, as the p-value is greater than 0.05.

Table 7. Association Between Knowledge of Healthcare Providers and Profession

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Profession					0.81
Doctor	8(10.1)	27(34.2)	44(55.7)	79(100.0)	
Nurse	3(8.3)	11(30.6)	22(61.1)	36(100.0)	
Dietitian	3(15.8)	4(21.1)	12(63.2)	19(100.0)	
Others	8(11.9)	16(23.9)	43(64.2)	67(100.0)	

- There is a null hypothesis between the knowledge of healthcare providers and their profession, as the p-value is greater than 0.05.
-

Table 8 .Association Between Knowledge of Healthcare Providers and Organization

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Organization					0.21
Government	17(10.1)	45 (26.6)	107(63.3)	169(100.0)	
Private	5(16.7)	11(36.7)	14(46.7)	30(100.0)	

- There is a null hypothesis between the knowledge of healthcare providers and the type of organization they work for, as the p-value is greater than 0.05.

Table 9. Association Between Knowledge of Healthcare Providers and Type of Practice

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Practice					0.31
Hospital-based	19(10.3)	52(28.3)	113(61.4)	184(100.0)	
Small practice	3(27.3)	4(36.4)	4(36.4)	11(100.0)	
Large practice	0(0.0)	2(33.3)	4(66.7)	6(100.0)	

- There is a null hypothesis between the knowledge of healthcare providers and the type of practice they are involved in, as the p-value is greater than 0.05.
-

Table 10.Association Between Knowledge of Healthcare Providers and Income

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Income					0.41
<200,000	10(10.8)	23(24.7)	60(64.5)	93(100.0)	
200,000-500,000	7(9.9)	24(33.8)	40(56.3)	71(100.0)	
>500,000	0(0.0)	7(36.8)	12(63.2)	19(100.0)	

- There is a null hypothesis between the knowledge of healthcare providers and their income level, as the p-value is greater than 0.05.

Table 11. Association Between Knowledge of Healthcare Providers and Experience

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Experience					
<5	17(15.9)	30(28.0)	60(56.1)	107(100.0)	0.34
5-9	3(6.5)	9(19.6)	34(73.9)	46(100.0)	
>10	2(4.2)	19(39.8)	27(56.3)	48(100.0)	

- There is a null hypothesis between the knowledge of healthcare providers and their years of experience, as the p-value is greater than 0.05.

Table 12. Association Between Knowledge of Healthcare Providers and Confidence

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Confidence					
Not confident	11(33.3)	16(48.5)	6(18.2)	33(100.0)	<0.001
Somewhat confident	6(11.8)	16(31.4)	29(56.9)	51(100.0)	
Confident	5(4.3)	26(22.2)	86(73.5)	117(100.0)	

- There is an alternative hypothesis between the knowledge of healthcare providers and their confidence levels, as the p-value is less than 0.05.

Table 13. Association Between Knowledge of Healthcare Providers and Overall Cancer Awareness Among the General Population in Nigeria.

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Awareness					0.18
Low	17(14.9)	35(30.7)	62(54.4)	114(100.0)	
Moderate	5(6.8)	20(27.0)	49(66.2)	74(100.0)	
High	0(0.0)	3(23.1)	10(76.9)	13(100.0)	

- There is a null hypothesis between the knowledge of healthcare providers and overall cancer awareness among the general population in Nigeria, as the p-value is greater than 0.05.

Table 14. Association Between Knowledge of Healthcare Providers and Emphasis on cancer prevention

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Prevention					0.062
Always	1(2.9)	6 (17.1)	28(80.0)	35(100.0)	
Never	14(9.6)	46(31.5)	86(58.9)	146(100.0)	

- There is a null hypothesis between the knowledge of healthcare providers and their emphasis on cancer prevention, although the p-value is close to 0.05, indicating a potential trend that may warrant further investigation.

Table 15. Association Between Knowledge of Healthcare Providers and Observing Specific Dietary Preferences or Restrictions Among Cancer Patients.

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Dietary restrictions					0.004

Never	2(2.4)	24(29.3)	56(68.3)	82(100.0)	
Rarely	18(17.8)	25(24.8)	58(57.4)	101(100.0)	
Sometimes	2(11.1)	9(50.0)	7(38.9)	18(100.0)	

- There is an alternative hypothesis between the knowledge of healthcare providers and their observance of specific dietary preferences or restrictions among cancer patients, as the p-value is less than 0.05.

Table 16. Association Between Knowledge of Healthcare Providers and Effective Educational Resources in Conveying Dietary Information to Patients

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Resources					<0.001
Yes	1(1.2)	19 (22.1)	66(76.7)	86(100.0)	
No	16(20.5)	29(37.2)	33(42.3)	78(100.0)	

- There is an alternative hypothesis between the knowledge of healthcare providers and the use of effective educational resources in conveying dietary information to patients, as the p-value is less than 0.05.

Table 17 Association Between Knowledge of Healthcare Providers and Involvement of Patients in Discussing Their Dietary Habits and Preferences During Treatment.

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Discussions					<0.001
Never	20(17.9)	37(33.0)	55(49.1)	112(100.0)	
Sometimes	2(5.7)	9(25.7)	24(57.4)	35(100.0)	
Always	0(0.0)	12(22.2)	42(77.8)	54(100.0)	

- There is an alternative hypothesis between the knowledge of healthcare providers and their involvement of patients in discussing dietary habits and involvement of patients in discussing their dietary habits and preferences during treatment.

Table 18. Association Between Knowledge of Healthcare Providers and Patterns Patients Face Adhering to Prescribed Dietary Plans.

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Similarities					0.39
Yes	10(8.3)	29(24.0)	82(67.8)	121(100.0)	
No	7(13.7)	20(39.2)	24(47.1)	51(100.0)	

- There is a null hypothesis between the knowledge of healthcare providers and the patterns patients face in adhering to prescribed dietary plans, as the p-value is greater than 0.05.

Table 19. Association Between Knowledge of Healthcare Providers and Progression of Cancer Through Insulin Levels.

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Insulin					0.12
Yes	12(8.2)	42(28.8)	92(63.0)	146(100.0)	
No	10(18.2)	16(29.1)	29(52.7)	55(100.0)	

- There is a null hypothesis between the knowledge of healthcare providers and the progression of cancer through insulin levels, as the p-value is greater than 0.05.

Table 20. Association Between Knowledge of Healthcare Providers and Community Initiatives Aimed at Improving Nutritional Health in Nigeria.

	Knowledge				
	Poor	**Fair**	**Good**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Community initiatives for improving nutritional health					0.012
Yes	6(7.7)	15(19.2)	57(73.1)	78(100.0)	
No	16(13.0)	43(35.0)	64(52.0)	123(100.0)	

- There is an alternative hypothesis between the knowledge of healthcare providers and their involvement in community initiatives aimed at improving nutritional health in Nigeria, as the p-value is less than 0.05.

4.5 Association Between Attitudes of Healthcare Providers in Promoting Healthy Eating Habits Among Oncology Patients in Nigeria.

Table 21. Association between attitudes of profession and years of experience

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Experience						0.89
<5	43(40.2)	19(17.8)	10(9.3)	35(32.7)	107(100.0)	
5-9	15(32.6)	8(17.4)	4(8.7)	19(41.3)	46(100.0)	
>10	21(43.8)	9(18.8)	5(10.4)	13(27.1)	48(100.0)	

There is a null hypothesis between the attitudes of healthcare providers (doctors, nurses, dietitians, and others) and their years of experience (<5 years, 5-9 years, >10 years) in promoting healthy eating habits among oncology patients. The high p-value indicates that any observed differences are likely due to random chance.

Table 22. Association Between Attitudes of Profession and Confidence Levels in Providing Dietary Advice to Oncology Patients

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Confidence						0.79
Not confident	15(45.5)	6(18.2)	3(9.1)	9(27.3)	33(100.0)	
Somewhat confident	23(45.1)	10(19.6)	4(7.8)	14(27.5)	51(100.0)	
Confident	41(35.0)	20(17.1)	12(10.3)	44(37.6)	117(100.0)	

There is a null hypothesis between the attitudes of different healthcare professions and their confidence levels (not confident, somewhat confident, confident) in providing dietary advice to oncology patients. The p-value suggests that differences in confidence levels across professions are not statistically significant

Table 23. Association Between Attitudes of Profession and Level of Awareness Among the General Population

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Awareness						0.29
Low	52(45.6)	18(15.8)	11(9.6)	33(28.9)	114(100.0)	
Moderate	23(31.1)	17(23.0)	7(9.5)	27(36.5)	74(100.0)	
High	4(30.8)	1(7.7)	1(7.7)	7(53.8)	13(100.0)	

There is a null hypothesis between the attitudes of healthcare providers and their perception of the general population's awareness levels (low, moderate, high) is not significant. The p-value indicates that there is no strong evidence to suggest that profession influences perceived awareness levels.

Table 24. Association Between Attitudes of Profession and Engagement in Continuous Education Related to Cancer and Lifestyle

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Continuous education						0.40
Regularly	16(40.0)	5(12.5)	3(7.5)	16(40.0)	40(100.0)	
Occasionally	42(43.3)	14(14.4)	9(9.3)	32(33.0)	97(100.0)	
Rarely	21(32.8)	17(26.6)	7(10.9)	19(29.7)	64(100.0)	

There is a null hypothesis between the attitudes of healthcare providers and their engagement in continuous education (regularly, occasionally, rarely) related to cancer and lifestyle. This suggests that the frequency of engagement in continuous education does not significantly differ by profession.

Table 25. Association Between Attitudes of Profession and Emphasis on Cancer Prevention in the Healthcare System

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Emphasis						0.07
Yes	9(25.7)	10(28.6)	2(5.7)	14(40.0)	35(100.0)	
No	58(46.0)	20(15.9)	13(10.3)	35(27.8)	126(100.0)	

There is a null hypothesis between the attitudes of different professions and their emphasis on cancer prevention in the healthcare system. While the p-value is close to the threshold, it does not conclusively indicate a significant difference.

Table 26. Association Between Attitudes of Profession And Discussing Cancer Prevention Strategies with Patients

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Prevention						
Always	11(31.4)	7(20.0)	5(14.3)	12(34.3)	35(100.0)	0.69
Never	59(40.4)	27(18.5)	13(8.9)	47(32.2)	146(100.0)	

The association a null hypothesis between the attitudes of healthcare providers and the frequency of discussing cancer prevention strategies (always, never) with patients is not significant. Differences observed are likely due to chance.

Table 27. Association Between Attitudes of Profession and General Nutritional Habits of Nigerian Population

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Habits						
Good	7(24.1)	6(20.7)	1(3.4)	15(51.7)	29(100.0)	0.16
Fair	40(44.0)	17(18.7)	11(12.1)	23(25.3)	91(100.0)	
Poor	32(39.5)	13(16.0)	7(8.6)	29(35.8)	81(100.0)	

There is a null hypothesis between the attitudes of healthcare providers and their perception of the general nutritional habits (good, fair, poor) of the Nigerian population. This suggests no significant differences across professions.

Table 28. Association Between Attitudes of Profession and Dietary Preferences or Restrictions Among Cancer Patients

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Preference						
Never	73(39.9)	31(16.9)	18(9.8)	61(33.3)	183(100.0)	0.67
Sometimes	6(33.3)	5(27.8)	1(5.6)	6(33.3)	18(100.0)	

There is a null hypothesis between the attitudes of different professions and the dietary preferences or restrictions (never, sometimes) among cancer patients. Observed differences are not statistically significant.

Table 29. Association Between Attitudes of Profession and Nutritional Assessment as part of Cancer Treatment

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Assessment						
Never	36(42.2)	22(25.9)	6(7.1)	21(24.7)	85(100.0)	<0.001
Sometimes	17(34.7)	5(10.2)	0(0.0)	27(55.1)	49(100.0)	
Always	26(38.8)	9(13.4)	13(68.4)	19(28.4)	67(100.0)	

There is an alternative hypothesis between the attitudes of healthcare providers and the frequency of conducting nutritional assessments (never, sometimes, always) as part of cancer treatment. This indicates that profession significantly influences the likelihood of performing nutritional assessments.

Table 30. Association Between Attitudes of Profession and Collaboration with Dietitians

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Collaborate						0.35
Yes	35(34.0)	21(20.4)	14(13.6)	33(32.0)	103(100.0)	
No	32(43.8)	12(16.4)	5(6.8)	24(32.9)	73(100.0)	

There is a null hypothesis between the attitudes of different professions and their collaboration (yes, no) with dietitians. Differences observed in collaboration rates are not statistically significant.

Table 31. Association Between Attitudes of Profession and Holistic needs (Physical, Emotional, Social, and Spiritual) of Cancer Patients

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Holistic						0.01
Very effective	6(25.0)	10(41.7)	0(0.0)	8(33.3)	24(100.0)	
Somewhat effective	27(32.5)	14(16.9)	10(12.0)	32(38.6)	83(100.0)	
Not effective	46(48.9)	12(12.8)	9(9.6)	27(28.7)	94(100.0)	

There is an alternative hypothesis between the attitudes of healthcare providers and their views on the effectiveness of holistic approaches (very effective, somewhat effective, not effective). This suggests that profession influences perceptions of holistic effectiveness.

Table 32. Association Between Attitudes of Profession and Organization

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Organization						0.02
Government	67(39.6)	34(20.1)	12(7.1)	56(33.1)	169(100.0)	
Private	12(40.0)	2(6.7)	7(23.3)	9(30.0)	30(100.0)	

There is an alternative hypothesis between the attitudes of healthcare providers and the type of organization they work for (government, private). This suggests that the type of organization influences attitudes towards promoting healthy eating habits.

Table 33. Association Between Attitudes of Profession and Type of Practice

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Practice						0.01
Hospital-based	74(40.2)	36(19.6)	14(7.6)	60(32.6)	184(100.0)	
Small practice	3(27.3)	0(0.0)	5(45.5)	3(27.3)	11(100.0)	
Large practice	2(33.3)	0(0.0)	0(0.0)	4(66.7)	6(100.0)	

There is an alternative hypothesis between the attitudes of healthcare providers and the type of practice (hospital-based, small practice, large practice). This indicates that profession significantly influences attitudes depending on the practice setting.

Table 34. Association between attitudes of profession and effective communication between healthcare providers and patients or families in improving quality of life.

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Communication						0.82
Extremely important	41(39.4)	19(18.3)	12(11.5)	32(30.8)	104(100.0)	
Very important	27(37.5)	14(19.4)	6(8.3)	25(34.7)	72(100.0)	
Slightly important	7(33.3)	3(14.3)	1(4.8)	10(47.6)	21(100.0)	

There is a null hypothesis between the attitudes of healthcare providers and the importance of effective communication (extremely important, very important, slightly important) with patients or families. Differences observed are likely due to chance.

Table 35. Association between attitudes of profession and awareness of local / community based nutrition program or initiatives aimed at improving nutritional health

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Program						0.02
Yes	22(28.2)	16(20.5)	12(15.4)	28(35.9)	78(100.0)	
No	57(46.3)	20(16.3)	7(5.7)	39(31.7)	123(100)	

There is an alternative hypothesis between the attitudes of healthcare providers and their awareness (yes, no) of local/community-based nutrition programs. This suggests that profession significantly influences awareness of such programs.

Table 36. Association Between Attitudes Of Profession And High Body Fat Link To The Progression Of Cancer Through Insulin

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***

	n (%)	n (%)	n (%)	n (%)	n (%)	
Insulin						
Yes	58(39.7)	24(16.4)	16(11.0)	48(32.9)	146(100.0)	0.58
No	21(38.2)	12(21.8)	3(5.5)	19(34.5)	55(100.0)	

There is a null hypothesis association between the attitudes of healthcare providers and their views on the link between high body fat and cancer progression through insulin (yes, no). The differences observed are not statistically significant.

Table 37. Association Between Attitudes of Profession and Similarities Patterns Patients Face Adhering to Prescribed Dietary Plans.

	Profession					
	Doctor	**Nurse**	**Dietitian**	**Others**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Similarities						
Yes	47(38.8)	19(15.7)	16(13.2)	39(32.2)	121(100.0)	0.02
No	14(27.5)	15(29.4)	1(2.0)	21(41.2)	51(100.0)	

There is an alternative hypothesis between the attitudes of healthcare providers and the similarities in patterns patients face adhering to prescribed dietary plans (yes, no). This indicates that profession significantly influences perceptions of adherence patterns.

4.6. Association Between Practice of Healthcare Providers in Promoting Healthy Eating Habits Among Oncology Patients in Nigeria.

Table 38. Association Between Confidence in Practice and Level of Awareness Among the General population

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Awareness					
Low	23(20.2)	31(27.2)	60(52.6)	114(100.0)	0.23

Moderate	10(13.5)	16(21.6)	48(64.9)	74(100.0)	
High	0(0.0)	4(30.8)	9(69.2)	13(100.0)	

There is a null hypothesis between confidence in practice and awareness of healthcare providers. Confidence in practice does not significantly differ based on the level of awareness among the general population.

Table 39. Association Between Confidence in Practice and Emphasis on Cancer Prevention in the Healthcare System in Nigeria

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Prevention					0.23
Always	3(8.6)	7(20.0)	25(71.4)	35(100.0)	
Never	25(17.1)	39(26.7)	82(56.2)	146(100.0)	

There is a null hypothesis between confidence in practice and emphasis on cancer prevention in the healthcare system in Nigeria

Table 40. Association Between Confidence in Practice and General Nutritional Habits of Nigerians

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Habits					0.18
Good	2(6.9)	4(13.8)	23(79.3)	29(100.0)	
Fair	17(18.7)	25(27.5)	49(53.8)	91(100.0)	
Poor	14(17.3)	22(27.2)	45(55.6)	81(100.0)	

There is a null hypothesis between confidence in practice and general nutritional habits of Nigerians

Table 41. Association Between Confidence in Practice and Observation of Specific Dietary Preferences or Restrictions Amongst Patients.

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Preference					0.002
Never	25(13.7)	46(25.1)	112(61.2)	183(100.0)	
Sometimes	8(44.4)	5(27.8)	5(27.8)	18(100.0)	

There is a null hypothesis between confidence in practice and observation of specific dietary preferences or restrictions amongst patients.

Table 42. Association Between Confidence in Practice and Inclusion of Nutritional Assessment During Cancer Treatment

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Assessment					0.057
Never	19(22.4)	25(29.4)	41(48.2)	85(100.0)	
Sometimes	7(14.3)	14(28.6)	28(57.1)	49(100.0)	
Always	7(10.4)	12(17.9)	48(71.6)	67(100.0)	

There is a borderline significance. Confidence in practice may differ based on the inclusion of nutritional assessment during cancer treatment, but the evidence is not strong.

Table 43. Association Between Confidence in Practice and Collaboration with Dietitians to Treat Patients

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Collaborate					0.006
Yes	12(11.7)	21(20.4)	70(68.0)	103(100.0)	
No	16(21.9)	25(34.2)	32(43.8)	73(100.0)	

There is an alternative hypothesis between confidence in practice and collaboration with dietitians to treat patients

Table 44. Association Between Confidence in Practice and Effective Educational Resources in Conveying Dietary Information to Patients

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Resources					<0.001
Yes	7(8.1)	17(19.8)	62(72.1)	86(100.0)	
No	22(28.2)	21(26.9)	35(44.9)	78(100.0)	

There is an alternative hypothesis between confidence in practice and effective educational resources in conveying dietary information to patients

Table 45. Association Between Confidence in Practice and Challenges with the Dietary Recommendations due to Availability of Certain Foods

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Challenges					0.61

Yes	17(14.3)	27(22.7)	75(63.0)	119(100.0)	
No	8(18.2)	12(27.3)	24(54.5)	44(100.0)	

There is a null hypothesis between confidence in practice and challenges with the dietary recommendations due to availability of certain foods

Table 46. Association Between Confidence in Practice and Involvement of Patients in Discussing Their dietary Habits and Preferences During Treatment

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Discussions					
Never	25(22.3)	32(28.6)	55(49.1)	112(100.0)	0.001
Sometimes	3(8.6)	13(37.1)	19(54.3)	35(100.0)	
Always	5(9.3)	6(11.1)	43(79.6)	54(100.0)	

There is an alternative hypothesis between confidence in practice and involvement of patients in discussing their dietary habits and preferences during treatment

Table 47. Association Between Confidence in Practice and Compliance with the Dietary Recommendations Provided

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Recommendations					
Yes	19(13.3)	31(21.7)	93(65.0)	143(100.0)	0.17
No	6(25.0)	7(29.2)	11(45.8)	24(100.0)	

There is a null hypothesis between confidence in practice and compliance with the dietary recommendations provided

Table 48. Association Between Confidence in Practice and Common Challenges Patients Face in Adhering to Prescribed Dietary Plan.

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Similarities					0.02
Yes	19(15.7)	23(19.0)	79(65.3)	121(100.0)	
No	7(13.7)	20(39.2)	24(47.1)	51(100.0)	

There is an alternative hypothesis between confidence in practice and common challenges patients face in adhering to prescribed dietary plan.

Table 49. Association Between Confidence in Practice and Awareness of Local or Community-based Nutrition Programs Aimed at Improving Nutritional Health

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Programs					0.003
Yes	9(11.5)	12(15.4)	57(73.1)	78(100.0)	
No	24(19.5)	39(31.7)	60(48.8)	123(100.0)	

There is an alternative hypothesis between confidence in practice and awareness of local or community-based nutrition programs aimed at improving nutritional health

Table 50. Association Between Confidence in Practice and the Importance of Effective Communication Between Healthcare Providers and Cancer Patients in Improving Their Quality of Life.

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Communication					0.059
Extremely important	16(15.4)	21(20.2)	67(64.4)	104(100.0)	
Very important	11(15.3)	26(36.1)	35(48.6)	72(100.0)	
Slightly important	4(19.0)	2(9.5)	15(71.4)	21(100.0)	

There is a borderline significance. Confidence in practice may differ based on the perceived importance of effective communication, but the evidence is not strong.

Table 51. Association Between Confidence in Practice and Accessibility of Support to Cancer Patients

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Accessibility					0.04
Highly accessible	6(28.6)	2(9.5)	13(61.9)	21(100.0)	
Moderately accessible	4(6.3)	17(26.6)	43(67.2)	64(100.0)	
Not accessible	21(19.1)	29(26.4)	60(54.5)	110(100.0)	

There is an alternative hypothesis between confidence in practice and accessibility of support to cancer patients.

Table 52. Association Between Confidence in Practice and Knowledge of the Relationship Between Nutrition and Cancer.

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Knowledge					<0.001
Poor	11(50.0)	6(27.3)	5(22.7)	22(100.0)	
Fair	16(27.6)	16(27.6)	26(44.8)	58(100.0)	
Good	6(5.0)	29(24.0)	86(71.1)	121(100.0)	

There is an alternative hypothesis between confidence in practice and knowledge of relationship between nutrition and cancer.

Table 53. Association Between Confidence in Practice and Emphasis on Cancer Prevention in the Healthcare System

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Emphasis					0.14
Yes	2(5.7)	10(28.6)	23(65.7)	35(100.0)	
No	25(19.8)	29(23.0)	72(57.1)	126(100.0)	

There is a null hypothesis between confidence in practice and emphasis on cancer prevention in the healthcare system

Table 54. Association Between Confidence in Practice and Collaboration with Dietitians.

	Confidence				
	Not confident	**Somewhat confident**	**Confident**	**Total**	**p-value***
	n (%)	**n (%)**	**n (%)**	**n (%)**	
Collaborate					
Yes	12(11.5)	21(20.2)	71(68.3)	104(100.0)	0.02
No	16(21.6)	26(35.1)	32(43.2)	74(100.0)	
Maybe	5(21.7)	4(17.4)	14(60.9)	23(100.0)	

There is an alternative hypothesis between confidence in practice and collaboration with dietitians.

5. DISCUSSION

The study consisted of 201 oncology healthcare providers in Nigeria, revealing a diverse representation of professionals within the field. The average age of the healthcare providers was 32 years, with a notable spread across age brackets. Most (over 84%) of the healthcare providers were employed within government organizations, suggesting a predominance of government-affiliated healthcare institutions within the study's scope. The study population predominantly comprises young, relatively inexperienced healthcare providers, with the majority being employed in government hospital-based settings. The gender distribution among participants is balanced, and a significant majority possess a Bachelor's degree. Participants' Income levels vary, with a substantial portion earning less than 200,000. Medical doctors represent the most critical professional group, followed by other healthcare professionals, nurses, and dietitians. The survey conducted assessed healthcare providers' comprehension of the nexus between nutrition and cancer, revealing an average knowledge score of 50.25, suggesting moderate proficiency within their respective domains. An average confidence score of 50.25 was observed among healthcare providers, indicating a balanced self-assurance in dispensing dietary advice to oncology patients. Concurrently, the average awareness level among healthcare workers registered at 40.2, denoting a comparatively diminished awareness or recognition of prevailing cancer-related issues within the general populace of Nigeria. This observation underscores the potential gap in disseminating crucial information and heightening cancer awareness among the broader community. The relationship knowledge of cancer and nutrition was poor, with a mean of 58.9, indicating moderate proficiency within their respective domains. Confidence in providing dietary advice was also low, with an average of 16.4. Awareness of cancer in Nigeria was low, with a mean of 74.8, emphasizing cancer prevention. Continuous education related to cancer and lifestyle was regular, with an average of 19.9, and cancer prevention strategies with patients were always or rarely. The table provides insight into healthcare professionals' levels of confidence and understanding regarding cancer, diet, and related preventative actions. There are notable gaps in knowledge, ongoing education, and the emphasis on cancer prevention techniques, even while there is typically strong comprehension and confidence in several areas.

By filling these gaps with focused education and more precise rules, healthcare practitioners may fight cancer more successfully overall. The study reveals significant disparities in familiarity with dietary patterns commonly adhered to by cancer patients among healthcare

professionals. 28.9% of surveyed healthcare workers indicated a complete lack of familiarity with such patterns, while only 1.5% reported needing to be more familiar with them. The integration of nutritional assessment into cancer treatment protocols was found to be relatively low, with only 17.4% of healthcare workers incorporating it into patient care. Collaboration between healthcare providers and dietitians or nutritionists emerged as a significant factor in dietary planning, with a substantial proportion (51.2%) of healthcare workers indicating consistent collaboration. Despite this, a notable portion (42.8%) expressed awareness of specific educational resources that effectively convey dietary information to patients. Interestingly, a substantial proportion (73.1%) of healthcare providers reported a lack of involvement in or exposure to research studies investigating the impact of dietary patterns on cancer treatment outcomes within the Nigerian context. A considerable majority (71.1%) of healthcare workers identified implementing specific dietary recommendations as challenging for patients, citing issues such as food availability. The survey revealed varying levels of knowledge regarding the association between body fat accumulation and cancer progression through insulin, with over 72.6% of respondents demonstrating awareness of this connection. However, awareness of the preventability of cancer through healthy dietary habits and adequate exercise was comparatively lower, with only 48.8% of healthcare workers recognizing that cancer can be preventable up to 30-40% through such lifestyle modifications.

Noncommunicable illnesses have increased in African nations recently, predominantly obesity and its comorbidities, which include diabetes, cancer, and cardiovascular disease. For example, the proportion of overweight and obese individuals in Nigeria has been continuously increasing. This is primarily due to the "nutrition transition," which is predominantly urban and reflects more significant dietary trends in Africa toward foods heavy in fat, sugar, and energy, often at the expense of traditional whole grains and pulses. (Galya et al., 2024). Cancer is a disease where cells grow uncontrollably and spread to other body parts. Rudolf Virchow's "cellular theory" of disease suggests that all diseases, including cancer, arise from changes in cells. Advances in molecular biology in the mid-20th century recognized that cancer cells have undergone driver mutations leading to uncontrolled proliferation, failure to differentiate, and successful invasion into normal tissue (Brown et al., 2023). Cancer affects over 10 million people annually, with over half living in the developing world. In 2008, there were 12.4 million new cases, with two-thirds of the estimated 7.6 million cancer deaths occurring in low- and middle-income countries. These countries bear the most significant burden of new cancer cases and deaths, with an estimated 14 million new cases reported in 2012 and an anticipated 22 million over the next twenty years. Over 60% of the world's total cancer cases occur in Africa,

Asia, Central America, and South America, with over 70% of cancer deaths coming from these regions (Moten et al., 2014). Cancer is more than just somatic evolution; it evolves adaptations, affecting and influencing the tumor microenvironment. Cancer cells grow to increase resource uptake, co-opt normal cells, evade the immune system, produce public goods, and tolerate acidic conditions. Natural selection plays a role in initiating and driving cancer, resulting in adapted cancer cells resistant to drug and radiation therapies, causing near certainty of death from late-stage cancers (Brown et al., 2023).

Cancer patterns in Africa were first available in the first half of the 20th century through pioneering researchers and population-based registries founded in the 1950s. However, progress was slow, with no representative from Africa in the period covered by Cancer Incidence in Five Continents Volume V (1978 to 1982). A slow rebirth of cancer registration has occurred since the 1980s, attributed to insufficient coordination of data sources, lack of trained technical staff, poor health infrastructure, lack of political will, and poor procurement systems. Even when a registry operates, it faces challenges such as poor healthcare infrastructure, lack of accurate census programs, absence of vital statistics, inability to identify new cases, lack of trained personnel, and lack of cooperation from other data sources. Despite these challenges, there has been a slow growth in the number and quality of cancer registries (Omonisi et al., 2020). Sub-Saharan African countries are lagging in establishing a comprehensive National Cancer Control Program (NCCP), with only 11 currently having one. This highlights the urgent need for such programs. Cancer registries provide crucial statistical information on the number of cancer cases in the population, essential for setting priorities and targeting cancer control activities. Annual numbers of incident cases indicate the resources needed for primary treatment, while prevalent cases describe the number of people needing regular long-term follow-up. Information from cancer registries is instrumental in planning and establishing cancer treatment and care facilities. Geographic differences in cancer occurrence and changes over time should be considered to make projections of future incidence rates, caseloads, and the need for treatment facilities (Omonisi et al., 2020). Linking information on cancer incidence with data on risk factors allows for estimating the population-attributable fraction, which represents the proportion of cancer cases that could be prevented if risk factors were eliminated or reduced. Early diagnosis, population screening, and prompt referral and management of patients with symptoms can significantly improve cancer outcomes. When early-stage, possibly treatable cancers are diagnosed, obesity raises the risk of both death and cancer recurrence. In addition, obesity raises the risk of post-treatment toxicities such as lymphedema, recurrent cancers, surgical difficulties, and unfavorable treatment outcomes.

There is little data on how lifestyle changes affect cancer outcomes. However, several studies have assessed how exercise and weight loss strategies affect cancer patients during and after active treatment (Ligibel et al., 2019).

The absence of specialist oncology surgeons in Nigeria's cancer care system is a critical issue. Factors such as Western lifestyle, late detection of cancer, poor access to cancer screening, poor oncology patient navigation, and limited access to comprehensive cancer treatment are contributing to the poor outcomes. Studies have shown that 68.9% of Nigerians would have to travel for 4 hours to access comprehensive cancer care, and the country requires a minimum of 280 radiotherapy machines. With over 124,000 cancer cases annually, Nigeria has only four of the eight government-funded radiotherapy machines that are functional at a time. Only two cancer centers can deliver advanced radiotherapy treatment, and no positron emission tomography (PET)-CT scanner is in any government cancer center in Nigeria. The absence of specialist oncology surgeons means that general surgeons are providing oncologic surgery, which is essential for 80% of cancer patients in many African countries. The limited presence of oncological services is an important issue that interferes with the ability of cancer patients to experience quality cancer treatment and healthy coping after diagnoses. The coping theory postulates how people avoid, manage, and adapt to physical, psychological, and social harm or life-threatening situations. In cancer, many survivors view a cancer diagnosis and treatment as life-threatening stressors, challenges, harm, or loss (Ndoh et al., 2022).

Nutritional Interventions

Obesity is a significant risk factor for cancer, accounting for 14% of all cancer deaths in men and 20% in women. Maintaining an average weight can prevent over 90,000 cancer deaths annually. CRON-Calorie Restriction with Optimal Nutrition is a dietary approach that aims to reduce food intake while ensuring the consumption of necessary nutrients, this method has been shown to extend life spans and reduce the risk of chronic diseases (Donaldson, 2004). High glycemic load is associated with various cancers, and foods contributing to hyperinsulinemia should be avoided. Low fiber is also crucial when choosing a cancer-protective diet, as it is not found to be a risk for breast cancer. Red meat, processed meat, and cooking amines have been linked to colon and colorectal cancer, as well as breast cancer. However, studies show that understanding the balance of omega 3:6 ratio can protect against cancer, while omega six fats can promote it (Donaldson, 2004). Flax seeds, a rich source of dietary fiber, omega-3 fat, and lignans, have been shown to reduce tumor load, metastasis, and growth rate. Chlorophyll, a light-collecting molecule found in green plants, is effective in

binding harmful substances like polycyclic aromatic hydrocarbons and aflatoxin, thereby reducing their potential to cause cancer. Vitamin B-12, a crucial nutrient for genetic stability and DNA repair, is beneficial. Folic acid, a dark green leafy vegetable, plays a role in DNA methylation and synthesis. Vitamin D, produced from skin exposure, has potent anti-cancer properties. Green plants contain essential vitamins and antioxidants that can help protect against cancer.

Carotenoids, including α and β-carotene, have been found to decrease cancer risk. β-carotene is a cancer-protective agent, while beta-carotene is a marker of fruit and vegetable intake. Various fruits and vegetables are a better anti-cancer strategy than a single high-carotene vegetable. Lycopene, a primary dietary source, is protective, especially for prostate cancer. Tomatoes are a major source; high lycopene intake reduces prostate cancer risk. Grape seed extract and green tea are antioxidants with potential cancer therapy benefits. Grape seed extract contains pro-anthocyanidin, while green tea contains EGCG, which inhibits metalloproteinases. Probiotics, beneficial bacteria in the gut, produce natural antibiotics, B vitamins, and enzymes, strengthening the immune system and preventing food allergies. Studies show that probiotics can prevent and reverse cancer, especially colon cancer. Oral enzyme supplements improve digestion and bio-accessibility of proteins and carbohydrates in the small intestine, with evidence suggesting they can have direct anti-tumor activity if they reach the systemic circulation. Gerson Therapy, a diet-based cancer treatment, has shown promising results in treating melanoma cancer, with five-year survival rates compared to conventional therapy. A study of Italian women found a 61% decrease in breast cancer risk with a salad-vegetable diet. A "prudent" diet is protective against colon cancer, while a "western" diet is detrimental. The Women's Healthy Eating and Living (WHEL) Study tested a plant-based dietary pattern in early breast cancer patients, finding increased vegetable and fruit intake and plasma carotenoid concentrations (Donaldson, 2004). Nutritional epidemiological research in Sub-Saharan Africa (SSA) is limited due to the need for validated dietary assessment tools for African diets and cuisine. Nigeria, the most populous nation in Africa, has over 500 distinct ethnic groups and a rich tapestry of cultures and dietary practices. The country's location affects the availability of locally sourced foods, with staples like rice and wheat being imported. The proliferation of fast-casual dining establishments and takeaway restaurants has led to a trend toward standardizing portion sizes. However, most Nigerians primarily eat at home, where food portion sizes remain non-standardized (Galya et al., 2024). Oncology providers assess BMI, physical activity, and dietary patterns during and after cancer treatment, advising overweight and obese patients to lose weight, increase physical activity,

and consume a healthy diet. However, referrals to weight management, physical activity, or nutrition programs are lower. There is a gap between clinicians' advice and patients' needs for a healthy lifestyle. Additionally, there is less information on patient attitudes and receptivity to weight management, dietary change, and physical activity messages after a cancer diagnosis (Ligibel et al., 2019).

6. CONCLUSION

Cancer treatment is a critical aspect of overall health, necessitating a comprehensive strategy that includes coordination from various stakeholders, affordability, accessibility, and awareness. Healthcare professionals and legislators are crucial in developing and implementing measures that facilitate communities' understanding of cancer risks, symptoms, and early detection techniques. Lowering treatment costs and ensuring healthcare facilities are accessible to all individuals can improve the accessibility and affordability of cancer treatment and services. Professional dietitians offer dietary advice to improve general health and manage cancer symptoms, ensuring personalized nutritional programs for patients and their families. Thorough patient counseling is essential for understanding diagnosis, treatment options, and what to expect during the cancer journey. Encouraging early hospital presentations, diagnosis, and treatment can lead to prompt treatment, improving outcomes, and instilling hope in cancer patients and their families. Government financial support, educational initiatives, research and innovation, cancer support groups, and survivor outreach programs can help patients afford necessary treatments and care. This study revealed that Nigerian oncology healthcare providers have moderate knowledge and confidence regarding the link between nutrition and cancer. Still, lower awareness levels suggest a gap in cancer-related information recognition and dissemination. Collaboration with dietitians is prevalent, indicating the importance of multi-disciplinary approaches in dietary planning for oncology patients. Addressing these gaps is essential for healthcare practitioners in Nigeria to enhance their role in cancer prevention and management through better nutritional guidance, ultimately contributing to improved patient outcomes.

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7. APPENDIX 1: Curriculum Vitae

Personal Informations

Name	Aisha Kakudi	**Surname**	Abba Abubakar

Education

Degree	**Department**	**The name of the Institution Graduated From**	**Graduation year**
Master	Public Health	Yeditepe University	2022-2024
University	Nutrition and Dietetics	Okan University	2018-2022
High school	-	NigerianTurkish International School	2015

Languages	**Grades**
Hausa	Native
English	Advanced

Work Experience (Sort from present to past)

Position	**Institute**	**Duration (Year - Year)**
Head of research / Recipe curator	MJ Amad & Co	April 2023-Present
Dietitian	Kindacare Wellness Clinic	March – December 2023

Intern	Medipol Mega University Hospital	2020-2021

Computer Skills

Program	**Level**
Microsoft Word, PowerPoint, Excel	Excellent
SPSS	Good

Others (Projects / Certificates / Rewards)

HAVARDX (November 2023) Innovating In Healthcare
TRAINING AND RESOURCES IN RESEARCH ETHICS EVALUATION (March 2024) - Introduction to Research Ethics - Research Ethics Evaluation - Informed Consent - Public Health Research Ethics