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EXAMINING PRESCRIPTION CONFORMITY IN ONCOLOGY CARE: A RETROSPECTIVE ANALYSIS IN IVORY COAST

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Abstract: *Cancer remains a formidable global health challenge, claiming millions of lives annually, particularly in its advanced or metastatic stages. Organs frequently affected by this devastating disease include the breast, lungs, colorectal, and prostate, contributing significantly to the staggering mortality rates observed worldwide. While various treatment modalities such as cytotoxic chemotherapy, immunotherapy, hormone therapy, radiotherapy, and targeted therapies offer promise in managing cancer, their widespread accessibility remains hindered by prohibitive costs, particularly in resource-limited settings. Prescription of anticancer drugs represents a critical aspect of cancer management, serving as the initial step in patient treatment. This medicolegal act demands strict adherence to guidelines encompassing readability, precision, and completeness. Compliance with prescription protocols is paramount for optimizing patient outcomes, given the narrow therapeutic margin and inherent toxicity associated with anticancer medications. Errors in prescription can swiftly lead to adverse events, resulting in prolonged hospitalization, increased utilization of pharmaceutical products, laboratory tests, or even necessitating surgical interventions.*

This abstract underscores the multifaceted challenges associated with cancer treatment, emphasizing the pivotal role of prescription accuracy in mitigating adverse outcomes and optimizing patient care. By highlighting the critical importance of adherence to prescription guidelines, it underscores the need for healthcare professionals to prioritize precision and thoroughness in prescribing anticancer medications. Moreover, it underscores the imperative for policymakers and healthcare stakeholders to address the systemic barriers hindering access to essential cancer treatments, particularly in resource-limited contexts.

Keywords: *Cancer, Anticancer drugs, Prescription, Patient outcomes, Adverse events.*

INTRODUCTION

Cancer stands as a leading global cause of mortality, advanced or metastatic stages (Touré, 2013). Organs accounting for nearly 10 million deaths in 2020, most frequently affected include the breast (2.26 million representing one in six deaths. The severity of this cases), lungs (2.21 million cases), colorectal (1.93 million pathology is exacerbated when diagnoses are made at cases), and prostate (1.41 million cases). Treatment modalities for cancer encompass cytotoxic chemotherapy, immunotherapy, hormone therapy, radiotherapy and targeted therapies. However, despite their efficacy, a substantial proportion of these treatments remain inaccessible to patients due to their prohibitive costs, posing a considerable economic burden in resource limited countries. Prescription serves as the initial step in the utilization of anticancer drugs, constituting a medicolegal act that demands strict adherence to various requirements such as readability, precision and completeness. Compliance with prescription guidelines is crucial for optimizing patient

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outcomes (Meyer, 2000). Given the narrow therapeutic margin and inherent toxicity of these drugs, errors in prescription can swiftly lead to adverse events, resulting in prolonged hospitalization, increased use of pharmaceutical products, laboratory tests, or even necessitating surgical interventions.

Despite the critical nature of prescription adherence, the scientific literature has seen limited exploration of prescription conformity. The present study conducted at the oncology reference center within Treichville University Hospital in Ivory Coast was motivated by the significant volume of anticancer drug prescriptions by the medical team. The objective of our investigation was to establish the profile of anti-cancer drugs and analyze the extent of prescription compliance with guidelines. The ultimate aim is to enhance medical practices, ensuring the safety and efficacy of patient treatments in the realm of cancer care.

MATERIALS AND METHODS

This study was conducted in the oncology care units of Treichville University Hospital in Abidjan, Ivory Coast. The service comprised two care units, namely the long-term hospitalization unit (LHU) with 12 beds and the day care unit (DCU) with 8 beds.

Study setting and design

This retrospective and descriptive study was conducted in the cancer department of Treichville University Hospital in Abidjan. This department includes a long-term hospitalization unit (LHU) with 12 beds and a day care unit (DCU) with 8 beds. The review period for patient data collection spanned 6 months, from January 1, 2021, to June 30, 2021.

Study population and sample selection

The study specifically targeted patient records of individuals aged 17 years and older who were diagnosed with cancer and had undergone at least one systemic anti-cancer treatment in the oncology department. Incomplete files and/or patients who were not under the care of a doctor in the designated care unit were excluded from this study.

Data collection tool

Information regarding prescriptions was gathered from various sources, including (i) an "Excel" file containing chemotherapy protocols and nursing data; (ii) a "PowerPoint" file containing weekly activity reports for the day care unit; and (iii) registers and medical hospitalization reports. The data collection process utilized a survey form based on a reference guide for good prescription practices developed in France (Order relating to prescription, 1999). The survey form consisted of 19 criteria categorized into three groups: Identification of the prescriber (criteria 1 to 8), identification of the patient (criteria 9 to 13), and identification of the drugs (criteria 14 to 19).

Variables measurement

For each patient, the following parameters were collected:

1. Patient-related data: Age, sex, organ and evolutionary stage.
2. Data related to prescription: Identification of prescriber, place of the prescription and protocol, and sources of indication
3. Data related to prescribed anti-cancer drugs: Therapeutic family drugs.

Collected data were cross-checked and consolidated using admissions and nurse registers of the oncology units.

Drug classification tools

Pharmaceutical analysis of prescriptions was facilitated by referencing scientific books, including Vidal Online (2021), Dorosz (2013), ANSM (2016), the Thesaurus of Drug Interactions (2012), and WHO (2017).

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Ethical considerations

The collection of human data adhered to recommendations and guidelines concerning human subjects, as stipulated by Public Decree No. 2017-884 (2017), Jarded (2016) and Le Louarn (2018).

Data processing and analysis

The collected data were entered into a Microsoft Office Excel 2013 spreadsheet and analyzed using STATA 14.0 software. The results, presented as numbers and percentages, were compared using the Pearson Chi-square statistical test with a significance level of α set at 5%. A difference between compared groups was considered significant when the p-value was less than 0.05.

RESULTS

Demographic characteristics of study participants

The retrospective study encompassed two hundred and thirteen patients (n=213) for demographic description and thirty patients (n=30) for the analytical cross-sectional part. In terms of gender, the majority (n=151; 71%) were women, resulting in an M/F sex ratio of 0.29 (Table 1).

Cancer types and metastatic status

Cancers identified, in order of importance, were predominantly located in the breast (n=118; 55.3%), followed by the colon-rectum (n=17; 8%), ovary (n=16; 7.5%), cervix (n=13; 6.1%), stomach (n=9; 4.2%), prostate (n=8; 3.7%), biliary (n=8; 3.2%), lungs (n=8; 3.2%) and liver (n=6; 2.8%). Additionally, 43.7% (n=93) of patients were identified as having metastatic cancer (Table 1).

Table 1. Distribution of patients according to socio-demographic characteristics and clinics.

Patient characteristics	**Number (N=213)**	**Percent**
Sex Male		
	62	29
Women	151	71
Sex ratio (M/F)	0.29	
Middle age	49 years (26 to 78)	
Organ		
Breast	118	55.3
Colon-rectum	17	8
Ovary	16	7.5
Cervix	13	6.1
Stomach	9	4.2
Prostate	8	3.7
Biliary	7	3.2
Lungs	7	3.2
Liver	6	2.8
Others	12	6

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Stage evolution		
Without metastasis	120	56.3
With metastasis	93	43.7

Prescription practices

All prescriptions written by the primary doctor (n=31; 100%) were not computerized. Among those made by the prescriber doctor, six (n=6; 19%) were manually written, while twenty-five (n=25; 81%) were generated from a computer (Table 2).

Administration route and anticancer drug families

During this period, chemotherapy was the most commonly practiced treatment, accounting for 82.84%, followed by hormone therapy (14.70%), targeted therapies (2.40%) and immunotherapy (0.05%) (Figure 1). A total of seven hundred and seventy-nine (n=779) anticancer drugs were administered intravenously, constituting 99% of the total (Table 3). The majority of the molecules used belonged to therapeutic families, including taxanes (49.8%): Paclitaxel, docetaxel; alkylating agents (30%): cyclophosphamide; antimetabolites (30%): gemcitabine; anthracyclines (28.1%): Doxorubicin, and platinum salts (25%): carboplatin (Figures 2 and 3).

Compliance and non-compliance in prescription

Five out of nineteen criteria were found to be compliant with recommendations, achieving a conformity rate of 100%.

These criteria included (i) the prescription date of each medication, (ii) the care unit in which the patient is hospitalized, (iii) the name of the prescriber, (iv) the patient's name, first name, sex, and age, and (v) the galenic form, dosage and medication treatment duration. Non-compliance issues were observed in the prescription details written by the prescriber doctor, encompassing incomplete information and errors in administration instructions for eight criteria in handwritten prescriptions and four criteria in computerized prescriptions (Table 4). Quality indicators not adhered to, at a rate of 0%, included the absence of the prescription redaction by the prescriber doctor, as well as their signature, telephone number, and the drugs' time administration on the protocol sheet.

Furthermore, on handwritten prescriptions exclusively, there were additional omissions, namely (i) no transcription of prescribed drugs on other documents (0%), (ii) absence of patient weight information (83%), (iii) lack of the full name of each drug (0%), and (iv) ns: Not significant

Table 2. Anti-cancer drugs prescription terms.

Terms of prescription	**Number (N=31)**	**Percent**
Primary doctor Handwritten	31	100
Computerized	0	0
Prescriber doctor Handwritten	6	19
Computerized	25	81
Place of prescription		
DCU	25	81

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LHU	6	19
Source of prescription decision		
MCM	31	100
Staff	0	0
Patient's doctor	0	0

DCU: Day Care Unit, LHU: Long-term hospitalization unit, MCM: Multidisciplinary consultation meeting.

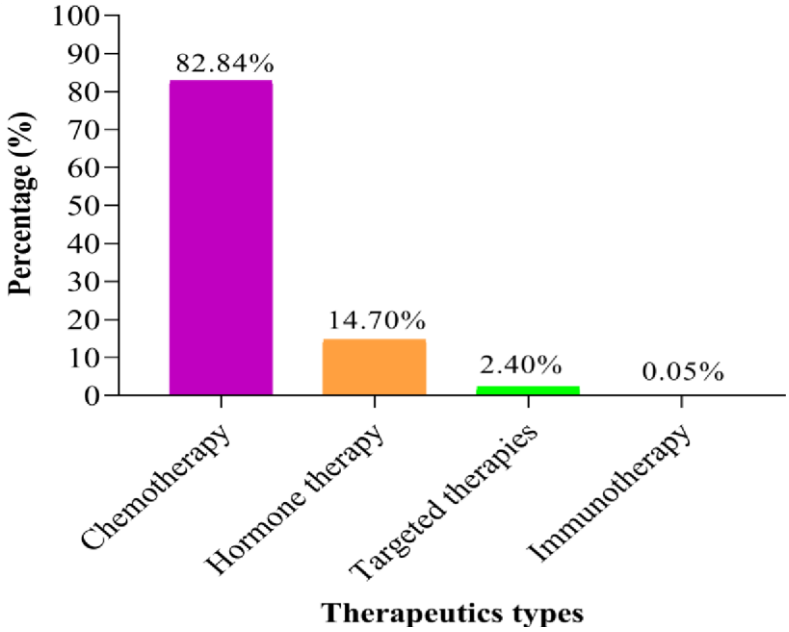

Figure 1. Drugs distribution according to therapy type.

Table 3. Anticancer drugs routes of administration.

Routes of administration	Number (N=779)	Percent
Peripheral venous	707	90.7
Central vein	73	9.3
Intramuscular or subcutaneous	140	18
Oral	63	8

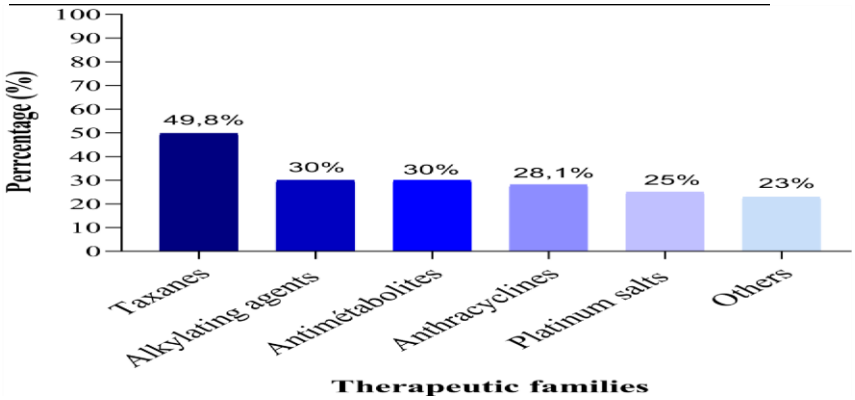

Figure 2. Drugs distribution according to conventional therapeutic families.

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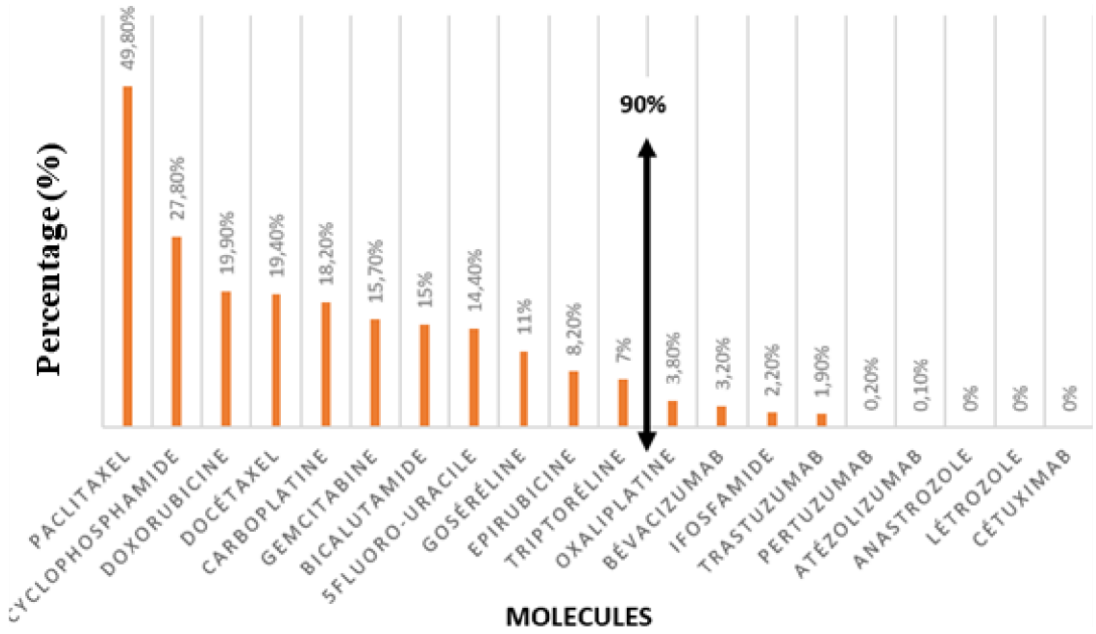

Figure 3. Drugs frequently prescribed.

Table 4. Anti-cancer drugs prescription conformity indicators.

Conformity criteria	Standards [11]	Prescription observed		*p*
		Handwritten n = 6 %	Computerized n = 25 %	
Drug prescriptions are individual	100	100	100	*ns*
Prescriptions are written by physician prescriber	100	0	0	-
Medical prescriptions are never transcribed on documents other than the nominative protocol sheet	100	0	100	*p* = 0.0001
Prescription date for each specialty appears on the protocol sheet	100	100	100	*ns*
Care unit in which the patient is hospitalized appears on the protocol sheet	100	100	100	*ns*
Name of the prescriber appears on the protocol sheet	100	100	100	*ns*
Prescriber's signature appears for each drug prescribed	100	0	0	-
Telephone number of the prescribing doctor appears on the protocol sheet	100	0	0	-
Patient's name appears on the protocol sheet	100	100	100	*ns*
Patient's first name appears on the protocol sheet	100	100	100	*ns*
Sex of the patient appears on the protocol sheet	100	100	100	*ns*
Patient's weight appears on the protocol sheet	100	83	100	*p* = 0.030
Patient's age appears on the protocol sheet	100	100	100	*ns*
Name of each specialty is written on the entire protocol sheet	100	0	100	*p* = 0.0001
Galenic form of each specialty appears on the protocol sheet	100	100	100	*ns*
Frequency of administration of each specialty appears on the protocol sheet	100	67	100	*p* = 0.030
Administration schedule for each specialty appears on the protocol sheet	100	0	0	-
Dosage of each drug is listed on the protocol sheet	100	100	100	*ns*
Duration of treatment for each specialty appears on the protocol sheet	100	100	100	*ns*

DISCUSSION

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imprecise information regarding drug administration frequency (67%) (Table 4). This study, conducted over a 6-month period, aligns with numerous works found in the literature. The investigation within the oncology care units at Treichville University Hospital focused on describing drugs used for cancer treatment, with a particular emphasis on the analysis of prescription quality written by prescribers in accordance with the reference guide for good prescription practices developed in France.

The high prevalence of breast cancer in Ivory Coast, particularly among women around the age of 49 mirrors findings in studies conducted by Anyanwu (2008) in Nigeria and Hoang et al. (2013) in Vietnam. This average age differs from observations in developed countries, as reported by Curado (2011), where most cases of breast cancer occur in postmenopausal women aged around 60 to 70 years. The relatively lower age at the time of cancer diagnosis in Ivory Coast can be attributed to the dissemination of information about cancer detection through mass media and social networks (Fitch et al., 2007; Mosomi, 2019). This awareness has contributed to reducing the proportion of non-metastatic cancers to 43.7%, compared to 56.3% for those detected at an advanced or metastatic stage.

Regarding prescription conformity, the analysis of results was limited to prescriptions written by the prescriber doctor, as those written by the primary doctor undergo validation by a multidisciplinary team of doctors bales before execution.

In the oncology care units department at Treichville University Hospital, the use of all families of anticancer drugs (taxanes, alkylating agents, antimetabolites, anthracyclines and platinum salts) was justified due to their broad spectrum of action, diverse indications in oncology (Africa France Press, 2021), and effectiveness across all stages of cancer development (locally advanced or metastatic) (Africa France Press, 2021; Sophie and Christine, 2014, National Program for the Fight against Cancer, 2021; Sophie and Christine, 2014). Powerful drugs commonly prescribed, such as paclitaxel, cyclophosphamide, doxorubicin, docetaxel, carboplatin and gemcitabine, employ various mechanisms of action to prevent mitosis and induce the destruction or blocking of tumor multiplication (Coudert, 2022; Houede, 2019). Targeted therapies that operate at the level of carcinogenesis signaling pathways (Schmitt, 2000; Sophie and Christine, 2014), including trastuzumab, pertuzumab, bevacizumab and atezolizumab have recently been utilized and provided free of charge to cancer patients in Ivory Coast (Africa France Press, 2021; National Cancer Control Program, 2021). This reflects the health authorities' desire to facilitate the accessibility of these drugs.

However, powerful drugs that could be essential for adequate management, such as tyrosine kinase inhibitors (Lapatinib) or ALK, ROS, MET inhibitors inside cells (Crizotinib) are still not included in free treatments and remain inaccessible to the vast majority of patients due to their high cost (Global Cancer Observatory, 2020; Kouasssi et al., 2019; Loriot et al., 2018).

This situation underscores the need for health authorities to allocate a substantial financial budget in their operating budget to purchase these essential products and ensure the effectiveness of treatments for patients suffering from cancer (Mousa et al., 2021).

The prescription of anticancer drugs, following the reference guide for good prescription practice, revealed that eleven (n=11; 57.89%) out of 19 criteria were compliant with recommendations. Among the six (n=6) handwritten prescriptions, eight (n=8; 42.10%) criteria did not meet quality requirements, while on twenty-five

(n=25) prescriptions generated by computer, four (n=4; 21.05%) prescriptions were affected. The noncompliance noted in computerized prescriptions was due to an imperfection in the design of the digital file, where this information was absent.

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Generating prescriptions by computer leads to fewer errors than those written by hand (Bates et al., 2001; Order relating to prescription, 1999). Approximately 42.10% of observed errors in handwritten prescriptions were attributed to omissions, a percentage higher than that reported in the work of Slama et al. (2005), where 8.3% of prescription errors were due to incomplete or illegible prescriptions. This difference can be explained by the fact that our study analyzed thirty-one prescriptions, while the study by Slama team covered 1262 prescriptions.

Computer-assisted prescription of medications is considered more secure because the readability of prescriptions and pre-recorded information about the doctor (name, qualification, address, telephone number, signature) and drug details (dose, unit, frequency of administration, duration of treatment, signature) can save a lot of time and contribute to reducing drug errors. These errors are the origin of many adverse effects, the management of which could compromise the success of treatment (Joshi et al., 2016). The results align with those of Bates et al. (2001) and, as stated by these authors, computer-generated prescriptions are three times less likely to contain errors and five times less likely to require clarification from the pharmacist (Bizovi et al., 2002).

Study limitations

This study focused on evaluating errors in prescription redaction rather than errors in the decision team validation. The results obtained do not pertain to medications prescribed for underlying pathologies, let alone the occurrence of drug interactions and the management of adverse effects caused by the use of anticancer drugs.

Conclusion

The deficiencies in cancer drug prescribing practices within the oncology care units at Treichville University Hospital revealed a need to increase awareness among the medical team regarding compliance with prescription recommendations, aiming to reduce drug errors and minimize adverse effects linked to their use. Additionally, efforts must be made at the health authorities' level to enhance the availability of anticancer drugs, thereby improving patient safety.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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