Eagle International Journal of Research, Innovation and Health Sciences

An International Peer Reviewed, Open-Access and Multidisciplinary Journal
Volume 1 | Issue 2 | June 2026 |ISSN:3141-4907
Website: https://eijrihs.com

FINANCIAL TOXICITY OF CANCER TREATMENT: EVALUATING THE DIRECT AND INDIRECT ECONOMIC BURDEN AMONG PATIENTS RECEIVING CHEMOTHERAPY AND RADIOTHERAPY AT NATIONAL HOSPITAL ABUJA, NIGERIA.

Anthony Idoko **Onoja**[1], Khadijat Bolanle **Abubakar**[2], Christiana O. **Abah**[3], Mary Ene **Adaje**[4], Sola J. **Abubakar**[5]

1. Department of Accounting, Benue State University, Makurdi
2. Department of Nursing, School of Post-Basic Oncology Nursing, National Hospital Abuja
3. Department of Nursing, Federal University of Health Sciences Teaching Hospital Otukpo (FUSHTHO), Benue State
4. Department of Nursing, Federal Medical Center, Makurdi
5. Department of Obstetrics and Gynecology, National Hospital Abuja

* [3]Corresponding email: christykidac143@gmail.com

Abstract:

Background: According to the International Agency for Research on Cancer and World Health Organization, an estimated 127,763 new cancer cases occur annually in Nigeria. However, the National Health Insurance Scheme (NHIS) provides negligible coverage for oncological treatment. This forces patients into financially toxic out-of-pocket expenditure. The financial toxicity of cancer treatment has emerged both as a critical patient safety and equity concerns globally, yet empirical evidence from Nigerian tertiary health institutions remains sparse.

Objective: This study evaluates financial toxicity by estimating direct medical and non-medical costs, identifying patient coping strategies and determining socio-demographic and clinical determinants of economic burden among patients receiving chemotherapy and/or radiotherapy at the National Hospital Abuja.

Methods: A descriptive cross-sectional survey was conducted with 94 cancer patients using a structured, self-administered questionnaire. The data obtained were analyzed using descriptive statistics and presented in frequency tables and bar charts.

Results: It is found that direct medical costs constituted 84% of total treatment expenditure, with a mean out-of-pocket cost of ₦550,000 ($367.90) per patient, and no meaningful insurance mitigation. The dominant coping strategies reported by patients were depleting personal savings (90.4%), borrowing from family (84.0%), and accessing formal loans (76.6%), while socioeconomic status and absence of insurance were found to be the primary determinants of financial burden, high cost of imported drugs and equipment was perceived as the single largest structural cost driver (35.1%).

Conclusion: Financial toxicity is pervasive and structurally driven in Nigeria. Urgent reform of the NHIS to include comprehensive oncology coverage, establishment of government-funded cancer assistance programmes and integration of financial navigation into nursing care pathways are critically needed to achieve equitable cancer care access.

Keywords: financial toxicity, cancer treatment, chemotherapy, radiotherapy, out-of-pocket expenditure, economic burden, Nigeria

1. INTRODUCTION

Cancer imposes catastrophic economic consequences on patients in low and middle-income countries (LMICs) like Nigeria where health financing infrastructures remain inadequate. The World Health Organization (WHO) estimates the aggregate global economic impact of cancer at more than $1.16 trillion annually, a burden that falls disproportionately on individuals in countries with underdeveloped social health protection systems (WHO, 2022). The Organization for Economic Co-operation and Development (OECD) further estimates that cancer costs EUR PPP 449 billion annually to OECD member health systems, increasing health expenditure by approximately 6% (OECD, 2024). In the United States, the projected national expenditure on cancer care reached $208.9 billion in 2020, with chemotherapy and radiotherapy alone constituting over 40% of total treatment costs (Mariotto et al., 2020).

The term financial toxicity was introduced into oncology discourse to describe both the measurable financial harm and the psychological distress precipitated by cancer treatment costs (Zafar et al., 2025). Unlike clinical toxicities, financial toxicity has no antidote in a pill but requires systemic intervention. Research from high-income settings consistently demonstrates that financial toxicity is associated with treatment non-adherence, delayed care-seeking, diminished quality of life and critically, inferior survival outcomes (Gilligan et al., 2018; De-Moor et al., 2022). Its consequences are amplified manifold in LMICs, where patients typically finance their care entirely through out-of-pocket (OOP) payments, in the absence of effective insurance or state subsidies.

Nigeria presents a particularly urgent and instructive context. With approximately 127,763 new cancer cases and 79,542 cancer-related deaths recorded in 2022, the country bears one of the highest non-communicable disease burdens in sub-Saharan Africa (Global Cancer Observatory Nigeria Fact Sheet, 2022). The five most common cancers namely: breast, cervical, prostate, liver and colorectal require costly combination therapies including chemotherapy and radiotherapy, the two modalities most associated with financial toxicity globally (Siegel et al., 2020). Yet the NHIS, established to provide universal health coverage, currently covers fewer than 5% of Nigerians and explicitly excludes most cancer treatments from its core benefit package (Mustapha et al., 2020). The result is a health financing crisis within a disease burden

crisis where patients are left to self-finance hugely expensive treatments from household incomes that are wholly inadequate to the task.

The National Hospital Abuja (NHA), as Nigeria's apex tertiary referral and oncology centre, represents a critical site for investigating this burden. The NHA's Radiotherapy and Oncology Department offers 3D conformal radiotherapy, intensity-modulated radiotherapy (IMRT), chemotherapy, hormonal therapy, and immunotherapy attracting patients from across Nigeria and West Africa. Despite serving a large and diverse cancer population, no prior study has rigorously quantified the patient-level financial burden of cancer treatment within this institution. This study was designed to address that gap, guided by three complementary health economic theories the Cost-of-Illness (COI) Theory (Rice, 1967), Human Capital Theory (Becker & Schultz, 1964), and Health Utility Theory (Bernoulli, 1738) and structured to generate evidence directly applicable to healthcare policy, nursing practice, and oncology service delivery reform.

2. LITERATURE REVIEW

2.1 Global Evidence on the Economic Burden of Cancer

The economic literature on cancer treatment costs is extensive but geographically skewed toward high-income settings. In the United States, Yabroff et al. (2021) estimated the annualized net out-of-pocket cost of cancer care at approximately $2,200 per patient, with additional annual time costs of $304 associated with care-seeking. Catastrophic health expenditure (CHE) defined as OOP spending exceeding 40% of household consumption after subsistence affects an estimated 42.5% of newly diagnosed cancer patients in the US within two years of diagnosis, even with insurance (Gilligan et al., 2018). In South Korea, despite near-universal National Health Insurance (NHI) coverage of approximately 97% of the population, Kim et al. (2025) demonstrated persistent incremental OOP expenditure of $482.80 per cancer patient per year, with inpatient services constituting the largest component.

Evidence from LMICs reveals a far more severe picture. In Iran, Teli et al. (2025) reported a mean total economic burden of $10,275.07 per breast cancer patient annually, with direct medical costs comprising 70.2% and indirect costs (productivity losses) representing 17.3% of total expenditure. Jabbari et al. (2023), in a multi-hospital Iranian study, found mean monthly direct medical costs of $1,029.40 per patient. In South India, Maurya et al. (2021) reported average OOP expenditure of $523.60 for

male and $299.60 for female cancer patients, with a catastrophic health expenditure prevalence of 61.6%. In Ethiopia, Bona et al. (2021) found mean cancer treatment costs of $209.99 per patient, with patients losing approximately 56% of their average annual income to treatment expenses. In Nigeria specifically, Mustapha et al. (2020) found that 82.7% of patients in a South-West tertiary facility perceived treatment costs as a significant financial burden, with a mean annual treatment cost of $5,306.90, a sum representing near-total annual income for many households. A comparative summary of empirical evidence on cancer treatment costs and insurance coverage is presented in Table 1 below to contextualize the present study's findings within a global landscape.

Table 1 International Comparison of Out-of-Pocket Cancer Treatment Costs and Insurance Coverage

Study / Country	Mean OOP Cost	Direct Medical %	Insurance Coverage	Key Driver
Kim et al. (2025) – South Korea	$482.80/yr	N/R	~97% (NHI)	Inpatient services
Teli et al. (2025) – Iran	$10,275/pt	70.2%	Partial	Chemo & hospitalizations
Jabbari et al. (2023) – Iran	$1,029/mo	91.2%	Partial	Medication cost
Bona et al. (2021) – Ethiopia	$209.99/pt	N/R	Minimal	Transport & medication
Maurya et al. (2021) – South India	$523.6 (M) $299.6 (F)	~65%	Low	CHE prevalence 61.6%
Mustapha et al. (2020) – Nigeria SW	$5,306.9/pt/yr	73.0%	<5% NHIS	Medical costs
Present study (2025) – Nigeria FCT	**₦550,000 (~$367.90)/pt**	**84%**	**<1% effective**	**Imported drugs & equipment**

OOP = out-of-pocket; NHI = National Health Insurance; NHIS = National Health Insurance Scheme; N/R = not reported; CHE = catastrophic health expenditure.

Source: Authors' compilation, (2026)

2.2 The Nigerian Healthcare Financing Context

Nigeria's health financing landscape is characterized by chronic underinvestment and structural inadequacy. Total government health expenditure as a proportion of GDP has persistently remained below the Abuja Declaration target of 15%, hovering around 3.8% in recent years (WHO, 2022). Out-of-pocket health expenditure constitutes approximately 76% of total health spending in Nigeria, one of the highest proportions globally compared to a sub-Saharan African average of approximately 36% (World Bank, 2023). The NHIS, despite operating for over two decades since its establishment in 2005 covers fewer than 5% of the population and is predominantly employer-based in the formal sector. This excludes the majority of Nigeria's informal workforce who constitute an estimated 80% of all employment (Onoka et al., 2019).

For cancer patients specifically, the financing gap is acute. The Basic Minimum Package of Health Services, which governs NHIS reimbursement, does not include chemotherapy, radiotherapy, or targeted cancer therapies. Patients therefore face the full, unmediated cost of these interventions. Compounding this, Nigeria imports approximately 70–80% of its pharmaceutical supplies and virtually all radiotherapy equipment, making cancer treatment costs highly sensitive to exchange rate fluctuations and import tariff regimes. This represents a structural vulnerability that the present study's respondents identified as the primary driver of treatment costs. The financing gap is further widened by the geographic concentration of oncology services: only six functional radiotherapy machines serve the entire country of over 220 million people, compared to a recommended benchmark of one machine per 500,000 populations (IAEA, 2021).

2.3 Theoretical Framework

This study is grounded in three interrelated theoretical frameworks from health economics. The Cost-of-Illness (COI) Theory, developed by Dorothy Rice in 1967, categorizes illness-related costs into direct costs (medical: consultations, medications, diagnostics, hospitalization; and non-medical: transport, accommodation, nutrition), indirect costs (lost productivity, absenteeism, premature mortality), and intangible costs (pain, psychological distress, reduced quality of life). Following Drummond et al., (2015), this framework provides the primary analytical structure for estimating patient-level burden in this study.

Human Capital Theory, formalized by Becker and Schultz (1964) conceptualizes health as an investment in productive capacity. Cancer-related income loss, absenteeism and early retirement represent depletions of human capital with long-run macroeconomic consequences. This framework is particularly salient in the Nigerian setting, where patients in their productive years often lack social protection and where caregiver income loss compounds household financial distress.

Finally, Health Utility Theory (rooted in Daniel Bernoulli, 1738 and operationalized through Quality-Adjusted Life Years (QALYs) and cost-effectiveness analysis) provides another theoretical lens for examining patient trade-offs between financial expenditure and therapeutic benefits. This framework helps to clarify why financially

constrained patients may accept treatment interruptions, substitute cheaper alternatives or abandon care entirely when costs become prohibitive.

3. METHODOLOGY

3.1 Study Design and Setting

A descriptive, cross-sectional survey design was employed. The study was conducted at the Radiotherapy and Oncology Department of the National Hospital Abuja (NHA), Nigeria's foremost apex tertiary and referral hospital. The NHA serves as a regional oncology hub for West Africa, offering 3D conformal radiotherapy, IMRT, brachytherapy, chemotherapy, hormonal therapy and immunotherapy. The department operates Monday through Thursday outpatient oncology clinics and provides 24-hour emergency oncology services, with a complement of seven consultants, nine registrars-in-training, nine radiographers, and twenty-two oncology nurses.

3.2 Population, Sampling, and Participants

The target population comprised 126 cancer patients and caregivers undergoing active chemotherapy or radiotherapy between 2nd and 7th November 2025. The minimum sample size of 96 was computed using the Yamane (1967) formula at a 95% confidence level and 5% margin of error. This was complemented with a convenience sampling technique where all eligible patients attending scheduled clinic appointments were encouraged to participate. The inclusion criteria were: (i) current receipt of chemotherapy or radiotherapy at NHA; (ii) capacity to understand written English and (iii) voluntary informed consent. Patients without a confirmed cancer diagnosis or not currently receiving active treatment were excluded. Of 96 questionnaires distributed, 94 were returned fully completed, yielding a response rate of 97.9%.

3.3 Data Collection Instrument

A structured, self-administered questionnaire was developed by the researchers based on the COI framework and validated through expert panel review for content and face validity. The instrument comprised five sections: Section A (demographics: age, gender, education, employment, household income); Section B (direct medical costs: per-session treatment costs, funding sources, financial-related treatment interruptions); Section C (direct non-medical costs: transport, nutrition, accommodation, caregiver

income loss); Section D (coping strategies) and Section E (determinants of financial burden: insurance status, stage of diagnosis, government policy awareness). Internal consistency was assessed via Cronbach's alpha on a pilot sample of 30 patients, yielding $\alpha = 0.79$, indicating satisfactory reliability. Questionnaires were administered and retrieved on the same day across five sequential working days.

4. DATA ANALYSIS AND RESULTS

Data were analyzed using descriptive statistics (frequencies and percentages) and presented in tables and charts. Cost figures are reported in Nigerian Naira (₦) and converted to US dollars ($) at the 2025 average exchange rate of ₦1,495:$1.

4.1 Socio-demographic Profile of Respondents

Table 2 Socio-demographic Profile of Respondents (N = 94)

Variable / Category	Frequency (n)	Percent (%)
Age Bracket		
18 – 30	9	9.57
31 – 45	19	20.21
46 – 60	25	26.60
Above 60	41	43.62
Gender		
Male	41	43.62
Female	53	56.38
Level		
No formal education	4	4.26
Primary education	11	11.70
Secondary education	20	21.28
Tertiary education	36	38.30
Postgraduate	23	24.46
Employment Status		
Employed (full time)	44	46.81
Self-employed	19	20.21
Unemployed	3	3.19
Retired	24	25.53
Student	4	4.26
Household Monthly Income		
Below N50,000	1	1.06
N50,000 – N100,000	12	12.77

Variable / Category	Frequency (n)	Percent (%)
N100,001 – N200,000	19	20.21
N200,001 – N500,000	30	31.91
Above N500,000	32	34.04

Source: Authors' compilation, (2026)

From Table 2, the majority of respondents (43.6%) were aged above 60 years, consistent with the known epidemiology of cancer as a disease that disproportionately affects older adults. A further 26.6% were between 46 and 60 years, with 20.2% in the 31–45 age bracket and 9.6% aged 18–30 years. Females comprised 56.4% of the sample (n=53) and males 43.6% (n=41), reflecting the higher incidence of hormone-sensitive cancers particularly breast and cervical in the female population. The majority (62.8%) held tertiary or postgraduate qualifications. Employment status revealed that 46.8% were formally employed full-time, 20.2% self-employed, 25.5% retired, 4.3% students, and 3.2% unemployed. Monthly household income exceeded ₦200,000 ($134) for 65.9% of respondents, though this did not insulate patients from financial toxicity given treatment costs routinely exceeding two to four times the monthly median household income.

4.2 Direct Medical Costs of Cancer Treatment

Direct medical costs comprising medication, hospitalization and diagnostic investigation expenses constituted 84% of total reported treatment expenditure. The mean estimated direct medical cost across all three categories was ₦550,000 (~$367.90) per patient. Notably, 3.2% of respondents reported costs exceeding ₦1,000,000 ($669). Table 2 presents the distribution of direct medical costs by category and cost band.

Table 3 Distribution of Direct Medical Costs by Category and Cost Band

Cost Category	Medication n (%)	Hospitalisation n (%)	Diagnostics n (%)	Average Total n (%)
Below ₦100,000 (<$67)	0 (0%)	19 (20.2%)	22 (23.4%)	12 (12.8%)
₦100,001–₦200,000 ($67–$134)	14 (14.9%)	29 (30.9%)	31 (33.0%)	24 (25.5%)
₦200,001–₦500,000 ($134–$334)	53 (56.4%)	38 (40.4%)	27 (28.7%)	41 (43.6%)
₦500,001–₦1,000,000 ($334–$669)	20 (21.3%)	8 (8.5%)	10 (10.6%)	14 (14.9%)
Above ₦1,000,000 (>$669)	7 (7.5%)	0 (0%)	4 (4.3%)	3 (3.2%)
TOTAL	**94 (100%)**	**94 (100%)**	**94 (100%)**	**94 (100%)**

Figures converted to USD at ₦1,495:$1 (2025 average rate).

Source: Authors' compilation, (2026)

From Table 3, aggregate 91.5% of the respondents reported hospitalization costs to be between ₦100,000 ($67) and ₦500,000 ($334); 85.1% of the respondents reported diagnostic costs between ₦100,000 ($67) and ₦500,000 ($334); while 85.2% of the respondents reported medication costs as between ₦200,000 ($134) to over ₦1,000,000 ($669). This indicates that medication constituted the most burdensome of the costs, underscoring the particular intensity of chemo- and radiotherapy-related financial toxicity.

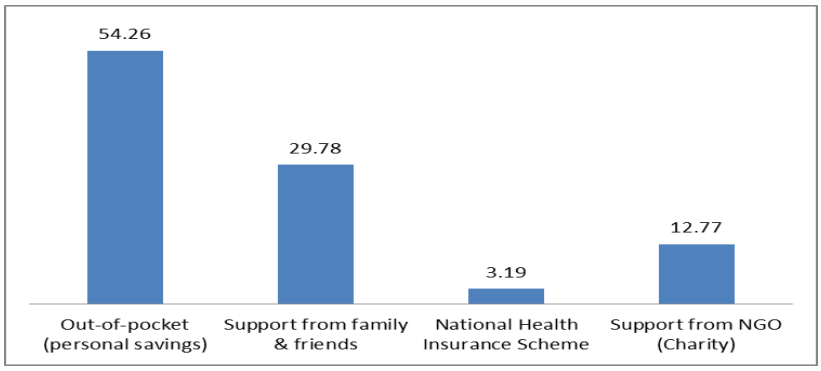

Figure 1 Primary Sources of Funding Treatment

Out-of-pocket expenditure was the primary funding source for 54.3% of patients, while 29.8% relied on family financial support and 12.8% on NGO assistance. A mere 3.2%

identified NHIS as a funding source and no respondent reported that insurance coverage significantly reduced their financial burden. Despite severe cost pressures, 55.3% of patients reported never skipping a scheduled treatment session, likely reflecting both healthcare provider reinforcement of treatment continuity and the high stakes patients attach to completing curative or life-extending courses.

4.3 Direct Non-Medical Costs

Non-medical direct costs including transport, accommodation and food represented a substantial secondary burden, with 49% of respondents estimating total monthly non-medical expenditure at ₦50,000 or above ($33.44+). Table 3 presents the distribution of non-medical costs.

Table 4 Distribution of Direct Non-Medical Costs by Category and Cost Band (n = 94)

Cost Range	Transport n (%)	Food n (%)	Accommodation n (%)	Total Avg. n (%)
Below ₦10,000 (<$7)	0 (0%)	2 (2.1%)	0 (0%)	1 (1.1%)
₦10,000–₦30,000 ($7–$20)	22 (23.4%)	23 (24.5%)	13 (13.8%)	20 (21.3%)
₦30,001–₦50,000 ($20–$33)	38 (40.4%)	27 (28.7%)	25 (26.6%)	27 (28.7%)
₦50,001–₦100,000 ($33–$67)	20 (21.3%)	31 (33.0%)	33 (35.1%)	29 (30.9%)
Above ₦100,000 (>$67)	14 (14.9%)	11 (11.7%)	23 (24.5%)	17 (18.1%)

Figures converted to USD at ₦1,495:$1 (2025 average rate).

Source: Authors' compilation, (2026)

Accommodation was identified as the most burdensome non-medical cost by 59.6% of respondents, reflecting the reality that many patients travel to the NHA from other states or regions and require lodging for treatment cycles that span weeks to months. Transportation costs exceeded ₦50,000 ($33.44) per month for 36.2% of respondents. Notably, 82% of respondents confirmed that their caregivers incurred either significant (45.7%) or moderate (36.2%) income losses due to work absence while accompanying them to treatment. This finding quantifies the household-level ripple effect of financial toxicity beyond the index patient.

4.4 Coping Strategies

Patients and families employed multiple simultaneous coping strategies to finance treatment. Table 5 presents the full ranking of strategies.

Table 5 Coping Strategies for Managing Financial Burden of Cancer Treatment, Ranked by Frequency (n = 94).

Coping Strategy	N	%	Rank
Depleted personal savings	85	90.4%	1st
Borrowed from family and friends	79	84.0%	2nd
Accessed formal loans (bank/cooperative)	72	76.6%	3rd
Sold assets (land, vehicle, jewelry)	67	71.3%	4th
Reduced household spending on food/clothing	60	63.8%	5th
Relied on charitable donations/NGOs	57	60.6%	6th
Withdrew/deferred children's school fees	28	29.8%	7th (sub)

Note: respondents could select multiple strategies; percentages sum to more than 100%.

Source: Authors' compilation, (2026)

Beyond direct financing strategies, households made profound sacrifices in other life domains: 63.8% drastically reduced spending on food and clothing and 29.8% stopped or deferred children's school fees, some transferring children from private to public schools. These findings explain the multi-generational and cross-sectoral consequences of financial toxicity, disrupting not only treatment adherence but education, nutrition and household stability.

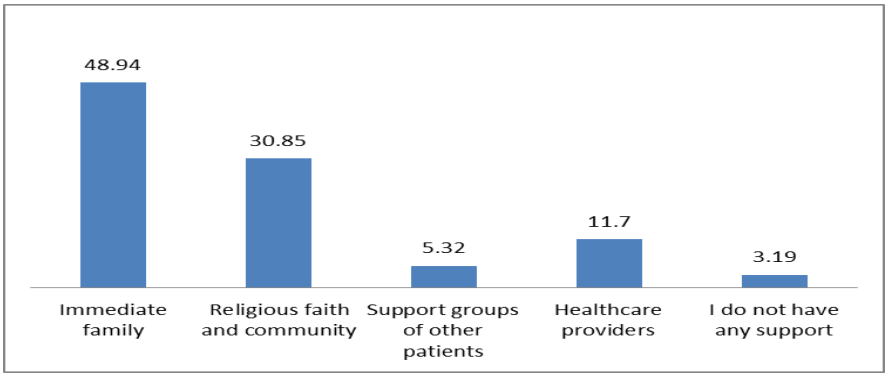

Figure 2 Sources of Emotional Support

Sources of emotional support in coping with financial stress were predominantly family (48.9%) and religious communities (30.9%), with only 11.7% citing healthcare

providers as an emotional resource, highlighting an unmet need for integrated financial and psychosocial support within oncology care settings.

4.5 Determinants of Financial Burden

Table 6 presents the ranking of factors identified by respondents as influencing their economic burden of cancer treatment.

Table 6 Factors Influencing Economic Burden of Cancer Treatment

Factor	Frequency	% of Sample	Rank
Patient socioeconomic status (income, education, social support)	86	91.5%	1st
Absence of functional health insurance coverage	84	89.4%	2nd
Out-of-pocket expenditure burden (compounded by no insurance)	83	88.3%	3rd
Stage at diagnosis (late-stage = higher cost)	82	87.2%	4th
Treatment type and duration	78	83.0%	5th
Comorbidities (presence of additional conditions)	71	75.5%	6th
Lost productivity / income from treatment-related absence	67	71.3%	7th
Other government policy deficiencies	65	69.1%	8th

Ranked by Frequency of Endorsement (n = 94). Multiple responses permitted.

Source: Authors' compilation, (2026)

Regarding insurance, 89.4% of respondents confirmed complete absence of NHIS coverage, and a striking 30.9% were entirely unaware that insurance could theoretically cover any aspect of cancer treatment. No respondent benefited from any government cancer subsidy or financial assistance programme, and 94.7% confirmed unawareness of the existence of such policies.

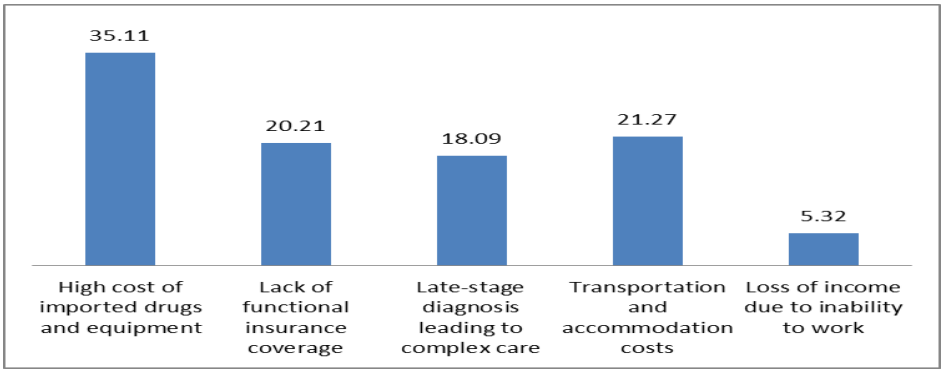

Figure 3 Structural Cost Drivers

Structural cost drivers as perceived by respondents are ranked as follows: high cost of imported drugs and equipment (35.1%); transportation and accommodation (21.3%); absence of functional insurance coverage (20.2%); late-stage diagnosis leading to complex care requirements (18.1%); and income loss from treatment-related inability to work (5.3%).

5. DISCUSSION

5.1 Financial Toxicity in Comparative Perspective

The findings of this study establish that financial toxicity is not a peripheral concern but a constitutive feature of the cancer experience for patients at the National Hospital Abuja. The mean direct medical cost of ₦550,000 (~$367.90) per patient must be interpreted against Nigeria's economic context: the national minimum wage stands at ₦70,000 per month as of 2024, meaning the average patient's direct medical costs alone equate to approximately 7.9 months of minimum wage earnings. Even for the 65.9% of respondents earning above ₦200,000 monthly, treatment costs routinely exceed two to four times their monthly household income for a single cycle. This cost-to-income ratio is among the most extreme documented in the oncology economics literature.

Internationally, the 84% OOP share of treatment costs documented in this study represents a figure that far exceeds patterns observed in comparable middle-income settings. Table 6 situates Nigeria's financing landscape within a global comparative frame.

Table 7 Comparative Healthcare Insurance Coverage and Out-of-Pocket Expenditure for Cancer Treatment across Selected Countries

Country	Insurance Model	Cancer Coverage	OOP Proportion
South Korea	National Health Insurance (NHI)	Comprehensive (~97% population)	~5–15%
United Kingdom	National Health Service (NHS)	Universal; most cancer drugs via NICE	<5%
Brazil	SUS (Unified Health System)	Oncology included; access gaps persist	~20–35%

Kenya	NHIF oncology package (2017)	Partial; limited real-world impact	~50–60%
India	Ayushman Bharat (PM-JAY)	Some cancers; variable state uptake	~60–70%
Nigeria (NHIS)	NHIS – fragmented, employer-based	Cancer largely excluded; <5% coverage	**~84% (this study)**

Sources: Kim et al. (2025); Gakunga et al. (2025); WHO (2022); World Bank (2023); IAEA (2021)

The contrast with South Korea where NHI covers 97% of the population and OOP constitutes 5–15% of cancer treatment costs is stark and instructive. Closer to home, Kenya's introduction of an NHIF oncology benefits package in 2017 has yielded disappointing results; Gakunga et al. (2025) found no statistically significant reduction in time-to-treatment initiation following its introduction, suggesting that poorly resourced insurance packages may create the appearance of coverage without the substance. Nigeria's NHIS appears to represent an even more extreme case of this coverage illusion: no respondent in this study reported meaningful financial benefit from NHIS membership for cancer treatment. India's Ayushman Bharat scheme (PM-JAY), launched in 2018 and covering an estimated 500 million beneficiaries for hospitalization, offers a more promising model for LMICs, though variable implementation quality across Indian states illustrates the importance of robust governance in translating insurance policy into patient outcomes (Berman et al., 2020).

The coping strategies documented in this study such as savings depletion, asset liquidation, debt accumulation and withdrawal of children from school mirror those observed in US studies (Gilligan et al., 2018) but without the safety net of eventual insurance reimbursement. Gilligan et al. (2018) found that 42.5% of cancer survivors in the US depleted their life savings within two years of diagnosis despite having insurance; in Nigeria, this depletion occurs without prospect of recovery. The 71.3% of patients who reported selling personal assets including land, vehicles and jewelry represents a form of irreversible impoverishment that has multi-generational consequences for household wealth accumulation in an already low-income context.

The near-total ignorance of government cancer assistance programmes (94.7%) is perhaps the study's most actionable finding. It suggests not merely that these

programmes are insufficient, but that they are effectively invisible to the populations they are designed to serve, a fundamental failure of health communication policy. The Federal Ministry of Health's Cancer Health Fund, established in 2021 with an initial capitalization of ₦5 billion, has failed to reach the overwhelming majority of cancer patients at Nigeria's premier oncology centre. This finding calls not only for programme expansion but for fundamental redesign of outreach and enrolment mechanisms.

5.2 The Role of Late-Stage Diagnosis

Fifty percent of respondents confirmed that late-stage diagnosis significantly increased their total treatment costs, a finding with major policy implications. Early-stage cancer treatment typically involves less aggressive, shorter-duration, and less costly regimens; late-stage disease necessitates multi-modal, prolonged, and more toxic (and costly) combinations of chemotherapy, radiotherapy, and supportive care. The cost multiplier effect of late diagnosis in LMICs has been documented by Siegel et al. (2020) and Yabroff et al. (2021), and is compounded in Nigeria by structural barriers including limited primary care capacity for early detection, persistent sociocultural beliefs that attribute cancer to supernatural causation (leading to health system avoidance), and inadequate distribution of diagnostic infrastructure beyond urban centres. Investing in community-based cancer screening particularly for the five highest-burden cancers would not only improve survival but constitute a cost-effective healthcare financing intervention by shifting the distribution of diagnoses toward less expensive early-stage treatment.

5.3 Implications for Oncology Nursing

The finding that only 11.7% of patients identified healthcare providers as a source of emotional support during financial distress underscores a significant unmet need within oncology nursing practice. International evidence increasingly positions nurses as central actors in financial toxicity navigation. Lentz et al. (2019) demonstrated that nurse-led financial toxicity screening using validated instruments such as the COmprehensive Score for financial Toxicity (COST) instrument can identify at-risk patients early, enabling proactive referral to social workers, patient assistance programmes, and advocacy services. The implementation of such screening as a routine nursing assessment at the NHA would represent a low-cost, high-impact intervention.

For nursing education, the inclusion of health economics literacy, insurance navigation skills, and financial distress counseling in post-basic oncology nursing curricula would

prepare future oncology nurses to address this dimension of patient suffering systematically rather than incidentally. At the research level, Nigerian nursing scholarship must generate longitudinal evidence on the relationship between financial toxicity and treatment adherence, mental health outcomes and survival, evidence that is currently entirely absent from the local literature.

6. CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This study provides a rigorous, patient-level economic analysis of financial toxicity amongst cancer patients receiving chemotherapy and radiotherapy at the National Hospital Abuja, Nigeria. Its central finding that 84% of cancer treatment costs are borne entirely out-of-pocket, with no meaningful insurance mitigation, at a mean cost of ₦550,000 per patient quantifies a financial burden that is both catastrophic in absolute terms and structurally determined by the absence of effective health financing policy. The coping strategies documented depleting savings, selling assets, withdrawing children from school, accumulating debt representing a cascade of financial harms that extend beyond the patient to the household and across generations. Addressing financial toxicity in Nigerian cancer care is not an optional equity enhancement but a precondition for effective oncological treatment and a fundamental obligation of a healthcare system that seeks to achieve universal health coverage. The evidence presented in this paper provides a foundation for the policy reforms, educational curricula, nursing practice changes and future research that will be necessary to meet that obligation.

6.2 Recommendations

The following evidence-based policy recommendations are advanced, prioritized by feasibility and impact.

First, the NHIS must be urgently reformed to incorporate a comprehensive oncology benefits package covering chemotherapy, radiotherapy, essential diagnostics, targeted therapies and supportive care medications. The Korean NHI model provides a precedent for how universal coverage can substantially reduce OOP cancer costs even in a middle-income country context.

Second, the Federal Government should fully capitalize, publicize and operationalize the Cancer Health Fund with a clear, simplified enrolment pathway accessible at the point of oncology care delivery.

Third, a national cancer early detection programme should be established, embedding breast clinical examination, cervical cytology, prostate-specific antigen testing, and colorectal screening into primary healthcare facility service packages, with community health workers trained as detection agents.

Fourth, the Federal Ministry of Finance should review the tariff and import duty regime applicable to chemotherapy drugs, radiotherapy equipment, and diagnostic consumables, with a view to reducing the import cost premium that respondents identified as the primary structural driver of treatment costs.

Fifth, all tertiary oncology departments should be mandated to employ dedicated oncology financial navigators, a cadre combining social work, insurance literacy and health economics skills as part of the core multi-disciplinary team.

REFERENCES

Becker, G. S., & Schultz, T. W. (1964). Human capital: A theoretical and empirical analysis, with special reference to education. Columbia University Press.

Berman, P., Ahuja, R., & Bhandari, L. (2020). The impoverishing effect of healthcare payments in India: New methodology and findings. *Economic & Political Weekly*, 45(16), 65–71.

Bona, L. G., Geleta, D., Dulla, D., Deribe, B., Ayalew, M., & Ababi, G. (2021). Economic burden of cancer on cancer patients treated at Hawassa University Comprehensive Specialized Hospital. *Cancer Control, 28, 1–8*. https://doi.org/10.1177/10732748211038494

De-Moor, J. S., Williams, C. P., & Blinder, V. S. (2022). Cancer-related care costs and employment disruption: Recommendations to reduce patient economic burden as part of cancer care delivery. *Journal of the National Cancer Institute Monographs*, 2022(59), 79–84. https://doi.org/10.1093/jncimonographs/lgac011

Doherty, M., Gardner, D., & Finik, J. (2021). The financial coping strategies of US cancer patients and survivors. *Supportive Care in Cancer*, 29(10), 5753–5763. https://doi.org/10.1007/s00520-021-06134-0

Drummond, M. F., Sculpher, M. J., Torrance, G. W., & O'Brien, B. J. (2015). *Methods for the economic evaluation of health care programmes* (4th ed.). Oxford University Press.

Gakunga, R., Korir, A., & Bouttell, J. (2025). Evaluating the impact of the National Health Insurance Fund oncology benefits package and a healthcare workers' strike on time to cancer treatment initiation in Nairobi County, Kenya: An interrupted time series analysis. *PLoS ONE*, 20(5), e0324593. https://doi.org/10.1371/journal.pone.0324593

Gilligan, A. M., Alberts, D. S., Roe, D. J., & Skrepnek, G. H. (2018). Death or debt? National estimates of financial toxicity in persons with newly diagnosed cancer. *American Journal of Medicine*, 131(10), 1178–1199. https://doi.org/10.1016/j.amjmed.2018.05.020

International Atomic Energy Agency. (2021). Radiotherapy infrastructure and access in Africa: Technical report. IAEA. https://www.iaea.org/publications

Jabbari, A., Hadian, M., Mazaheri, E., & Jelodar, Z. K. (2023). The economic cost of cancer treatment in Iran. *Journal of Education and Health Promotion*, 12(32), 1–6. https://doi.org/10.4103/jehp.jehp_1070_22

Jalali, F. S., Seif, M., Jafari, A., Zangouri, V., Kerhayarz, K., & Ravangard, R. (2023). Factors affecting the economic burden of breast cancer in Southern Iran. *BMC Cancer*, 23, 1332. https://doi.org/10.1186/s12885-023-11416-x

Kim, J., Park, H., Lee, S., & Choi, Y. (2025). Assessing the economic impact of cancer care: A study on out-of-pocket expenditures and utilisation in South Korea. *Cancer Medicine*, 14(3), e70593. https://doi.org/10.1002/cam4.70593

Lentz, R., Benson III, A. B., & Kircher, S. (2019). Financial toxicity in oncology: A practical review and guidelines for patient financial counseling. *American Society of Clinical Oncology Educational Book*, 39, 55–64. https://doi.org/10.1200/EDBK_100058

Mariotto, A. B., Enewold, L., Zhao, J., Zeruto, C. A., & Yabroff, K. R. (2020). Medical care costs associated with cancer survivorship in the United States. *Cancer Epidemiology, Biomarkers & Prevention*, 29(7), 1304–1312. https://doi.org/10.1158/1055-9965.EPI-19-1534

Maurya, P. K., Murali, S., Jayaseelan, V., Thulasingam, M., & Pandjatcharam, J. (2021). Economic burden of cancer treatment in a region in South India: A cross-sectional analytical study. *Asian Pacific Journal of Cancer Prevention*, 22(12), 3755–3762. https://doi.org/10.31557/APJCP.2021.22.12.3755

Mustapha, M. I., Ali-Gombe, M., Abdullahi, A., Adenipekun, A., & Campbell, O. B. (2020). Financial burden of cancer on patients treated at a tertiary health facility in South West Nigeria. *Journal of the West African College of Surgeons,* 10(4), 23–29.

Nigeria Global Cancer Observatory. (2022). Statistics at a glance: Nigeria. *International Agency for Research on Cancer.* https://gco.iarc.fr

Onoka, C. A., Onwujekwe, O. E., Uzochukwu, B. S., & Ezumah, N. N. (2019). Promoting universal coverage: Can social health insurance work in Nigeria? *Health Policy and Planning*, 28(1), 1–11. https://doi.org/10.1093/heapol/czs006

Organisation for Economic Co-operation and Development. (2024). Tackling the impact of cancer on health, the economy and society. OECD Health Policy Studies. OECD Publishing. https://doi.org/10.1787/85e7c3ba-en

Project Pink Blue. (2024). Nigeria cancer statistics report 2024. Project Pink Blue.

Rice, D. P. (1967). Estimating the cost of illness. *American Journal of Public Health*, 57(3), 424–440. https://doi.org/10.2105/AJPH.57.3.424

Siegel, R. L., Miller, K. D., & Jemal, A. (2020). Cancer statistics, 2020. *CA: A Cancer Journal for Clinicians*, 70(1), 1–15. https://doi.org/10.3322/caac.21590

Teli, B. D., Behzadifar, M., Beiranvand, M., Rezapour, A., & Taheri Mirghaed, M. (2025). The economic burden of breast cancer in western Iran: A cross-sectional cost-of-illness study. *Journal of Health, Population and Nutrition*, 44(16), 1–11. https://doi.org/10.1186/s41043-025-00718-8

World Bank. (2023). Out-of-pocket expenditure (% of current health expenditure): Nigeria. World Development Indicators. https://data.worldbank.org

World Health Organization. (2022). Global cancer burden growing, amidst mounting need for services. WHO Press.

Yabroff, K. R., Lund, J., Kepka, D., & Mariotto, A. (2021). Annual report to the nation on the status of cancer, Part 2: Patient economic burden associated with cancer care. *Journal of the National Cancer Institute,* 113(12), 1670–1682. https://doi.org/10.1093/jnci/djab192

Zafar, S. Y., Peppercorn, J. M., Schrag, D., Taylor, D. H., Goetzinger, A. M., Zhong, X., & Abernethy, A. P. (2025). Financial toxicity of cancer treatment: A multinational study. *Journal of Clinical Oncology*, 33(14), 1647–1654. https://doi.org/10.1200/JCO.2014.59.10

DECLARATIONS

Ethics, Approval and Consent to Participate

Ethical clearance was obtained from the Radiotherapy and Oncology Department of the NHA. Participation was anonymous, voluntary and confidential. Informed consent was implied through completion of the questionnaire and participants were assured that responses would have no bearing on their clinical care

Competing Interests

The authors declare no competing interests.

Funding

This research received no external funding and was self-funded by the authors.

Availability of Data

The dataset supporting the conclusions of this study is available from the corresponding author upon reasonable request. The study was her research project submitted to the

School of Post-Basic Oncology Nursing at the National Hospital Abuja in November, 2025.