Determinants of Noncompliance to Cancer Treatment among Cancer Patients in David Umahi Federal University Teaching Hospital; Focus on Sociodemographic, Psychological and Treatment Modalities.

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ABSTRACT

Background: Cancer treatment outcome in Nigeria and in Sub Sahara Africa has been identified to be sub-optimum and implicated factors include delayed presentation, late-stage diagnosis, and inadequate treatment as challenges linked to poverty, prolonged treatment durations, social issues and non-adherence to treatment protocols. Many reports have focused on patient-related and health system challenges from symptom development through diagnosis. Despite the critical need for radiotherapy, many patients who start treatment do not complete the full course. It has been documented that only 46.5% of cervical cancer patients at an urban tertiary health center in the United States completed treatment within the recommended time frame of 56 days. Therefore, various factors could be responsible for the non completion of treatment leading to devastating effect of cancers in patients in Nigeria and sub-Saharan Africa. Furthermore, underlying psychological factors, an area clinicians rarely take seriously, have become a major barriers to the timely completion of radiation therapy for cancer patient. Despite these findings, there is a notable lack of local studies in the Nigerian context that specifically examine the correlation between psychosocial issues and the extended duration of radiation therapy in cancer patients in relation to treatment compliance.

Aim: To aggregate data on cancer treatment (surgery, chemotherapy, radiotherapy, hormonal and targeted therapy) outcome in relation to identifying factors that impede the success of cancer treatment completion in DUFUTH.

Method: Data from patient's files, registers, summary sheets, doctors' medical and referral notes, physical interviews of patients, caregivers, treatment sponsors, nurses and doctors and all cadres of professionals directly

involved in the treatment of cancer patients in DUFUTH directly were extracted between January 2023 to June 2025.

Result: Common findings among the 50.9% of cancer patients who absconded, discharged against medical advice or have incomplete treatment found in this research were; length of stay on admission, poverty predominantly among farmers and petty traders, state of origin, type of cancer, absence of psychological support during treatment , treatment type and male sex.

Conclusion: Several factors that contributed to non adherence and incomplete cancer treatment among cancer patients in DUFUTH are bothersome on both patients and healthcare facility. Psychosocial problems further complicate treatment completion. Efforts must be made by all to mitigate against this ugly trend in order to improve the treatment efficacy and survival rate for cancer patients in our locality.

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Key words; Psychosocial, determinants, noncompliance, psychological support,

INTRODUCTION

Malignant neoplasms are characterized by progressive growth of tissue with structural and functional alterations with a peculiarity of ability to metastasize via blood and lymph vessel penetration. Cancer therefore, is defined by rapid creation of abnormal cells that grow beyond their usual boundaries, invade adjoining parts of the body and spread to other organs.

Neoplasms can be classified into benign and malignant conditions. Benign neoplasms unlike the malignant ones appear as a localized growths of tissue with predominantly minor symptoms which are amenable to surgical therapy. They can become clinically important when they occur in organs of close compartment causing compression and where surgery cannot be easily performed like the brain and when they produce hormones with systemic effect.

Globally, approximately 2.1 million diagnoses were estimated in 2018, contributing to about 11.6% of total cancer incidence with approximately 627 000 deaths making 6.6% of total cancer mortality. Cancer has become one of the challenging major causes of morbidity and mortality in Nigeria accounting for the 2nd most common cause of death after cardiovascular diseases worldwide [1]

Most cancers can present with localized lesions and cancer patients can be rendered disease-free with treatment , however, distant metastasis is common in most cancerous lesions and metastasis is the primary cause of death in cancer patients. Adjuvant systemic therapies are effective in reducing the risk of distant and local recurrence, including chemotherapy. Despite a life threatening appearance and manifestation of some cancerous tumours, a reasonable number of patients do not adhere to medication representing a potential missed opportunity for health gain and waste of resources [2].

Cancer can arise is any tissue, organ or cells of the body and most prevalent cancers globally include, prostate cancer for males and breast and cervical cancers for females, however lung cancer for both male and females has assumed a prominent prevalence and cause of morbidity and mortality worldwide.

For example, WHO (2016) estimates that there are 100,000 new cases of breast cancer in Nigeria and this high incidence especially in developing countries has been attributed to scarcity of adequate facilities for detection and diagnosis[3][4].

Nigeria has one of the world's highest age-standardized mortality rates of cancers and the highest in Africa [3]. GLOBOCAN 2020 reported breast cancer as the most common cause of cancer-related death in Nigeria, accounting for 14,274 (18.1%) of all cancer deaths . A recent Sub-Saharan African (SSA) multinational study by McCormack et al, found that breast cancer patients in Nigeria had the lowest three-year survival rate of six

countries evaluated: 36% in Nigeria, compared to 44% in Uganda, 47% in Zambia, 56% for black women in Namibia and 59% for black women in South Africa [4]

Many factors could be responsible for this poor survival rate of cancer patients in Nigeria and Sub Sahara Africa.

Some previous researches have identified delayed presentation, late-stage diagnosis, and inadequate treatment as challenges linked to poor breast cancer outcomes in Nigeria and in Sub Sahara Africa. Many reports have focused on patient-related and health system challenges from symptom development through diagnosis. In contrast, treatment, which is also a critical determinant of breast cancer outcomes, has been under-reported.

[5][4]

Cervical cancer is especially prevalent and most diagnosed cancer in Sub-Saharan Africa, Melanesia, South America, and South-Eastern Asia, with Sub Saharan Africa having the highest incidence and mortality rates. According to the United Nations, cervical cancer is the third most common cancer in Nigeria and the second leading cause of cancer-related deaths among women aged 15 to 44. In 2020, Nigeria recorded 12,000 new cases and 8,000 deaths from cervical cancer [5]

Many treatment modalities abound for various cancers ranging from surgery, chemotherapy, immunotherapy, radiotherapy and combined therapy.

Radiation therapy, including external beam radiotherapy and brachytherapy, is a standard treatment for cervical cancer patients, both as definitive and adjuvant therapy [5]. It utilizes ionizing radiation to destroy malignant cells. It is essential for Fédération Internationale de Gynécologie et d' Obstétrique (FIGO) stage 1b and above, which represents 60% of cervical cancer cases in developing countries as many as in developed nations [6]. Radiotherapy is indicated for 58% of cervical carcinoma cases [6]. Prolonged treatment is longer than 56 days buy the American Brachytherapy Society guidelines [7]. This is of significant concern, especially in low and middle-income countries where cervical cancer alone accounts for 7% of patients needing radiotherapy [5]. Maranga et al found that only 6.7% of cervical cancer patients received optimal combined external beam radiotherapy, brachytherapy, and adjuvant chemotherapy [5]

Despite the critical need for radiotherapy, many patients who start treatment do not complete the full course. Cohen et al found that only 46.5% of cervical cancer patients at an urban tertiary health center in the United States completed treatment within the recommended timeframe of 56 days [5].Therefore, various factors could be responsible for the non completion of treatment leading to devastating effect of cancers in patients in Nigeria and Sub-Saharan Africa.

Non-compliance to the schedule can reverse this trend of success stories following cancer treatment thereby leading to accelerated repopulation of the cancer cells and worsening the outcomes

The assertion that Africa "is functioning at 25% of its potential treatable capacity for cervical cancer alone" starkly illustrates the dire need for a more comprehensive global strategy in delivering radiation therapy. Worldwide, about 56.4% of cancer patients have access to only 31.7% of the necessary teletherapy units. Within Africa, although 20 countries offer brachytherapy services, a staggering 75% of these services are concentrated in the northern regions and South Africa [5]. Ideally, the ratio of teletherapy units to individuals should be 1 per 120,000 to 250,000 people. In high-income countries, this ratio is around 1 unit per 130,000 people, whereas in low- and middle-income countries, it drastically drops to approximately 1 unit per 1.4 million people [5].

In 2012, Nigeria alone accounted for 8.3% of the global cancer burden [5]. The International Atomic Energy Agency has identified Nigeria as having the largest gap between the availability of radiotherapy machines and the actual need for these services [5]. A 2015 radiotherapy needs assessment revealed that only 2 out of Nigeria's 9 radiation centers were operating at full capacity. The country has approximately 1 radiation unit per 19.4 million people, a stark contrast to the recommended ratio of 1 unit per 120,000 to 250,000 people. Furthermore, research by Anakwenze et al indicated that 91.3% of patients who completed radiotherapy treatments

experienced delays or cancellations due to issues such as healthcare worker strikes, power failures, machine breakdowns, or prolonged wait times [5].

These findings underscore a critical issue: even when radiotherapy machines are available in low- and middle-income countries, the reliability and quality of access to this technology are inconsistent. This inconsistency is often due to challenges in maintaining and servicing the equipment properly. As a result, many patients in less developed nations do not complete their prescribed courses of radiation therapy, significantly impairing their treatment outcomes [4]

Nigeria is a LMIC in Sub-Saharan Africa with a population of 224 million, larger than the population of the UK, France and Germany combined. A study of hospital case notes of urban dwellers identified from the Nigerian Cancer registry with breast, uterine cervix, colorectal or prostate cancer showed that between two-thirds and three-quarters of patients presented late (stages 3 or 4), with no recent improvement [6][7]. Cancer incidence is rising in Nigeria as people adopt new lifestyles [7], and the overall cancer incidence is 113.6 per 100 000 persons per year whilst the overall cancer mortality is 74.5 per 100 000 persons per year [8]. Less than 10% of Nigerians are enrolled in the National Health Insurance Scheme which provides limited coverage of healthcare services [9][10][11]. Consequently, most Nigerian patients experience financial hardship due to high out-of-pocket expenditures related to cancer care. In response to the growing cancer burden, health boards in Nigeria have invested in facilities for curative treatment for common cancers [6]. However, to realize the benefits of these investments, it will be necessary to reduce the delay between first symptoms and treatment [10].

Treatment adherence is defined by the World Health Organization as “the extent to which a person's behavior, taking medication, following a diet, or executing lifestyle changes, corresponds with the agreed recommendation from a health care provider. Cancer medication non-adherence has been shown to lead to decreased survival, higher recurrence, treatment failure rates, and health care costs [1].

Adherence to cancer treatment especially breast cancer treatment is crucial to obtain optimal health outcomes, such as cure or improvement in the quality of life. Although most breast cancer patients present late at diagnosis, survival rates can be greatly improved with improvement in adherence to recommended treatment. In a Nigerian-based study, patients' adherence and reasons for non-adherence to chemotherapy were evaluated and the results showed that 80.9% of the clients were non-adherent with the most common reason for non-adherence being financial barriers[1].

Another study revealed that 47.9% of breast cancer patients refused a mastectomy and 38.6% adherence to chemotherapy [5]. Increasing the effectiveness of adherence interventions may have a far greater impact on the health of the population than any improvement in specific medical treatments [10].

In a study done in Nsukka Nigeria, patients adherence to surgery and chemotherapy is low 44% and 56.1% respectively, and this was greatly influenced by treatment delay, missed chemotherapy dose without medical indication, patient's motivation, and knowledge towards their disease and treatment respectively [2].On the other hand, study done in Kwara showed that financial constraint 61(61.0%) was the major patient related factor that influence non-adherence to chemotherapy. This was followed by medication side effects (hair loss, loss of weight) 62(62.0%) and duration of treatment 50(50.0%) was the major therapy related factor while unfavorable hour of clinic visit 40(40.0%) was the major health care related factor that influences non-adherence to chemotherapy [3].

Chemotherapy (chemo) which is a systematic therapy is the treatment for breast cancer and may be given intravenously or by mouth. Chemo can be used as the main treatment for women whose cancer has spread outside the breast and underarm area, either when it is diagnosed or after initial treatments. The length of treatment depends on whether the cancer shrinks, how much it shrinks, and how well the chemo is tolerated. Treatment may be longer for advanced breast cancer and is based on how well it is working and what side effects. Chemo drugs can cause side effects such as hair loss and nail changes, mouth sores, loss of appetite or increased appetite and nausea and vomiting, increased susceptibility to infection, easy bruising, depending on the type and dose of drugs given, and the length of treatment [3].

Oncology Health Care Providers (HCPs) generally assume that patients with cancer will adhere to treatment because of the seriousness of a cancer diagnosis, however, reports in the literature have demonstrated adherence levels as low as 20% (6, 7). Reasons for non-adherence are complex in most situations (8). Factors that have been frequently associated with non-adherence to recommended medical therapies include individual patient characteristics, features of the disease and the treatment regimen, and aspects of the medical care system [3].

Failure of adherence to medication is a serious problem which does not only affect the patient but also the healthcare system [11]. Medication non-adherence leads to substantial worsening of the disease, death and increased health cost and as such health care professionals such as nurses, doctors and pharmacist have a significant role in their daily practice to improve patient adherence to medication [3].

Nigerian health care system faces public health challenges in the form of breast cancer. The issue of non-adherence to chemotherapeutic agents among women with breast cancer has been cited by the World Health Organization (2008) as the single most important modifiable factor that can compromise treatment outcomes. Non adherence is dangerous and can lead the practitioner to change the dose or prescribe a different agent because of apparent non responsiveness or unexpected adverse effects. It can also result in unnecessary diagnostic testing, changes in dose or therapeutic regimen and hospitalizations [3].

It has been observed at the University of Nigeria Teaching Hospital, Enugu that there is an increase in oncologist visit by cancer survivors due to a relapse in the disease condition. Increased hospitalization rates, longer hospital stays and decreased patient satisfaction outcomes which are all possible encouraging factors in adherence to chemotherapy [3] . Cancer is a devastating disease that brings significant psychological challenges not only to the patients but also to their families [4]. Patients often rely on caregivers who provide essential psychosocial support and care. Despite this support, cancer patients continue to face numerous psychological hurdles. A study conducted at a comprehensive cancer center in the United States involving nearly 4,500 patients aged 19 and older found that the prevalence of significant psychological distress ranged from 29% to 43% among patients with the 14 most common types of cancer [4]. These findings align with subsequent studies across diverse cancer populations, which report high rates of psychological symptoms that meet the criteria for clinical diagnoses such as depression, adjustment disorders, and anxiety [5].

Radiotherapy can exacerbate these psychological issues. It is associated with long-term physical side effects, such as pain and reduced physical functioning, as well as emotional distress, including anxiety and depression [4]. These psychological factors can significantly influence the treatment trajectory for cancer patients, affecting both their quality of life and their ability to adhere to treatment protocols. Various studies have highlighted that anxiety and depression are prevalent and significant issues that impact the overall well-being of cancer patients. These conditions diminish the quality of life, reduce treatment compliance, and extend hospitalization periods [5].

The psychological burden of cancer is profound. Beyond the immediate impact of the disease, the treatment process itself can be mentally and emotionally taxing. The anticipation of radiotherapy, the experience, and the side effects all contribute to heightened stress levels. Patients often grapple with fears about treatment efficacy, potential side effects, and the overall prognosis. This psychological stress can manifest in various ways, including sleep disturbances, appetite changes, and mood swings [5].

Research by Cohen et al identified underlying psychological factors as major barriers to the timely completion of radiation therapy in cervical cancer patients [10]. Additionally, Zaki et al found that in 59% of cervical cancer patients who experienced prolonged treatment durations, the primary causes were social issues and non-adherence to treatment protocols [8]. Despite these findings, there is a notable lack of local studies in the Nigerian context that specifically examine the correlation between psychosocial issues and the extended duration of radiation therapy in cancer patients [4].

Radiation toxicity's impact on treatment completion is a critical concern. Acute symptoms can be debilitating, leading some patients to interrupt or cease treatment prematurely, which can adversely affect the overall success of therapy. The long-term complications of late toxicity further complicate patient management, as they require ongoing care and can significantly diminish a patient's quality of life [5].

The studies further revealed the challenges facing cancer care to include the following: poor health system, lack of human resource, lack of screening centers, cost of drug. Cancer cases are in a pandemic level in Nigeria evidenced by uncountable number people who died of it daily. Nigeria health system is ill equipped to withstand the situation coupled with her current dilapidated economic state [5].

According to Ngoma, cancer remains a low priority for low and middle income countries health spending and donor nations and agencies. Only about 5% of global resources devoted to cancer are [5]. Spent in developing countries and cancer control is conspicuously absent from the internationally agreed millennium development goals [5].

In Nigeria, cancer is often being perceived as end to one's life simply because of series of reasons including poorly equipped hospitals, lack of knowledge on the part of the people, lack of trained oncology human resource, lack of drugs and high cost of treatment, limited screening centers, government's poor attitude towards policy formulation and implementation [5].

In studies with available data, nearly half of patients who initiated chemotherapy did not complete the recommended number of doses or received treatments at irregular intervals. The utilization of radiotherapy was five times higher when patients received treatment in centers with radiation facilities. Overall survival estimates were 80% at one year, 43% at two years, and 32% at five years. Patients with early-stage (AJCC I/II) disease survived longer, with a 5-year survival difference of 32% compared to patients with late-stage (AJCC III/IV) disease. Patients receiving multimodality therapy also had longer survival. The three-year survival for patients who received chemotherapy, surgery, and radiotherapy was 68%, whereas it was 43% for patients who received chemotherapy and surgery only [3].

Factors such as low awareness and utilization of Pap smears, inadequate HPV vaccination, financial constraints, insufficient radiotherapy infrastructure, and the psychological burden of cancer treatment are mainly implicated. Limited screening and vaccination efforts exacerbate the high incidence of cervical cancer in Nigeria. Financial barriers are a primary obstacle, with many patients unable to afford the high cost of radiotherapy. Nigeria's radiotherapy infrastructure is severely lacking leading to significant treatment delays and cancellations. Geographical barriers further complicate access, as many patients must travel long distances to reach treatment centers. Psychosocial issues, including anxiety and depression, significantly impact treatment adherence and completion. These psychological factors, coupled with the physical side effects of radiotherapy, contribute to high rates of treatment interruption. To address these challenges, the review suggests enhancing cervical cancer prevention through increased human papillomavirus (HPV) vaccination and screening, expanding radiotherapy capacity by increasing the number of treatment centers, and providing comprehensive support systems to address financial and psychosocial barriers. By implementing these strategies, it is possible to improve treatment adherence and outcomes for cervical cancer patients in Nigeria [5].

The overall response rate in a study done in Ebonyi state university to assess the incidence of cancer and challenges to its treatment in Nigeria was 94.1% (433), with 42.3% of patients adhering to chemotherapy. Moreover,having a family history of cancer , being female having no history of comorbidity and having side effects from chemotherapy and having social support were identified as the most important predictors of chemotherapy adherence[6].

WHO adopts the following definitions of adherence from Haynes and Rand: "the degree to which a person's behavior matches agreed-upon recommendations from a health-care provider about instructions regarding medication intake, medical device use, diet, exercise, lifestyle changes, rest, and attendance at scheduled appointments [6].

Although cancer has numerous treatment options, chemotherapy is by far the most widely used. Chemotherapy adherence entails a collaborative effort and silent comprehension between care providers and patients about the level of compliance in day-to-day treatment in such things as dose, frequency, duration of therapy, and cessation. Adherence to cancer treatment is critical for achieving optimal health outcomes such as a cure or an improvement in quality of life. Despite the availability of cancer treatment options, patients are vulnerable to adverse drug reactions for a variety of reasons, including poor drug adherence and clinical conditions. As a result, poor

chemotherapy adherence leads to drug resistance, recurrence, and poor quality of life in patients, negatively impacting the nation's health costs and ultimately resulting in mortality. Chemotherapy adherence is strongly related to patient related factors, therapy-related factors, condition-related factors, healthcare system factors, and socioeconomic factors [6].

In a study done in Ethiopia on the adherence to Chemotherapy and associated factors among patients with cancer in Amhara Region, Northeastern Ethiopia in 2022.The main implicator on non-compliance were deranged blood test , chemotherapy symptoms, related financial constraints disease progression and transportation related [7].

In most cases, breast cancer care discontinuation is associated with late presentation and advanced stage of disease. Therefore a system of communityfollow-up care and public awareness about breast cancer symptoms is recommended to reduce late presentation and discontinuity of care [8].

Moreso, it has been noticed that the major constraint in the management of breast cancer in Nigeria is the limitation of resources because patients bear the burden of paying for cancer treatment. Having a population of over 180 million and a Gross Domestic Product of about 2000US dollar per capital annually, Nigeria currently ranks among the poorest nations in the world [8].

Insurance scheme is still in its formative stage; thus payment for cancer treatment is mostly out of pocket. Thus a significant proportion of patients do not present for treatment, may not complete the prescribed courses of treatment, and do not attend posttherapy surveillance, the follow-up care required to maintain better health status, assess effectiveness of therapy, and detect and treat early recurrence of the disease[8].

Loss to follow-up is a major challenge in the successful management of breast cancer patients in Nigeria and Sub Saharan Africa; true outcomes of patients lost to follow up thus become difficult to assess. In Nigeria, as indeed in many developing countries, a combination of poor education, poverty, and a high percentage of nonorthodox healing practices among the populace contribute to late presentation of breast cancer in many hospitals with consequent high occurrence of metastatic disease and poor disease survival [6]. This is worsened by the commonly encountered non adherence to treatment schedule among the patients. The burden of caring for these large numbers of patients in a low resource country is challenging [8].

There are five functional radiotherapy centers in Nigeria today with a population of over 150million. This gives a ratio of one radiotherapy centers to about 30million persons, a far cry from the WHO recommendation of 1: 250,000 persons [7].Thus patients will have to travel long distances for radiotherapy. Longer distances imply more financial burden on the patient's caregivers; the family members who have to take more time off from work suffer loss of pay and incur the costs of feeding, travelling, and accommodation at the referral hospital. Such expenditure can be sufficiently enormous to discourage the patient from adherence to routine follow-up care. The benefits of follow-up in breast cancer patients include early detection of potentially curable events, management of therapy related side effects, psychosocial care, support and counselling, encouragement and support for physical exercise, and weight reduction during follow-up in order to improve quality of life and physical performance, reevaluation of current adjuvant therapy, and monitoring of compliance with endocrine therapies. However, these benefits are missed by patients discontinuing follow-up [8].

Cancer survivors are individuals between diagnosis and the remaining part of their lives. Sulik posits that the term "survivor" gives an optimistic perspective to dealing with cancer and is believed to help cancer patients feel better about their well-being. Relatedly, cancer survivorship includes efforts to understand the health needs of individuals with a history of a cancer diagnosis. Though the concept of survivorship moves the disease from a death sentence to possible wellness, it does not impact cancer's effect on people. The concept of cancer survivorship identifies with Sustainable Development Goal 3 as agreed by members of the United Nations (UN), which accepts and acknowledges the place of good health and well being. The WHO report on NCDs in 2021 reveals that despite the slow pace, member states of the UN have agreed to make efforts to prevent and control cancer [9].

It is essential to target this group of patients and understand the sociodemography and identify disease related, patient related, institutional and policy related barriers to cancer treatment and post-therapy follow-up in order to provide strategic interventions to prevent loss to follow-up and a better patient outcome.

Aim: To aggregate data on treatment (surgery, chemotherapy, radiotherapy, hormonal and targeted therapy) and outcomes of treatment of cancer in DUFUTH/DUFUHS Institute of cancer research and identify factors that impede the success of treatment outcome as these will enable Oncology health care providers to plan accurately for the treatment regimen and to improve the quality of health services provided.

Objectives

1. To access the sociademography of treated cancer patients in DUFUTH
2. To ascertain the patient-related factors, therapy-related factors and health-care-system factors that influence the non-adherence to the treatment of cancer among cancer patients in DUFUTH.

METHODOLOGY

Study Setting

This retrospective study was carried out amongst patients pathologically confirmed and Oncologically treated cancer cases in Cancer Research Institute, DUFUTH, Uburu, Ebonyi state, South East Nigeria, between January 2023 to June 2025. David Umahi Federal University Teaching Hospital is a 500 bedded tertiary referral hospital in southeast Nigeria, Ebonyi state with a well equipped radiology and radio-oncology department. Equipment present includes a linear accelerator, Brachytherapy machine which are used for the various cancer treatment that meet the criteria. Other than that, chemotherapy, surgery, immunotherapy and combine treatment are forms of modalities of cancer treatment in DUFUTH. For diagnostic and simulative purposes, the radio diagnostic department has a 1.5 tesla MRI, a 64 slides CT scan, a digital and mobile x-ray machine, a mammogram and several 4ds ultra sound scanners.

Study Design/ Description of Material and Data Collection

All cancer cases treated at DUFUTH cancer center were collated and analyzed and their level of compliance with medications and treatment outcome was assessed and analyzed.

Records used included data from patients' files, registers, summary sheets, doctors' medical and referral notes, physical interviews of patients, caregivers, treatment sponsors, nurses and doctors and all cadres of professionals directly involved in the treatment of cancer patients in DUFUTH directly.

Data analysis

Collected data were analyzed using SPSS version 20, IBM Corp Armonk, NY. All continuous variables was summarized using medians with interquartile ranges, while categorical data were record as proportions with percentages. Pearson's Chi-square test was used to examine the associations between independent variables and the timing of diagnosis among cancer patients. Modified Pearson regression with robust variances was used at bi-variable and multi variable analysis to identify factors associated with the timing of diagnosis among cancer patients. Prevalence ratios (PRs) were estimated the strength of association between the outcome and indicator variables, and associations were estimated at a 95% confidence interval (CI).

Inclusion Criteria

All diagnosed and treated cancer cases were considered for this analysis

Exclusion Criteria

All cases with missing record of treatment and diagnosis were excluded

Ethical Clearance

Clearance was obtained in Research and ethics department of David Umahi Federal University Teaching hospital bothering on patient's confidentiality and protection of data. HREC/20/09/25/002.

RESULT

General Result

DUFUTH received and treated 343 patients with neoplastic diseases between January 2023 to June 2025, out of which, 253 (74%) were malignant cases while 92 (26%) were benign growth amenable to surgery only. Overall, 193 (56.3%) were males while 150(43.7%) were females. Prostate cancer was the major presenting malignant condition among all the patients followed by breast cancer and cervical cancers. Among all the modalities of treatment, most of the cancer patients received radiotherapy.

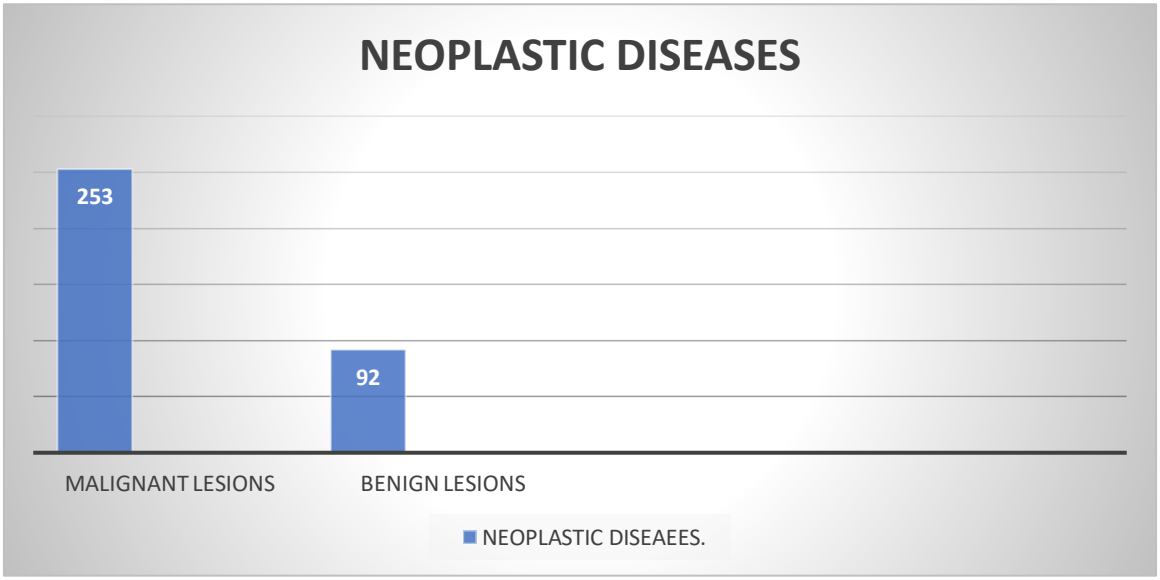

Fig. 1 frequency of malignant and benign lesions

TREATMENT OUTCOME

Overall, 46.5% of patients became stable and got clearance of cancer without recurrence within the two years of treatment and were religious with their clinic follow up and visit post treatment. While 50.9%(129) patients absconded and never came back after receiving a single or some doses of the treatment regimen thereby having incomplete treatment. Some of the patients requested discharged against medical advice(DAMA). 1.2% (3) of patient had mortality while 1.2%(3) were referred or transferred to another facility for treatment. **See table 1**

Table 1: showing the treatment outcome of cancer patients

Treatment outcome	**Number**	**Percentages**
Stable/discharged/cured	118	46.5
Incomplete/Absconded/DAMA	129	50.9
Dead	3	1.2
Transfer/Referral	3	1.2
TOTAL	253	100

Treatment Modalities with Treatment Outcome.

Greater percentage of cancer patients in DUFUTH received radiotherapy at a rate of 41.5% as a means of treatment. This was followed by palliative care at a rate of 20.4%.Chemotherapy combined with surgery was 11.9% while chemotherapy only stood at 10.3%. Surgery alone stood at the least rate of 1.5% while surgery combined with radiotherapy stood at 6.0% and chemotherapy with radiotherapy was 8.3%. On treatment compliance 57.1% of the subjects that received radiotherapy only completed their treatment while 41.8% absconded or discharged against medical advice. On chemotherapy alone, 26.9% had complete treatment while 61.5% had incomplete treatment and 11.5% had inter-facility/hospital transfer. Surgery had 100% compliance with medication while chemotherapy combined with radiotherapy had 33.3% treatment compliance and 66.7% non-compliance. Chemotherapy combined with surgery had 60% compliance and 40% non-compliant. Palliative care had 38.5% treatment compliant and 55.5% non compliant and 5.7% mortality. Radiotherapy combined with surgery had 13.5% complete treatment and 86.5% incomplete treatment. **See table 2 for the distribution.**

Table 2. Showing Distribution of Cancer Treatment Modalities in Dufuth.

TREATMENT	NUMBER	STABLE	INCOMPLETE TTREATMENT	DEAD/TRANSFER
Chemotherapy only	26(10.3%)	7(26.9%)	27(61.5%)	3(11.5%)
Radiotherapy only	105(41.5%)	60(57.1%)	45(41.8%)	-
Surgery only	4(1.5%)	4(100%)	-	-
Chemotherapy+Radiotherapy	21(8.3%)	7(33.3%0	14(66.7%)	-
Chemotherapy + surgery	30(11.9%)	18(60%)	12(40%)	-
Radiotherapy + surgery	15(6.0%)	2(13.3%)	13(86.7%)	-
Palliative care	52(20.4%)	20(38.5%)	29(55.58%	3 (5.7%)
TOTAL	**253**	**118**	**129**	**6**

Sex Distribution with Treatment Outcome

Among the males, 46.9% had complete treatment and were subsequently discharged with clinic follow up, while, 51% had incomplete treatment, 0.7% was transferred and 1.4% died. In the female counterpart, 46.3% had complete treatment and stable outcome while 50.9% had incomplete treatment.1.8% transferred and 0.9% died in the course of treatment**.**Among all the patient non received professional psychological support in the course of treatment.**See table 4.**

Table 3, showing sex distribution with treatment outcome

sex	Stable/discharged/cured	Incomplete/abonded/Dama	Transfer	Dead	Total	Psychological support
male	68(46.9%)	74(51.0%)	1(0.7%)	2(1.4%)	145(57%)	none
Female	50(46.3%)	55(50.9%)	2(1.8%)	1(0.9%)	108(43%)	none
total	118	129	3	3	253	None.

Comparison of Social Status with Treatment Outcome.

Among all the occupations of the cancer patients, farmers had 13.9% complete treatment while 83.3% incomplete treatment and 2.8% mortality in the course of treatment. Petty traders stood at 36% of stable treatment outcome while 64% had incomplete treatment. Teachers/lecturers/public servants/police had 75% compliance to treatment and21.9% non-compliance and 3.1% referrals. Retiree had 29.5% stable outcome and 65.9% incomplete treatment and 4.5% mortality. Clergy men had 61.1% stable treatment outcome and 38.9% incomplete treatment outcome while medical practitioners had, 72.7% stable treatment outcome and 27.3% incomplete treatment outcome respectively. Engineers had 87.5% stable and 12.5% incomplete treatment. Students had 80% stable outcome and 20% incomplete treatment and traditional rulers had 60% stable outcome and 40% transfers/referrals

Table 4, showing social status of the patients with treatment outcome

OCCUPATION	**NUMBER**	**STABLE**	**INCOMPLETE TREATENT**	**DEAD**	**REFFERED**
Farmers	**36(14.2%)**	**5(13.9%)**	**30(83.3%)**	**1(2.8%)**	
Petty trader	**75(29.6%)**	**27(36%)**	**48(64%)**	**-**	**-**
Teacher/lecturer/pub.servant/police	**32(12.6%)**	**24(75%**	**7(21.9%)**	**-**	**1(3.1%)**
Retiree	**44(17.4%)**	**13(29.5%)**	**29(65.9%)**	**2(4.5%)**	**-**
Clergy	**18(7.11%)**	**11(61.1%)**	**7(38.9%)**	**-**	**-**
Medical Practitioners	**11(4.3%)**	**8(72.7%)**	**3(27.3%)**	**-**	**-**
Engineering/ construction engineers.	**16(6.3%)**	**14(87.5%)**	**2(12.5%)**	**-**	**-**
Student	**15(5.9%)**	**12(80%)**	**3(20%)**	**-**	**-**
Traditional Rulers	**6(2.4%)**	**4(60%)**	**none**		**2(40%)**
TOTAL	**253**	**118**	**129**	**3**	**3**

State of Origin and Treatment Outcome.

Predominantly, cancer patients were from Enugu and Imo state with least percentage from Abuja and Rivers. Among the patients from Ebonyi, 57.4% had incomplete treatment while 38.3% had compete treatment with stable outcome, 4.3% died in the course of treatment. Enugu had 36.1% non compliant to treatment while 57.8% were compliant and 1.2% mortality. Anambra had 57.9% incomplete treatment while 42.1% had complete treatment. Abia patients had 43.5% non compliant and 56.5% stable outcome. Imo patients had 53% incomplete treatment and 43.9% stable treatment and 3.0% transfer/referrals. Abuja patients had 100% incomplete treatment as all the patients either absconded or failed to complete their treatment or discharged against medical advice. Rivers patient had 33.3% stable treatment outcome and 33.3 % incomplete treatment and 33.3% mortality. Edo patients had 100% incomplete treatment and Cross Rivers had 100% incomplete treatment. Akwa Ibom patient had 100% incomplete treatments and patients without records of location had 100% incomplete treatment.

Table 5, showing Patient state of residence and treatment outcome.

State of residence	Number	INCOMPLETE/ABSCONDED/DAMA	STABLE	DEAD/TRANSFER
Ebonyi	47(18.5%)	27(57.4%)	18(38.3%)	2(4.3)

Enugu	83(32.8%)	30(36.1%)	48(57.8%)	1(1.2%)
Anambra	19(7.5%)	11(57.9%)	8(42.1%)	
Abia	23(9.1%)	10(43.5%)	13(56.5%)	
Imo	66(26.1%)	35(53.0%)	29(43.9%)	2(3.0%)
Abuja	3(1.3%)	3(100%)	0	
Rivers	3(1.2%)	1(33.3%)	1(33.3%)	1(33.3%)
No record	6	6(100)	0	
EDO	1	1(100%)	0	
CROSSRIVERS	1	1(100%)	0	
AKWA-IBOM	1	1(100%)	0	
TOTAL	**253**	**129**	**118**	**6**

Number of Days on Admission

About 43 patients spent between 15-30 days on admission receiving treatment, and out of which, 46.5% had complete treatment while 46.5% were not treatment compliant with 7.0% referrals. This was Closely followed by 37 patients spending 31-60 days on admission and out of which, 81.1% completed their treatment while 18.9% absconded from treatment. 0-14 days on admission had 12.6%(32) number of patients out of which 31.2% were treatment compliant while 59.4% were non-compliant with treatment. Greater than 60 days on admission had 18 patients out of which 88.9% were treatment compliant while 11.1% had incomplete treatment. Patient without admission amounted to 17.4%(44) in number and out of which, 9.1% completed their treatment while 90.9% were not treatment compliant. A greater number of patients up to 31.2%(79) did not have documented number of days on admission and these group of patients had 38% treatment compliant and 62% non-compliant. **See table 6 for the analysis**

Table 6: showing the number of days cancer patient spent on admission

Number of days on admission	number	COMPLIANT	NON-COMPLIANT	DEAD	REFERRED
0-14	32(12.6%)	10(31.2%)	19(59.4%)	3(9.4%)	-
15-30	43(17.0%)	20(46.5%)	20(46.5%)	-	3(7.0%)
31-60	37(14.6%)	30(81.1%)	7(18.9%)	-	-
>60	18(7.1%)	16(88.9%)	2(11.1%)	-	-
None	44(17.4%)	9((9.1%)	35(90.9%)	-	-
Not stated	79(31.2%)	30(38%)	49(62%)	-	-
TOTAL	**253**	**118**	**129**	**3**	**3**

Cancer Treatment Outcome.

Cervical cancer cases had 27.8% stable outcome treatment while 72.2% had incomplete treatment. Among patients with breast cancer, 70% had incomplete treatment while 30% had stable outcome. Patients treated for renal cancers had 50% stable treatment outcome and 50% incomplete treatment outcome. 60% of endometrial cancer patients had incomplete treatment and 40% stable treatment. Oesophageal cancer had 50% incomplete treatment and 50% complete treatment. Prostate cancer had 61.3% had incomplete treatment and 30.6% stable treatment and 3.2 % mortality and 4.8% referred.Urothelia carcinoma had 50% stable outcome and 50% incomplete treatment. Gastric cancer had 100% stable outcome. Colorectal cancer had 61.1 % stable outcome and 33.3% incomplete outcome. Lung cancer had 50% incomplete treatment and 50% stable outcome. Ovarian cancer had100% stable outcome. Melanoma had 100% treatment outcome.

Table 7 Showing Cancer Treatment Outcome.

CANCER TYPEE	NUMBER(PERCENTAGE)	INCOMPLETE/ABSCONDED/DAMA	STABLE/DISCHARGED/CURED
CERVICAL CA	36(14.0) %	26(72.2%)	10(27.8%)
BREAST CA	41(16.0) %	25(70%)	14(30%)
RENAL CA	10(4%)	5(50%)	5(50%)
ENDOMETHRIA CA	5(2%)	3(60%)	2(40%)
OESOPHAGEAL CA	10(4%)	5(50%)	5(50%)
PROSTATIC CA	62(24.5%)	38(61.3%)	19(30.6), 2 (3.2%) dead, , 3 (4.8%) referred.
UROTHELIA CARCINOMAS	10(4.3%)	5(50%)	5(50%)
GASTRIC CANCERS	3(1.2%)	0	33(100%)
Colorectal CA	18	6(33.3%)	11(61.1%)
LUNG CANCERS	2(0.8%)	1(50%)	1(50%)
OVARIAN	3(1.2%)	0	3(100%)
VAGINA CANCERS	1(0.4)	0	1(100%)
MELANOMA	4	0	4(100%)
LYMPHOMAS	3(1.2%)	1(33.3%)	2(66.7%)
BASAL CEL CARCINOMA	3(1.2)	0	3(100%)
MALIGNANT HEMANGIOPERICYTOMA	3(1.2%)	0	3(100%)

NASOPHARYNGEAL CANCER	8	3(37.5%	5(62.5%)
OLFATORY NEUROBLASTOMA	3(1.2%)	1(33.3%)	2(66.7%)
MPNST	3(1.2%)	0	3(100%)
PITUITARY CARCINOMA	3(1.2%)	1(33.3%)	2(66.7%)
SQUAMOUS CELL CARCINOMA	15	44(26.7%)	11(73.3%)
PAROTID GLANDS TUMOUR	3	0	3(100%)
SARCOMAS	3	1(33.3%)	2(66.7%)
CHOROID MENINGIOMA	1	0	0 (1, 100% died).
TOTAL	253	129	118

Table:8 Logistics Regression of Factors with Statistical Relationship to Non-Adherence of Participants To Cancer Treatment

Variables	**B (regression coefficient)**	**p value**	**Odds ratio**	**95% C.I. for Odds ratio**	
				Lower	**Upper**
Occupation		0.997			
Academic/Education Professional	-1.25	1	0.286	0.000	0.000
Agriculture (Farmer)	-119.23	0.010	1.0670	0.900	1.204
Petty traders	-19.085	0.024	0.990	0.871	1.023
Civil/Public Servant	-0.62	1	0.538	0.000	0.000
Health Worker (Support)	-0.525	1	0.592	0.000	0.000
Media/Communication	-1.703	1	0.182	0.000	0.000
Paramilitary/Uniformed Service	-2.582	1	0.76	0.000	0.000
Professional (Engineering)	-19.808	0.999	0.000	0.000	0.000
Professional (Finance)	-20.57	0.999	0.000	0.000	0.000
Professional (Health)	-19.935	0.999	0.000	0.000	0.000
Religious Leader	-21.94	0.999	0.000	0.000	0.000

Retiree	-55.16	0.999	0.000	0.000	0.000
No records		1			
State of Residence	-16.077	0.999	0.000	0.000	0.000
Abia	-16.616	0.999	0.000	0.000	0.000
Abuja	-14.962	0.999	0.000	0.000	0.000
Akwa-Ibom	-3.504	1	0.03	0.000	0.000
Anambra	1.999	1	7.381	0.000	0.000
Benue	-16.65	0.999	0.000	0.000	0.000
Cross River	-38.1	0.999	0.000	0.000	0.000
Delta	-16.743	0.999	0.000	0.000	0.000
Ebonyi	-14.855	0.041	0.997	0.789	1.980
Enugu	-14.452	1	0.000	0.000	0.000
Imo		0.034			
Rivers	-1.25	1	0.286	0.000	0.000
No records		1			
Treatment reception					
Yes	-19.4	0.998	0.000	0.000	0.000
No		1			
Chemotherapy					
Yes	-17.824	0.998	0.000	0.000	0.000
No		1			
Radiotherapy					
Yes	-18.135	0.023	1.127	0.987	1.461
No		1			
Surgery					
Yes	72.348	0.998	2.63E+31	0.000	0.000
No Palliative care	-19234	0.0121	0998	0.832	1.222

Yes No					
Length of stay (Days)	0.063	0.057	1.000065	0.000.998	1.137

*Reference category, R^2 (coefficient of determination) = 47.8% to 73.3%

The model explained between 47.8% and 73.3% of the variance (R^2) in non-adherence. Across the occupational categories, none of the groups showed statistically significant associations with non-adherence (all p-values ≥ 0.999). Large negative regression coefficients were observed in several occupations (e.g., retirees, religious leaders, and professionals), all with odds ratios of 0.000, reflecting instability in the estimates due to sparse data.

For state of residence, no significant associations were observed with non-adherence. Although Imo State served as the reference group, coefficients for other states ranged widely, but their odds ratios mostly converged to 0.000, again suggesting unstable model estimation from small cell sizes.

In relation to treatment modalities, reception of chemotherapy, radiotherapy, and general treatment did not show significant independent associations with non-adherence, as all yielded p-values ≥ 0.998 and odds ratios of 0.000. Interestingly, surgery had a very large positive regression coefficient (B = 72.348), with a corresponding extremely high odds ratio (2.63E+31), but this was not statistically significant (p = 0.998), further indicating the influence of very small sample representation in that category.

Regarding length of hospital stay, the regression coefficient was positive (B = 0.063) with a borderline p-value (0.057). The odds ratio (approximately 1.065) and 95% confidence interval (0.998–1.137) suggest that longer hospital stay may slightly increase the likelihood of adherence, but this association did not reach conventional statistical significance.

In summary, the regression model did not identify any statistically significant independent predictors of non-adherence. The wide confidence intervals and extreme odds ratio estimates in several categories highlight limitations due to sparse data distribution across subgroups.

DISCUSSION

Oncology Health Care Providers generally assume that patients with cancer will adhere to treatment because of the seriousness of a cancer diagnosis [9], however, many instances have proven otherwise and very negative reports have been generated over compliance to cancer treatment globally. Reasons for non-adherence are not far fetched in most cases. Many oncology patients in DUFUTH have been characterized predominantly by poverty, lack of support for treatment, poor motivation and absence of psychological support during treatment process. This is not a surprise as it has been widely documented that less than 10% of Nigerians are enrolled in the National Health Insurance Scheme which provides limited coverage of healthcare services [9][10][11]. Consequently, most Nigerian patients experience financial hardship due to high out-of-pocket expenditures related to cancer care. In response to the growing cancer burden, health boards in Nigeria have invested in facilities for curative treatment for common cancers [6]. However, to realize the benefits of these investments, it will be necessary to reduce the delay between first symptoms and treatment [10]. Similar studies done in Kwara showed that financial constraint 61(61.0%) was the major patient related factor that influenced non-adherence to chemotherapy. This was followed by medication side effects (hair loss, loss of weight) 62.0% and duration of treatment 50.0% was he major therapy related factors while unfavorable hour of clinic visit 40.0% was the major health care related factor that influences non-adherence to chemotherapy [3]. Some previous researchers have identified delayed presentation, late-stage diagnosis, and inadequate treatment as challenges linked to poor breast cancer outcomes in Nigeria and In Sub Sahara Africa. Many reports have focused on patient-related and health system challenges from symptom development through diagnosis. In contrast, treatment, which is also a critical determinant of breast cancer outcomes, has been under-reported [5][4].

According to Ngoma, cancer remains a low priority for low and middle income countries health spending, donor nations and agencies. Only about 5% of global resources devoted to cancer is [5] spent in developing countries and cancer control is conspicuously absent from the internationally agreed millennium development goals [5]. Additionally, it has been noticed that the major constraint in the management of breast cancer in Nigeria is the limitation of resources because patients bear the burden of paying for cancer treatment. Having a population of over 180 million and a Gross Domestic Product of about 2000US Dollar per capita annually. Nigeria currently ranks among the poorest nations in the world [8]. Insurance Scheme is still in its formative stage; thus payment for cancer treatment is mostly out-of-pocket. Thus a significant proportion of patients do not present for treatment, may not complete the prescribed courses of treatment, and do not attend post therapy surveillance, the follow-up care required to maintain better health status, access effectiveness of therapy, and detect and treat early recurrence of the disease [8]

Moreso, the psychological burden of cancer is profound. Beyond the immediate impact of the disease, the treatment process itself can be mentally and emotionally taxing. The anticipation of radiotherapy, the experience, and the side effects all contribute to heightened stress levels. Patients often grapple with fears about treatment efficacy, potential side effects, and the overall prognosis. This psychological stress can manifest in various ways, including sleep disturbances, appetite changes, and mood swings [5].

Research by Cohen et al identified underlying psychological factors as major barriers to the timely completion of radiation therapy in cervical cancer patients [10]. Additionally, Zaki et al found that in 59% of cervical cancer patients who experienced prolonged treatment durations, the primary causes were social issues and non-adherence to treatment protocols [8]. Despite these findings, there is a notable lack of local studies in the Nigerian context that specifically examine the correlation between psychosocial issues and the extended duration of radiation therapy in cancer patients [4]. Therefore, it is pertinent that cancer patients on treatment are provided with psychological support by regular visit by the psychologist, this will in no small way contribute to their compliance rate with treatment. Radiotherapy can exacerbate these psychological issues. It is associated with long-term physical side effects, such as pain and reduced physical functioning, as well as emotional distress, including anxiety and depression [4]. These psychological factors can significantly influence the treatment trajectory for cancer patients, affecting both their quality of life and their ability to adhere to treatment protocols. Various studies have highlighted that anxiety and depression are prevalent and significant issues that impact the overall well-being of cancer patients. These conditions diminish the quality of life, reduce treatment compliance, and extend hospitalization periods [5].

Non compliance with cancer treatment in DUFUTH is common among males, mostly with patients with prostatic and cervical cancers, increase in days on admission greater than 30days , common among Ebonyians and patients from Imo state and radiotherapy treatment among other forms of treatment. Radiation toxicities and treatments side effects and comorbidity as well as ignorance are common factors against medication compliance.

Radiation toxicity's impact on treatment completion is a critical concern. Acute symptoms can be debilitating, leading some patients to interrupt or cease treatment prematurely, which can adversely affect the overall success of therapy. The long-term complications of late toxicity further complicate patient management, as they require ongoing care and can significantly diminish a patient's quality of life [5]. In studies with available data, nearly half of patients who initiated chemotherapy did not complete the recommended number of doses or received treatments at irregular intervals. The utilization of radiotherapy was five times higher when patients received treatment in centers with radiation facilities. In a study done in Nsukka Nigeria, patients adherence to surgery and chemotherapy was as low as 44% and 56.1% respectively, and this was greatly influenced by treatment delay, missed chemotherapy dose without medical indication, patient's motivation, and knowledge towards their disease and treatment respectively [2].

Loss to follow-up is a major challenge in the successful management of breast cancer patients in Nigeria and Sub Saharan Africa; true outcomes of patients lost to follow up thus become difficult to assess. In Nigeria, as indeed in many developing countries, a combination of poor education, poverty, and a high percentage of non orthodox healing practices among the populace contribute to late presentation of breast cancer in many hospitals with consequent high occurrence of metastatic disease and poor disease survival [6]. This is worsened by the

commonly encountered non adherence to treatment schedule among the patients. The burden of caring for these large numbers of patients in a low resource country is challenging [8].

CONCLUSION

This research has highlighted several factors that contribute to non-adherence , treatment delays and incomplete radiation therapy among cancer patients in Nigeria. Financial constraints are the primary challenge for most patients, making it difficult for them to access and complete treatment. Additionally, the insufficient number of radiotherapy machines, leading to long wait times, poses a significant barrier. Other issues, such as radiation toxicity, psychosocial problems, and geographical challenges related to the distance from treatment centers, further complicate treatment completion.

RECOMMENDATION

Expanding radiotherapy capacity by increasing the number of machines and treatment centers is crucial to ensure timely access for all patients. Furthermore, improving support systems by offering financial assistance, psychological support, and patient education can help enhance adherence to treatment protocols. Local studies are necessary to further explore the specific impacts of these factors on treatment completion in Nigeria, allowing healthcare providers to develop targeted interventions that improve outcomes for cancer patients and increase radiotherapy completion rates. More importantly, we advocate for complete coverage of cancer treatment by National health insurance agency to enable improve compliance

The place of psychology support for cancer patients can never be overemphasized, we advocate for increase psychology services by the university and the teaching hospital for cancer patients in DUFUTH to enable early identification of depressions and other related difficulty in treatment compliance for cancer patients

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