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Assessment of Prescription Pattern in Patients Receiving Chemotherapy for Lung Cancer

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Abstract **Original Research Article**

Lung cancer develops when lung cells divide rapidly, which leads to the growth of tumors. It is the most prevalent cancer and the major factor in men's cancer-related mortality. The goal of the study is to assess prescription pattern in patients receiving chemotherapy for lung cancer. A study on prescription pattern will help in optimizing the anti-malignancy therapy with improved efficacy & minimal toxicity. This study assesses prescription pattern in patients receiving chemotherapy for lung cancer. This was a prospective observational study carried out in the Out-patient Department of Oncology in tertiary care teaching hospital, Bengaluru. A total of 37 samples were collected, of which 31 were selected for the study. Subjects for the study were identified by the investigator during ward rounds based on the inclusion and exclusion criteria. Relevant data collected were recorded on the Self-designed data collection form. All recorded data were entered and analyzed using MS Excel. Descriptive statistics were computed for quantitative variables. The majority of the subjects involved in the study were prescribed with Carboplatin. Carboplatin with Pemetrexed Disodium was the most preferred combination therapy. In the present study, we have concluded that the oncologists in this hospital prefer Cytotoxic and Targeted drugs over Hormonal drugs for the treatment of lung cancer.

Keywords: Antimalignancy, efficacy, toxicity, self-designed, tertiary, descriptive, cytotoxic, targeted, hormonal.

INTRODUCTION

Cancer is a broad category of diseases that can affect virtually any organ or tissue in the body. These diseases occur when abnormal cells proliferate uncontrollably and cross their normal boundaries, infecting nearby body parts and spreading to other organs. An estimated 9.6 million deaths, or one in every six deaths, were attributed to cancer in 2018, making it the second highest cause of death worldwide [1]. India has the third-highest rate of cancer cases among all countries. According to a data from the National Cancer Registry Program, over 13 lakh people in India are diagnosed with cancer each year [2]. Lung cancer (LC) is also known as Bronchogenic carcinoma [3]. LC develops when lung cells divide rapidly, which leads to the growth of tumors. The ability to breathe can be affected by these tumors, and they have the potential to spread to other parts of the body [4]. With approximately 68000 cases each year in India, LC is the 4th most prevalent type of cancer [5].

The two primary types of LC are Non-Small Cell Lung Cancer (NSCLC) and Small Cell Lung Cancer (SCLC). This categorization is based on how the tumor cells appear under the microscope. It is critical to distinguish between these two types of cancer because they differ in how they develop, spread, and respond to treatment. SCLC accounts for 10%-15% of all lung tumors. This type of LC has the highest aggressiveness and rate of growth. Cigarette smoking is closely linked to SCLC. SCLCs spread rapidly throughout the body and are commonly detected after they have spread widely. NSCLC is the most common LC, accounting for about 85% of all cases. NSCLC has three main types designated by the type of cells found in the tumor. They

are: Adenocarcinoma, Squamous cell carcinoma, Large cell carcinoma and undifferentiated carcinoma [6].

Prescription pattern monitoring studies (PPMS) are drug utilization studies that concentrate on drug prescribing, dispensing, and administration. They advocate for the proper use of controlled substances and the reduction of drug abuse or misuse. PPMS also advises and supports prescribers, dispensers, and the general public on drug use, and collaborates and develops working relationships with other key organizations to achieve drug rationalization. Prescription Patterns describe the extent and profile of drug use, trends, drug quality, and compliance with regional, state, or national guidelines such as standard treatment guidelines, drug use from the essential medicine list, and generic drug use [7].

Most lung cancer patients are diagnosed at an advanced stage and are primarily treated with palliative care, which increasingly includes multiple chemotherapy lines. A prescription pattern study will aid in the optimization of anti-cancer therapy with improved efficacy and minimal toxicity.

MATERIAL AND METHODS

This was an educational observational study, and subjects for the study were identified by the investigator during ward rounds based on the inclusion and exclusion criteria. Relevant data (demographic details, prescription details) collected were recorded on the Self-designed data collection form. The data thus obtained was entered into a Microsoft Excel sheet and analyzed appropriately. A total of 37 samples were collected, of which 31 were selected for the study. The study was approved by Institutional Ethics Committee of the tertiary care teaching hospital, Bengaluru in accordance with the guidelines issued by ICMR (No.532/L/11/12/Ethics/ESICMC&PGIMSR/Estt.Vol.-IV).

Inclusion criteria:

a) Subjects diagnosed with different types of lung cancer of any stage attending the day care ward of the Oncology Department.
b) Subjects willing to participate and ready to give consent for the study.
c) Subjects prescribed with chemotherapy for different types of lung cancer of any stage.
d) Subjects of age above 18 years.
e) Subjects of any gender.

Exclusion criteria:

Subjects with any other solid or liquid tumors were excluded from the study.

Statistical Analysis:

All recorded data were entered and analyzed using MS Excel. Descriptive statistics were computed for quantitative variables. Frequencies and percentages were calculated for categorical values. Column charts, pie-charts, bar graphs were applied to find the nature of data distribution.

RESULTS

The study was conducted in the Out-Patient Department of Oncology, in a Tertiary care teaching hospital, Bangalore. The study was carried out over a period of three months and a total of 37 samples were collected. Of these, six samples were dropped out due to insufficient data, so the overall sample size were 31.

Distribution of subjects according to age and gender

Subjects were categorized based on age and gender (shown in table 1). The highest number of subjects included in the study belonged to the 51–60 age groups. Among these age groups, nine subjects were men and four subjects were women, accounting for the total number of patients to be 13 (6%). The majority of the subjects included in the study were men, followed by women.

Table 1: Age – gender distribution in lung cancer

AGE	MALE	FEMALE	TOTAL NUMBER OF PATIENTS	PERCENTAGE
31-40	1	1	2	6%
41-50	5	5	10	32%
51-60	9	4	13	42%
61-70	5	1	6	19%

Distribution of subjects according to personal history

Subjects were categorized based on personal history (shown in table 2). In social habits, the highest number of patients were involved with smoking (52%) followed by alcohol consumption (42%). In family history, the patients with a family history of malignancy account for about 6% of the total, followed by the patients without a family history of malignancy (77%). In the case of comorbidities, the highest number of subjects had diabetes (3%) followed by hypertension (10%).

Table 2: Distribution of personal history

PERSONAL HISTORY OF PATIENTS	TYPES	NUMBER OF PATIENTS	PERCENTAGE
SOCIAL HABITS	SMOKING	16	52%
	ALCHOHOL	13	42%

PERSONAL HISTORY OF PATIENTS	TYPES	NUMBER OF PATIENTS	PERCENTAGE
	GUTKA	2	6%
	TOBACCO CHEWING	6	19%
FAMILY HISTORY	PATIENTS WITH FAMILY HISTORY OF MALIGNANCY	5	16%
	PATIENTS WITHOUT THE FAMILY HISTORY OF MALIGNANCY	24	77%
COMORBIDITIES	DIABETES MELLITUS	4	13%
	HYPERTENSION	3	10%
	RELAPSED CANCER	2	6%
	BRONCHIAL ASTHMA	2	6%
	HCV +ve	1	3%
	CVA	1	3%
	IHD	1	3%
	HYPOTHYROIDISM	1	3%

Distribution of subjects according to the grade of lung cancer

Subjects were categorized based on the grade of cancer (shown in table 3). The majority of the subjects in the study had poorly differentiated cancer cells (58%), followed by GX (Grade cannot be differentiated) with 3%.

Table 3: Grade wise distribution in lung cancer

GRADE OF CANCER	NUMBER OF PATIENTS	PERCENTAGE
GX	7	23%
WELL DIFFERENTIATED	2	6%
MODERATELY DIFFERENTIATED	4	13%
POORLY DIFFERENTIATED	18	58%

Distribution of subjects according to the stage of lung cancer

Subjects were categorized based on the stage of cancer (shown in table 4). The majority of the subjects involved in the study belonged to stage IV B (58%), followed by stage III A.

Table 4: Stage wise distribution in lung cancer

STAGE OF LUNG CANCER	NUMBER OF PATIENTS	PERCENTAGE
STAGE 1 A2	1	3%
STAGE 1 A3	2	6%
STAGE 1 B	2	6%
STAGE II A	1	3%
STAGE III A	3	10%
STAGE III B	1	3%
STAGE III C	1	3%
STAGE IV A	1	3%
STAGE 1V B	18	58%
STAGE II B	1	3%

Distribution of subjects according to the types of lung cancer

Subjects were categorized based on the types of lung cancer (shown in Table 5). The most prevalent lung cancer among the study subjects was found to be NSCLC, which accounts for about 87% of the total study population, followed by SCLC. Adenocarcinoma is the most common subtype of NSCLC, accounting for 61% of all cases.

Table 5: Distribution of the types of lung cancer

TYPES OF CANCER	SUB - TYPES OF LUNGS CANCER	NUMBER OF PATIENTS	PERCENTAGE
NSCLC	ADENOCARCINOMA	19	87%
	SQUAMOUS CELL CARCINOMA	7	
	UNDIFFERENTIATED CARCINOMA	1	
	LARGE CELL CARCINOMA	0	
SCLC		3	10%
SYNOVIAL SARCOMA		1	3%

Distribution of subjects based on the extent of tumor spread

Subjects were categorized based on the extent of tumor spread (shown in Table 6). Out of the 31 subjects, 84% had metastasis and 6% were non-metastatic.

Table 6: Distribution of the extent of tumor spread in lung cancer

EXTENT OF TUMOR SPREAD	DESTINATION OF CANCER SPREAD	NUMBER OF PATIENTS	PERCENTAGE
METASTATIC	SKELETAL + LIVER	1	84%
	BONE	2	
	BRAIN	3	
	GALL BLADDER	1	
	SKELETAL	2	
	SPINAL	1	
	PFS	1	
	ANAL CANAL	1	
	OVARY	1	
	ADRENAL	1	
	BRAIN + BONE	2	
	TONSIL + ESOPHAGUS	1	
	LOCAL SPREAD	6	
	UNKNOWN SPREAD	3	
NON - METASTATIC		5	6%

Distribution of subjects based on the symptoms

The subjects were categorized based on the symptoms (shown in table 7). It was observed that the highest number of subjects presented with complaints of cough and loss of weight, accounting for about 74%, followed by loss of appetite which accounts for about 48%.

Table 7: Distribution of symptoms in patients with lung cancer

MAJOR SYMPTOMS SEEN IN LUNG CANCER PATIENTS	NUMBER OF PATIENTS PRESENTED WITH EACH COMPLAINTS	PERCENTAGE
LOSS OF APPETITE	15	48%
LOSS OF WEIGHT	23	74%
CHEST PAIN	10	32%
COUGH	23	74%
FATIGUE	7	23%
BREATHING DIFFICULTY	13	42%
HEMOPTYSIS	13	42%
VOICE CHANGE	10	32%
DYSPNEA	12	39%

Distribution of subjects based on chemotherapy for lung cancer

The subjects were categorized based on the distribution of chemotherapy drugs used in lung cancer (Shown in Table 8). The majority of the subjects involved in the study were prescribed with Carboplatin (74%) followed by Pemetrexed Disodium (29%).

Table 8: Distribution of chemotherapy drugs used in lung cancer

CATEGORY OF CT DRUGS	LIST OF THE SUB - CATEGORY OF DRUGS USED IN LUNG CANCER	LIST OF DRUGS PRESCRIBED UNDER EACH SUB - CATEGORY	TOTAL NUMBER OF DRUGS PRESCRIBED FOR EACH PATIENTS	%
CYTOTOXIC DRUGS	ALKYLATING AGENT	IFOSTAMIDE	1	3%
	PLATINUM CO-ORDINATION COMPLEX	CISPLATIN	2	6%
		CARBOPLATIN	23	74%
	ANTI - METABOLITES	PEMETREXED	9	29%
		GEMCITABINE	6	19%
	MICROTUBULE DAMAGING AGENT	VINORELBINE	1	3%
		PACLITAXEL	7	23%

CATEGORY OF CT DRUGS	LIST OF THE SUB - CATEGORY OF DRUGS USED IN LUNG CANCER	LIST OF DRUGS PRESCRIBED UNDER EACH SUB - CATEGORY	TOTAL NUMBER OF DRUGS PRESCRIBED FOR EACH PATIENTS	%
	TOPOISOMERASE 2 INHIBITOR	ETOPOSIDE	2	6%
	TOPOISOMERASE 1 INHIBITOR	IRINOTECAN	2	6%
	ANTIBIOTICS	DOXORUBICIN	1	3%
TARGETED DRUGS	EGF RECEPTOR INHIBITORS	CETUXIMAB	2	6%
	ANGIOGENESIS INHIBITORS	BEVACIZUMAB	2	6%
	UNARMED MONOCLONAL ABTIBODY	ATEZOLIZUMAB	1	3%
		PEMBROLIZUMAB	1	3%
		RAMUCIRUMAB	1	3%
		NIVOLUMAB	1	3%
		DENOSUMAB	1	3%

Prescription pattern based on the types of lung cancer in patients

Subjects were categorized based on the types of lung cancer (Shown in table 9). The dual therapy of Carboplatin and Pemetrexed were the most commonly preferred dual therapy for NSCLC patients. For the patients with SCLC dual therapy and triple therapy of chemotherapy drugs were given. For the patients with synovial sarcoma, dual therapy with Ifostamide + Adriamycin was given.

Table 9: Prescription pattern of chemotherapeutic drugs based on the types of lung cancer

TYPES OF LUNGS CANCER	SUB - TYPES OF UNG CANCER	TYPE OF THERAPY	DRUG NAME	Number of patients received CT	%
NSCLC	ADENOCARCINOMA	MONOTHERAPY	PEMETREXED	2	61 %
			RAMUCIRUMAB	1	
			CARBOPLATIN	1	
		DUAL THERAPY	CARBOPLATIN + PEMETREXED	6	
			GEMCITABINE + CISPLATIN	1	
			GEMCITABINE + CARBOPLATIN	1	
			PEMETREXED + CISPLATIN	1	
			GEMCITABINE + VINORELBINE	1	
			CARBOPLATIN + DENOSUMAB	1	
			PACLITAXEL + CARBOPLATIN	1	
		TRIPLE THERAPY	CARBOPLATIN + PACLITAXEL + BEVACIZUMAB	1	
			PACLITAXEL + CARBOPLATIN + CETUXIMAB	1	
			CARBOPLATIN + GEMCITABINE + BEVACIZUMAB	1	
	SQUAMOUS CELL CARCINOMA	MONOTHERAPY	NIVOLUMAB	1	23 %
		DUAL THERAPY	GEMCITABINE + CARBOPLATIN	2	
			PACLITAXEL + CARBOPLATIN	1	
			IRINOTECAN + CARBOPLATIN	1	
		TRIPLE THERAPY	PACLITAXEL + CARBOPLATIN + CETUXIMAB	1	
			PACLITAXEL + CARBOPLATIN + PEMBROLIZUMAB	1	
	UNDIFFERENTIATED CARCINOMA	DUAL THERAPY	PACLITAXEL + CARBOPLATIN	1	3%
SCLC		DUAL THERAPY	ETOPOSIDE + CARBOPLATIN	1	10 %
			ETOPOSIDE + IRINOTECAN	1	
		TRIPLE THERAPY	ETOPOSIDE + CARBOPLATIN + ATEZOLIZUMAB	1	
SYNOVIAL SARCOMA		DUAL THERAPY	IFOSTAMIDE + ADRIAMYCIN	1	3%

Prescription pattern of chemotherapeutic drugs based on the stages of lung cancer

Subjects were categorized based on the stages of lung cancer (Shown in table 10). The majority of the subjects involved in the study belonged to stage IV B, so the commonly preferred treatment was by using dual therapy. Carboplatin and Pemetrexed were the most commonly preferred dual therapy.

Table 10: Prescription pattern of chemotherapeutic drugs based on the stages of lung cancer

STAGE OF LUNG CANCER	TYPE OF THERAPY	DRUG NAME	NUMBER OF PATIENTS RECEIVED CT	PERCENTAGE
STAGE I A2	DUAL THERAPY	GEMCITABINE + CARBOPLATIN	1	3%
STAGE I A3	DUAL THERAPY	PEMETREXED + CISPLATIN	1	6%
		CARBOPLATIN + DENOSUMAB	1	
STAGE I B	DUAL THERAPY	CARBOPLATIN + PEMETREXED	1	6%
	TRIPLE THERAPY	CARBOPLATIN + PACLITAXEL + CETUXIMAB	1	
STAGE II A	DUAL THERAPY	CARBOPLATIN + IRINOTECAN	1	3%
STAGE II B	DUAL THERAPY	PACLITAXEL + CARBOPLATIN	1	3%
STAGE III A	MONOTHERAPY	NIVOLUMAB	1	10%
	DUAL THERAPY	GEMCITABINE + CARBOPLATIN	1	
	TRIPLE THERAPY	ETOPOSIDE + CARBOPLATIN + ATEZOLIZUMAB	1	
STAGE III B	MONOTHERAPY	CARBOPLATIN	1	3%
STAGE III C	DUAL THERAPY	PACLITAXEL + CARBOPLATIN	1	3%
STAGE IV A	DUAL THERAPY	PEMETREXED + CARBOPLATIN	1	3%
STAGE IV B	MONOTHERAPY	PEMETREXED	2	10%
		RAMUCIRUMAB	1	
	DUAL THERAPY	CARBOPLATIN + PEMETREXED	5	35%
		GEMCITABINE + PEMETREXED	1	
		GEMCITABINE + CISPLATIN	1	
		PACLITAXEL + CARBOPLATIN	1	
		ETOPOSIDE + CARBOPLATIN	1	
		IFOSTAMIDE + DOXORUBICIN	1	
		IRINOTECAN + CARBOPLATIN	1	
	TRIPLE THERAPY	CARBOPLATIN + PACLITAXEL + CETUXIMAB	1	13%
		PACLITAXEL + CARBOPLATIN + PEMBROLIZUMAB	1	
		PACLITAXEL + CARBOPLATIN + BEVACIZUMAB	1	
		CARBOPLATIN + GEMCITABINE + BEVACIZUMAB	1	

Prescription pattern of chemotherapeutic based on metastatic locations

Subjects were categorized based on the metastatic locations (Shown in Table 11). The most commonly preferred treatment of choice in the metastasis patient is the dual therapy of Carboplatin + Pemetrexed Disodium. Dual therapy with Carboplatin and Pemetrexed Disodium is the most commonly preferred treatment for patients with metastasis.

Table 11: Prescription pattern of chemotherapeutic drugs based on the metastatic locations

DESTINATION OF CANCER SPREAD	TYPE OF TREATEMENT	DRUG NAME	NUMBER OF PATIENTS RECEIVED CT	PERCENTAGE
SKELETAL + LIVER	DUAL THERAPY	CARBOPLATIN + PEMETREXED	1	3%
BONE	MONOTHERAPY	RAMUCIRUMAB	1	6%
	DUAL THERAPY	GEMCITABINE + CARBOPLATIN	1	
BRAIN	MONOTHERAPY	PEMETREXED	1	10%
	DUAL THERAPY	PEMETREXED + CARBOPLATIN	1	
		GEMCITABINE + VINORELBINE	1	
GALL BLADDER	DUAL THERAPY	GEMCITABINE + CISPLATIN	1	3%
PFS	TRIPLE THERAPY	CARBOPLATIN + PACLITAXEL + CETUXIMAB	1	3%

DESTINATION OF CANCER SPREAD	TYPE OF TREATEMENT	DRUG NAME	NUMBER OF PATIENTS RECEIVED CT	PERCENTAGE
ANAL CANAL	TRIPLE THERAPY	PACLITAXEL + CARBOPLATIN + PEMBROLIZUMAB	1	3%
OVARY	TRIPLE THERAPY	CARBOPLATIN + PACLITAXEL + BEVACIZUMAB	1	3%
ADRENAL	DUAL THERAPY	ETOPOSIDE + CARBOPLATIN	1	3%
BRAIN + BONE	DUAL THERAPY	PEMETREXED + CARBOPLATIN	2	6%
TONSIL + ESOPHAGUS	DUAL THERAPY	IRINOTECAN + CARBOPLATIN	1	3%
SPINAL	DUAL THERAPY	PACLITAXEL + CARBOPLATIN	1	3%
UNKNOWN SPREAD	MONOTHERAPY	PACLITAXEL	1	19%
		NIVOLUMAB	1	
		CARBOPLATIN	1	
	DUAL THERAPY	PEMETREXED + CARBOPLATIN	1	
	TRIPLE THERAPY	ETOPOSIDE + CARBOPLATIN + ATEZOLIZUMAB	1	
		PACLITAXEL + CARBOPLATIN + CETUXIMAB	1	
LOCAL SPREAD	DUAL THERAPY	PACLITAXEL + CARBOPLATIN	1	10%
		GEMCITABINE + CARBOPLATIN	1	
		CARBOPLATIN + IRINOTECAN	1	
SKELETAL	MONOTHERAPY	PEMETREXED	1	6%
	TRIPLE THERAPY	CARBOPLATIN + GEMCITABIN + BEVACIZUMAB	1	
NON-METASTATIC	DUAL THERAPY	PACLITAXEL + CARBOPLATIN	1	16%
		PEMTREXED + CARBOPLATIN	1	
		GEMCITABINE + CARBOPLATIN	1	
		PEMETREXED + CISPLATIN	1	
		CARBOPLATIN + DENOSUMAB	1	

DISCUSSION

Out of the 31 subjects included in the study, the majority of them belonged to the age group of 51–60. Among these nine subjects were males and four subjects were females accounting for the total number of patients to be 13 (42%). Followed by the age group of 41–50 with 32%, then the age group of 61–70 with 19%, and 31–40 with 6%. Out of 31 subjects included in the study, the majority of them were males (65%) when compared to females (35%).

Social habits and family history played a vital role in the incidence of lung cancer. In social habits majority of patients were involved with smoking (52%), followed by alcohol (42%), tobacco chewing (19%) and gutka (6%). In family history, 6% of patients had a family history of malignancy and 77% percent of patients without family history of malignancy. In comorbidities, 3% of the patients had diabetes mellitus, ten of patients with hypertension, 6% with relapsed cancer and bronchial asthma, 3% with HCV (Hepatitis C) positive, IHD (ischemic heart disease), hypothyroidism and CVA (Cerebral vascular accident).

Out of the 31 subjects included in the study, the majority of the subjects in the study had poorly differentiated cancer cells with 58% followed by followed by GX with 3%, moderately differentiated with 3% and well differentiated with six percent.

The current study concluded that the majority of lung cancer patients consulting this hospital belongs to stage IV B lung cancer, accounting for up to 58%, followed by stage III A with 10%, 6% of stage IA3 and stage I B and 3% with stage I A2, stage II A, stage III B, stage III C, stage IV A and stage II B. The results were similar to the work done by Lemjabbar-Alaoui H *et al*., [8].

In this study, 87% of patients attending the day-care ward of the oncology department had non-small cell lung cancer (NSCLC), 10% had small cell lung cancer (SCLC) and 3% with synovial sarcoma. In the NSCLC subtype of lung cancer, 61% of patients were diagnosed with adenocarcinoma, 3% with Squamous cell carcinoma and 3% undifferentiated carcinoma. The results were similar to the study conducted by Galvez-Nino M *et al*., [9].

Out of the 31 subjects included in the study, 84% of the patients had metastasis and 6% with non-metastasis. Under metastasis, 19% of the patients were with local spread and unknown spread with 10%. Metastasis to the brain with 10%, bone and brain + bone with six percent, skeletal + liver, gall bladder, spinal, PFS, anal canal, ovary, and adrenal with 3%. The results were similar to the work done by Lemjabbar-Alaoui H *et al*., [8].

The majority of the patients enrolled for this study presented with complaints of cough and loss of weight with 74%, loss of appetite with 48%, breathing difficulty and hemoptysis with 42%, dyspnea with 39%, voice change and chest pain with 32% and fatigue with 3%. The results were similar to the study conducted by Galvez-Nino M *et al*., [9].

In the general prescribing pattern of chemotherapy (CT) drugs in this hospital, Carboplatin (74%) was the most preferred drug of choice by the oncologist, followed by Pemetrexed with 29%, Paclitaxel with 3%, Gemcitabine with 19%, 6% of Cisplatin, Etoposide, Irinotecan, Cetuximab, Bevacizumab and 3% of Ifostamide, Vinorelbine, Doxorubicin, Atezolizumab, Ramucirumab, Pembrolizumab, Nivolumab and Denosumab. The results were similar to the study conducted by Bazhenova L *et al*., [10].

Chemotherapy drugs for cancer patients are divided into three categories: Cytotoxic drugs, Targeted drugs, and Hormonal drugs. In the present study, we have concluded that the oncologists in this hospital prefer Cytotoxic and Targeted drugs over Hormonal drugs for the treatment of lung cancer. The prescription pattern of anticancer drugs was categorized into three types: monotherapy, dual therapy, and triple therapy. Oncologists' prescription patterns for anticancer drugs at this hospital based on the type of lung cancer: NSCLC, SCLC and synovial sarcoma was also studied.

In this hospital, NSCLC was more prevalent. The prescription patterns for the administration of anticancer medications to patients with NSCLC were classified using three categories: monotherapy, dual therapy, and triple therapy.

- Under monotherapy of NSCLC adenocarcinoma; Pemetrexed (six percent), Ramucirumab (3%) and Carboplatin (3%) was used.
- Under dual therapy NSCLC adenocarcinoma; the combination of Carboplatin + Pemetrexed (19%), then 3% of Gemcitabine + Carboplatin, Gemcitabine + Cisplatin, Pemetrexed + Cisplatin, Gemcitabine + Vinorelbine, Carboplatin + Denosumab, Paclitaxel + Carboplatin was used.
- Under triple therapy NSCLC adenocarcinoma; 3% of Carboplatin + Paclitaxel + Bevacizumab, Paclitaxel + Carboplatin + Cetuximab, Carboplatin + Gemcitabine + Bevacizumab is used.
- Under monotherapy of NSCLC Squamous cell carcinoma; 3% Nivolumab was used.
- Under dual therapy of NSCLC Squamous cell carcinoma; 6% of Gemcitabine + Carboplatin and 3% of Carboplatin + Paclitaxel and Carboplatin + Irinotecan was used.
- Under triple therapy of NSCLC Squamous cell carcinoma; 3% of Paclitaxel + Carboplatin + Cetuximab and Paclitaxel + Carboplatin + Pembrolizumab are used.
- For the treatment of undifferentiated carcinoma, the dual therapy of 3% Carboplatin + Paclitaxel was used.

The administration of anticancer medications to patients with SCLC was classified into three categories: monotherapy, dual therapy, and triple therapy. Dual therapy was mostly preferred by the oncologist for the treatment of SCLC.

- Under dual therapy, 3% of Etoposide + Carboplatin and Etoposide + Irinotecan was used.
- Under triple therapy, 3% of Etoposide + Carboplatin + Atezolizumab were used.

For the treatment of Synovial Sarcoma, the Oncologist in this hospital prescribed the dual therapy of Ifostamide + Adriamycin (3%).

The stages of cancer reveal the extent of the disease's spread and guide treatment. When lung cancer is diagnosed and treated early, the likelihood of a successful or curative treatment is substantially increased. Lung cancer does not manifest noticeable symptoms in its early stages, it is commonly detected after it has already spread. In the present study, we analyzed the prescription pattern of anticancer drugs chosen for the treatment of various stages of lung cancer. The current study concluded that the majority of lung cancer patients consulting this hospital belongs to stage IV B lung cancer, accounting for up to 58%, followed by stage III A with 10%, 6% of stage IA3 and stage I B and 3% with stage I A2, stage II A, stage III B, stage III C, stage IV A and stage II B.

In most cases, stage I and II was treated surgically. Chemotherapy may be beneficial for certain individuals with a large tumor or lymph node metastases. Before surgery, chemotherapy may be administered as neoadjuvant chemotherapy or induction chemotherapy. Adjuvant chemotherapy may also be administered after surgery to reduce the likelihood of cancer recurrence. In the current study, neoadjuvant therapy was given to most of the patients which includes monotherapy, dual therapy and triple therapy.

- Under Stage I A2, the dual therapy of 3% of Gemcitabine + Carboplatin was used.
- Under Stage I A3, the dual therapy of 3% of Pemetrexed + Cisplatin and Carboplatin + Denosumab was used.
- Under Stage I B, the dual therapy of 3% of Carboplatin + Pemetrexed and triple therapy of Paclitaxel + Carboplatin + Cetuximab was used.
- Under Stage II A, the dual therapy of 3% of Carboplatin + Irinotecan was used.

- Under Stage II B, the dual therapy of 3% of Paclitaxel + Carboplatin was used.

Stage III is a heterogeneous disease, and varies from resectable tumors with microscopic metastases to lymph nodes to unresectable, bulky disease involving multiple nodal locations. The treatment strategies, including radiotherapy, chemotherapy, and surgical resection are determined by the tumor location and whether it is resectable.

- Under Stage III A, monotherapy of 3% Nivolumab was used. Dual therapy of 3% Gemcitabine + Carboplatin was used. Triple therapy of 3% Etoposide + Carboplatin + Atezolizumab was used.
- Under Stage III C, dual therapy of 3%Carboplatin + Paclitaxel was used.

In most cases, patients with stage IV do not undergo surgery or radiation therapy as the primary treatment. People with stage IV disease have an extremely high risk of the cancer spreading or growing elsewhere. The majority of patients with this stage were treated with systemic treatments, such as chemotherapy, targeted therapy, or immunotherapy. Palliative care will also be essential for symptom and side effect relief. In the current study the prescribing pattern for the treatment of stage IV lung cancer was analyzed.

- Under Stage IV A, dual therapy of 3% Carboplatin + Pemetrexed was used.
- Under Stage IV B, the monotherapy of 6% Pemetrexed and 3% Ramucirumab was used. 6% Carboplatin + Pemetrexed, 01 percent of Gemcitabine + Pemetrexed, Gemcitabine + Cisplatin, Carboplatin + Paclitaxel, Etoposide + Carboplatin, Ifostamide + Adriamycin and Irinotecan + Carboplatin is used as dual therapy. 3% of Paclitaxel + Carboplatin + Cetuximab, Carboplatin + Paclitaxel + Bevacizumab, Paclitaxel + Carboplatin + Pembrolizumab and Carboplatin + Gemcitabine + Bevacizumab was used as triple therapy.

The results were similar to the article in PubMed by Lemjabbar-Alaoui H *et al*., [8]

Metastatic cancer is the term used by oncologists to describe cancer that has spread to another area of the body. The objectives of systemic therapies are to reduce the size of the cancer, alleviate the pain caused by the cancer, prevent the cancer from spreading, and prolong the patient's life. Sometimes, these treatments can eradicate metastatic lung cancer. The current study examined the prescription pattern of oncologists in this hospital based on the drugs given for the treatment of the type of cancer spread destinations. The most commonly preferred treatment of choice in the metastasis patient is the dual therapy of Carboplatin + Pemetrexed Disodium. Dual therapy with Carboplatin and Pemetrexed Disodium was the most commonly preferred treatment for patients with metastasis.

- For the treatment of Skeletal and Liver metastasis, dual therapy with Carboplatin + Pemetrexed (3%) was used.
- For the treatment of Bone metastasis, monotherapy with 3% Ramucirumab and Gemcitabine + Carboplatin (3%) dual was used.
- For the treatment of Brain metastasis, monotherapy with 3% Pemetrexed and Gemcitabine + Vinorelbine, Carboplatin + Pemetrexed (3%) dual was used.
- For the treatment of Gall Bladder metastasis, dual therapy with Gemcitabine + Cisplatin was used.
- For the treatment of PFS metastasis, triple therapy with Paclitaxel + Carboplatin + Cetuximab (3%) was used.
- For the treatment of Anal Canal metastasis, triple therapy with Paclitaxel + Carboplatin + Pembrolizumab (3%) was used.
- For the treatment of Ovary metastasis, triple therapy with Paclitaxel + Carboplatin + Bevacizumab (3%) was used.
- For the treatment of Adrenal metastasis, dual therapy with Etoposide + Carboplatin (3%) was used.
- For the treatment of Brain + Bone metastasis, dual therapy with Carboplatin + Pemetrexed (6%) was used.
- For the treatment of Tonsil + Esophagus metastasis, dual therapy with Irinotecan + Carboplatin (3%) was used.
- For the treatment of Spinal metastasis, dual therapy with Paclitaxel + Carboplatin (3%) was used.
- For the treatment of Skeletal metastasis, triple therapy with and Carboplatin + Gemcitabine + Bevacizumab (3%) was used.
- For the treatment of Unknown metastasis, monotherapy with 3%Paclitaxel, Carboplatin and Nivolumab is used. Dual therapy with 3% Carboplatin + Pemetrexed. Triple therapy with 3% with Paclitaxel + Carboplatin + Cetuximab and Etoposide + Carboplatin + Atezolizumab was used.
- For the treatment of Local spread, dual therapy with 3% Paclitaxel + Carboplatin, Carboplatin + Gemcitabine and Irinotecan + Carboplatin was used.

For the treatment of non-Metastatic, dual therapy with 3% Paclitaxel + Carboplatin, Carboplatin + Pemetrexed, Carboplatin + Gemcitabine, Pemetrexed + Cisplatin and Carboplatin + Denosumab were used.

From this study, it is concluded that the highest number of subjects were 51–60 years old, with most of

the population being male. Most patients had a history of smoking, alcohol use, and a family history of malignancy, which led to lung cancer. Most patients had poorly differentiated cancer cells that belonged to stage IV B lung cancer. NSCLC was more common than SCLC, and adenocarcinoma was the most common NSCLC subtype. The majority of subjects had coughing, loss of weight, and hemoptysis as symptoms of lung cancer. The most preferred prescribing therapy was dual therapy. Carboplatin and Pemetrexed disodium were the most preferred combination therapies. Carboplatin was the most prescribed drug of choice. In the present study, it was observed that Cytotoxic and targeted drugs were preferred more than hormonal drugs for the treatment of lung cancer. The majority of the medications prescribed in this hospital were on the National List of Essential Medicines. The drugs prescribed at this hospital were in accordance with NCCN guidelines.

CONCLUSION

The present study was conducted in a tertiary care teaching hospital, focusing only on lung cancer patients. From this study, it is concluded that the highest number of subjects were 51–60 years old, with most of male population. Most patients had a history of smoking, alcohol use, and a family history of malignancy, which led to lung cancer. Most patients had poorly differentiated cancer cells and belonged to stage IV B lung cancer. NSCLC was more common than SCLC, and adenocarcinoma was the most common NSCLC subtype. The majority of subjects had cough, loss of weight and hemoptysis as symptoms during lung cancer.

The most preferred prescribing therapy was dual therapy. Carboplatin + Pemetrexed Disodium were the most preferred combination therapy. Carboplatin was the most prescribed drug of choice. In the present study, it was observed that Cytotoxic and Targeted drugs were preferred more than Hormonal drugs for the treatment of lung cancer.

The majority of the medications prescribed in this hospital were on the National List of Essential Medicines. The drugs prescribed in this hospital were in accordance with NCCN guidelines.

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