CUTANEOUS MANIFESTATIONS IN CANCER PATIENTS : A CROSS – SECTIONAL STUDY

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Abstract

Introduction

Skin, the biggest organ in the body, reflects organismal changes. Internal malignancies can induce skin, hair, nail, and oral mucosal alterations. Some changes occur early, indicating a significant cancer link, whereas others arise later, indicating spread or immunosuppression. This study seeks to identify dermatosis patterns associated with internal cancers for early identification and treatment.

Aim

To detect internal malignancy-related, particular, and non-specific dermatosis patterns

Materials & Methods

Written informed permission was obtained from internal malignancy patients with skin lesions who visited dermatology and oncology from May 2023 to November 2024. A complete skin lesion and cancer history were gathered. Clinical evaluation (skin/hair/nail) and photos were taken. Relevant investigations occurred.

Dermatographic data and dermatosis related to internal malignancies were calculated by frequency and proportion.

Results

Cross-sectional observational research of 207 patients diagnosed with internal malignancy, including 111 males and 96 females, found that breast and buccal mucosa were the most common types of carcinomas. Scabies is the most common infectious dermatosis; Urticaria is a common inflammatory one; and pigmentary dermatoses are characterized by hyperpigmentation. Melanonychia is a common nail alteration. Angen effluvium is a typical hair change. Hyperpigmentation is a common oral alteration.

Conclusion

Understanding particular and non-specific dermatosis associated with internal cancers helped doctors manage them.

Keywords: Breast carcinoma, cutaneous manifestations, malignancies

INTRODUCTION

Introduction

Cancer is one of the most significant contributors to mortality and morbidity across the globe, affecting both developed and developing regions. The annual number of people who are diagnosed with cancer is approximately 14.1 million around the world. There were 8.2 million deaths caused by cancer, and 58% of those deaths occurred in less advanced areas.[1] The burden of cancer is expected to increase at an exponential rate in

the years to come.

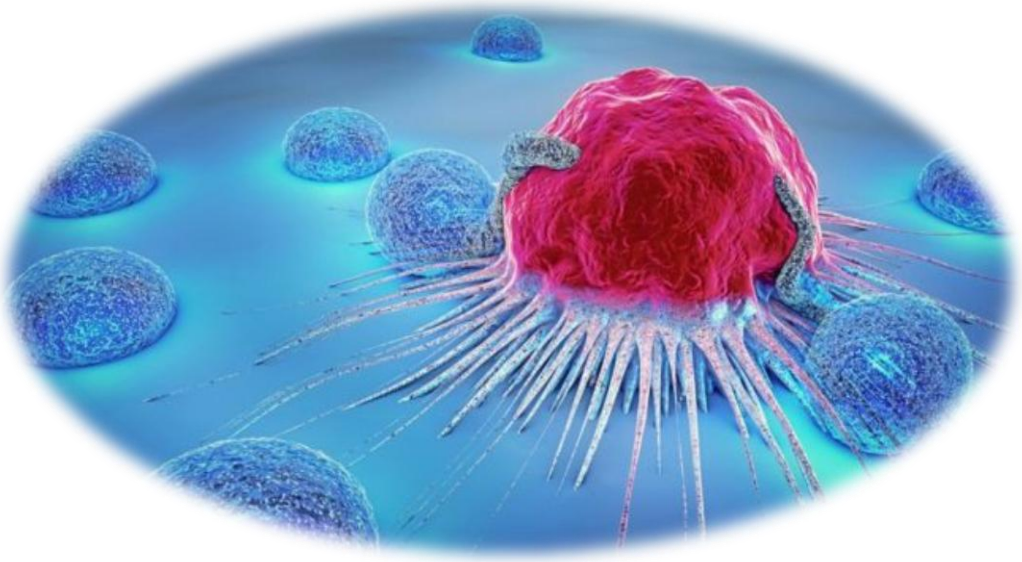

Figure1:Development of cancer

More than two hundred different types of cancer exist, and there are still a great deal of unknown facts regarding the disease. The elimination of cancer cells is the primary objective of all cancer treatment. Chemotherapy is the primary treatment for cancer in today's world. More than fifty percent of cancer patients are prescribed toxic anticancer medications with a low therapeutic index, even though the overall cure rate for these drugs is only between two and five percent. When it comes to cancer treatment, cutaneous symptoms are usually considered to be an essential component. As a result, patients and others who provide medical care are willing to accept them without question. [2]

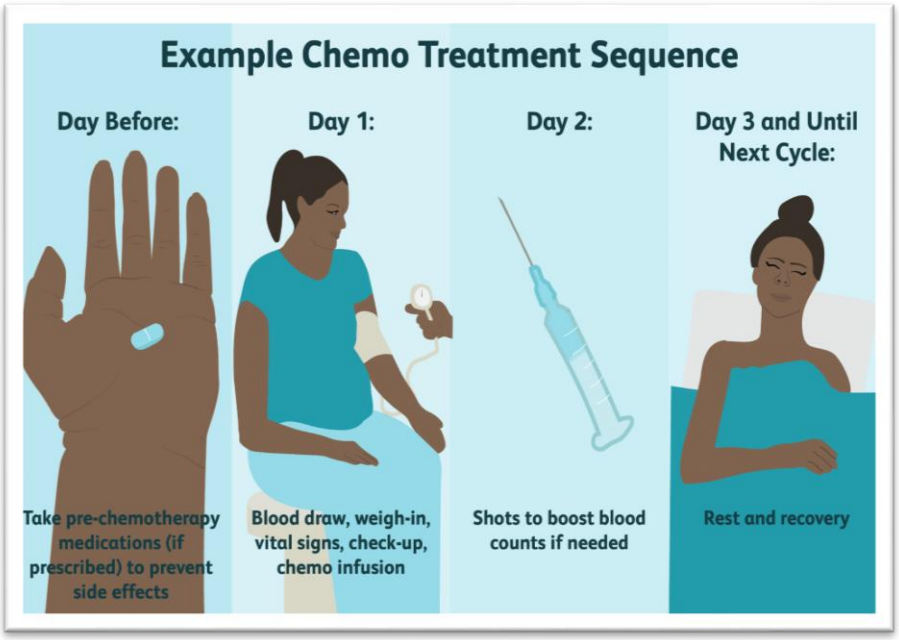

Figure 2: Process of Chemotherapy

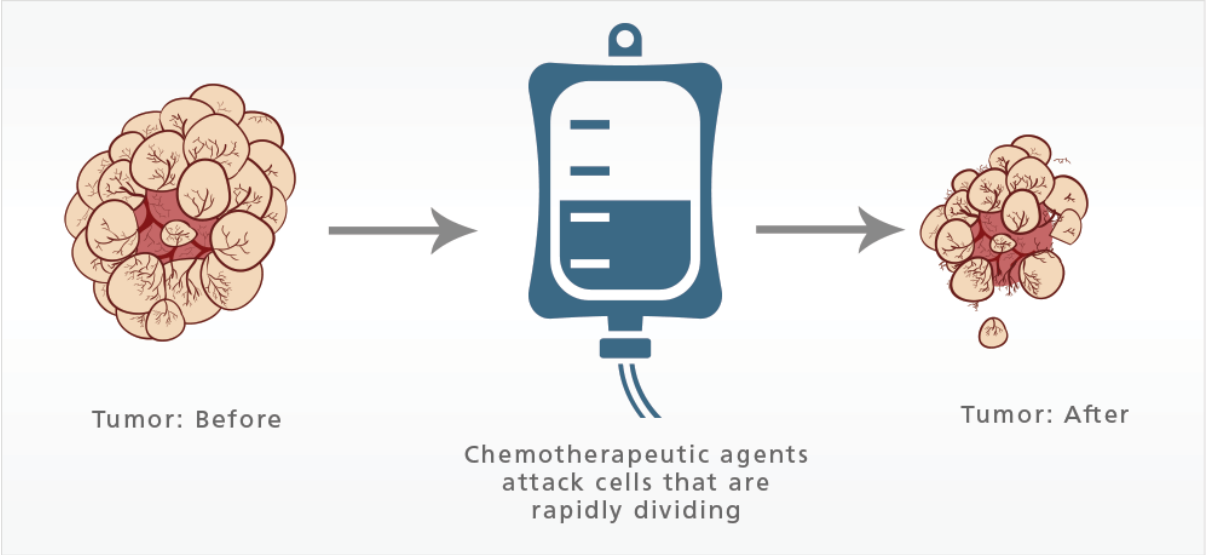

Figure 3: Tumor before and after treatment

The skin changes related to internal cancers encompass a range of nonmalignant skin conditions related to malignancy (paraneoplastic dermatoses), as well as skin disorders that result from the penetration of cancerous cells into the skin due to either

metastasis or the accumulation of disseminated tumor cells (for instance, leukemia cutis). The paraneoplastic dermatoses, such as Acanthosis nigricans, Florid cutaneal, Bazex Syndrome, Triple palm, Necrolytic migratory erythema, etc, in association with a specific carcinoma as a cutaneous marker will be seen. Along with Specific Paraneoplastic dermatoses, many non -nonspecific cutaneous changes will also be observed.[3]

Radiotherapy is linked with a high frequency of dermal adverse effects, which can occasionally be severe. These effects may reduce the duration of treatment, and acute or chronic effects are both possible outcomes. Symptoms of acute consequences include erythema, oedema, hyperpigmentation, scaling, and baldness. These symptoms manifest themselves anywhere from a few hours to several weeks following radiation exposure. Chronic consequences are more severe than acute effects, and they manifest themselves as ulcers, necrosis, and fibrosis. Chronic effects can emerge months to years after exposure. Chemotherapy has been linked to various dermatological alterations, including erythema, pimples, aversion reactions, itching, local peeling, and changes in nail appearance. Both the absence of a medicine that is truly curative and safe, as well as the growing prevalence of cancer, call for the expedited development of anticancer drugs and the acceleration of their approval processes. In the past few years, there has been a significant advancement in the development of information regarding cancer specialties and the management of these conditions. There is a constant process of developing a

large number of new targeted medications.[3] However, since the incidence of cancer continues to rise, the care of this disease has become an increasingly difficult task for the field of clinical medicine in the present day.

Need for the Study:

In the countryside, there is a high frequency of tobacco usage by both men and women. In light of this, it is anticipated that there would be a significant incidence and prevalence of cancerous lesions, especially in Kolar. In some rural regions, challenges such as poverty, illiteracy, inadequate healthcare, insufficient knowledge, and a lack of awareness about cancer are still widespread. [10] The cutaneous dermatoses will serve as a pre-marker in the finding of malignancy. Due to the paucity of literature, this study is undertaken.

AIMS & OBJECTIVES

Aims & Objectives

- To determine the patterns of various cutaneous indices connected with inner malignancy.
- To determine the prevalence of various cutaneous manifestations in cancer patients.

REVIEW OF LITERATURE

Review of Literature

Cancer constitutes a momentous societal and economic trial in the 21st century, accounting for about 16% of fatalities and 22% of deaths from noncommunicable diseases (NCDs) globally. The sickness accounts for 30.3% of global untimely expiries from NCDs in individuals aged 30–69, standing as one of the top three roots of demise in this demographic across 177 of 183 nations. [1,4] Disease not only hinders the enhancement of life expectation but also incurs significant economical expenses that differ by disease kind, geographic location, and gender.[5]

A recent study showed the serious effects of women's cancer mortality imbalance: About one million children were converted into motherless orphans in 2020 due to their mothers' cancer deaths, with over half of them due to breast or cervical cancer.[4]

Incidence of cancer cases and deaths globally

In 2022, there were projected to be 20.0 million novel cancer incumbents globally (19.96 million as well as non-melanoma skin cancer and 18.73 mountain without NMSC and 9.7 million cancer-related demises. In 2022, approximately 49.2% of all cancer gears and 56.1% of cancer mortalities worldwide were assessed to occur in Asia, a region that is home to 59.2% of the global population. [4]The cancer mortality weight in Africa and Asia is significantly higher than the incidence burden in these regions. This illustrates the dispersal of cancer kinds and the relatively higher case accident rates in these areas, partly due to late-stage identifies. Europe exhibits a significantly elevated cancer rate and mortality rate, accounting for one-fifth of the universal cancer drain (22.4%) and bereavements (20.4%), despite comprising less than 10% of the worldwide residents (9.6%).[4]

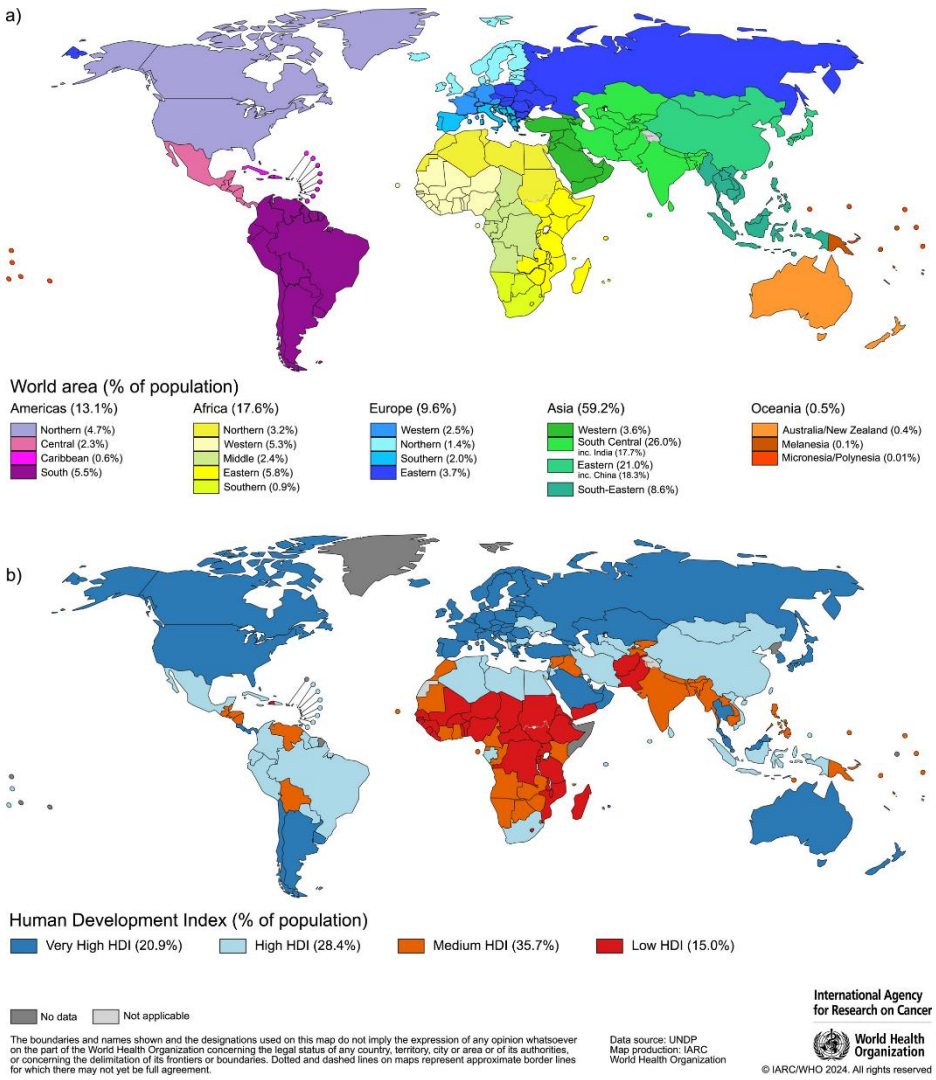

Figure 3: International maps extant (A) 20 zones of the biosphere and (B) the four-tier Human Development Index.

The dimensions of the particular people are comprised in the legend.

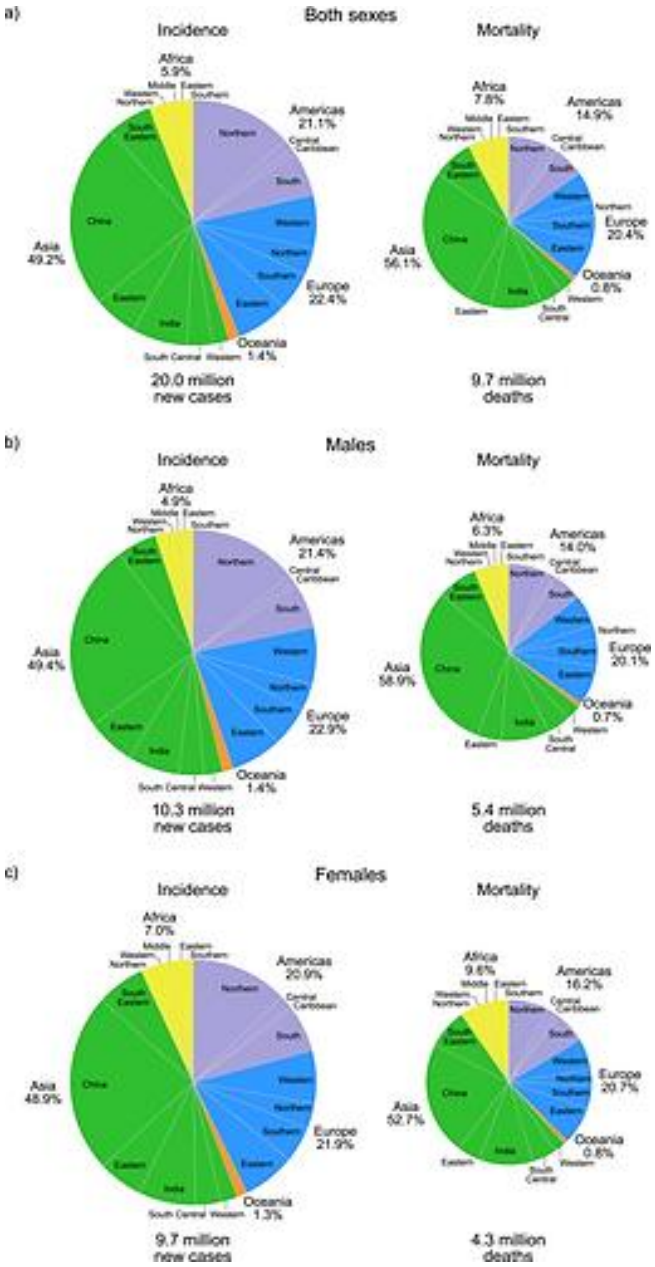

Figure 4: Pie charts extant the spread of cases and losses by world zone in 2022 for (A) both (B) males, and (C) females.

The sections of the pie graph represent the quantity of total deaths for each gender.

Cancer Incidence in India

Cancer ranks among the foremost contributors to illness and death in India. India is positioned third, next China and the USA. GLOBOCAN has projected that the figure of cancer cases in the Republic of India will influence 2.08 million by 2040, representing a momentous upsurge of 57.5 percent related to 2020.[6]

Despite recent advancements in medication and expertise, the incidence of cancer in India remains significant and is on an upward trajectory. Furthermore, significant regional variations in cancer frequency and access to critical medical possessions are present across the nation.[7] Ground-breaking and operative cancer treatments show potential for enhancing patient outcomes; however, various barriers impede their expansion and implementation in India. [8]

It is well known that cancer is a major problem in developing countries. More than 13.9 lakh cancer cases are newly identified every year in our nation. In Karnataka, it is estimated that there have been about 87,000 new cancer cases in recent years. At any point in time, there are more than 37.5 lakh cancer cases observed in India, and about 2.3 lakhs were observed in Karnataka. In India, the principal Cancers amongst men are Lung, Oral Cavity, Intestinal, colorectal, and oesophagus; in women, Breast, Uterine cervix, Ovary, and Oral Cancers are in a chief place.[9]

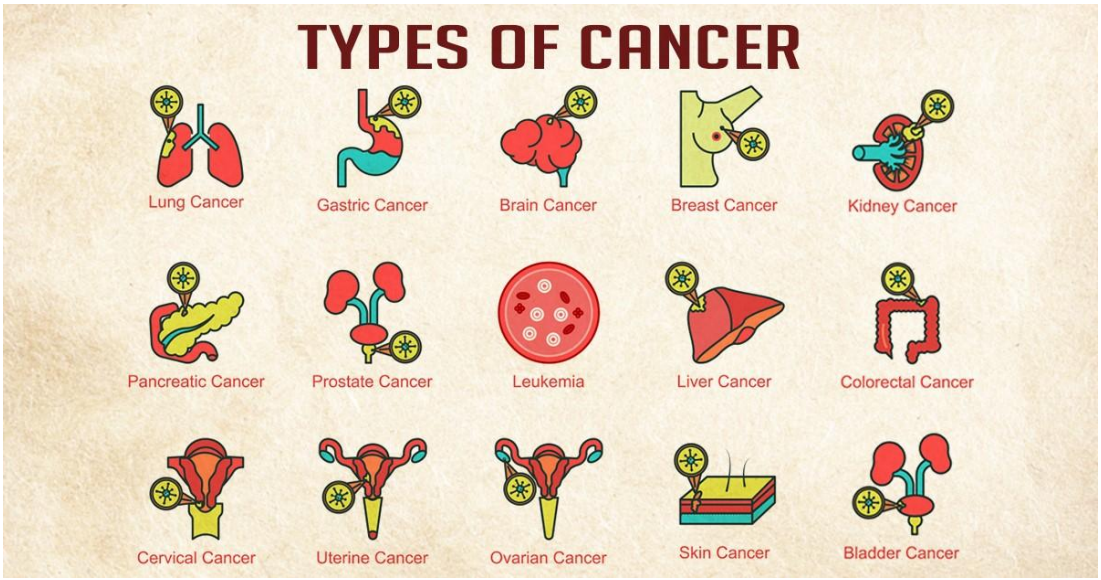

Figure 5: Types of Cancer

Cutaneous manifestations in cancer patients

General surgeons need to be conscious of cutaneal ciphers and signs that may designate the existence of a causal menace. Approximately, there are four classes to contemplate.

1. cutaneal metastasis
2. Congenital cancer syndromes
3. cutaneous symbols of introduction to carcinogens, and
4. Paraneoplastic conditions.

Understanding the dermal symptoms of universal and besieged cancer therapies is essential[10].

Cutaneal metastasis

Regarding distant metastases, the crust is a very infrequent site (rate ranging from 2% to 4%). When it comes to primary sites, the most communal ones in humanities are the lung (24%), El Salvadoran colon (19%), and oral squamous cell carcinoma (12%). In womenfolk, the most shared primary spots are the breast (69%), Rican rectum (19%), and the ovary (4%). [11] Lesions manifest themselves as non-cancerous, red or blue nodules that are frequently numerous and located near the underlying tumor. The term "Sister Mary Joseph's nodule" refers to a periumbilical nodule that has the potential to be linked to stomach cancer.[12]

Both carcinomas can be mistaken for cellulitis, and a hard, infiltrating plaque, directly invade the skin. Cellulitis is a common complication of carcinoma. Among the two, breast cancer is the more frequently linked syndrome. Paget's illness is a type of intra-epidermal carcinoma that can be found in the mammary and areola region or the axillary skin. Paget's ailment of the chest manifests itself as a one-sided, clearly delineated nipple dermatitis or erosion, frequently accompanied by bleeding or release, and is typically associated with an original intraductal glandular cancer of the breast. An erythematous plaque that is irritating, wet, and well-defined is the defining characteristic of extramammary Paget's disease. [13] This plaque is often found in the anogenital region and is maximum frequently found in ageing women. Squamous carcinoma in situ, or Bowen's disease, or psoriasis, is sometimes misinterpreted as this condition. A local adnexal tumor is associated with it in twenty-five percent of instances, and an internal malignancy, typically originating from the gastrointestinal (GI) or genitourinary (GU) tract, is related to it in twelve percent of occurrences. Vulval illness is more frequently linked to intestinal tract cancer, and perianal disease is more frequently linked to gastrointestinal tract cancer.[14]

Inherited cancer syndromes

Genetic cancer disorders are collectively termed genodermatoses. They have dermal appearances and tend to internal enmity. [15]They comprise skin G1 polyposis syndromes like Gardner. Cancer of the G1 or GU tract is connected with sebaceous adenomas and carcinomas. The internal cancers are indolent. [16]

The comprehensive cutaneous and internal appearances, heirloom patterns, and related malignant risks of these settings, including several endocrine neoplasia and von Recklinghausen's disease, are outlined in Table 1.

Table 1: Inherited cancer disorders and their topographies

Syndrome*	Features		Malignancy risk
	Cutaneous	Internal	
Gardner	Osteomas, epidermoid cysts, desmoid tumours, fibroma, lipoma	Adenomatous polyps large bowel 3rd-4th decade. Dental abnormalities. Bilateral congenital hypertrophy of retinal pigment epithelium	50–100% carcinoma upper and lower GI tract (colon, rectum, duodenum, ampulla of vater). Thyroid carcinoma risk greater than general population
Peutz-Jeghers	Pigmented macules lips, buccal mucosa, hands, feet. Appear in infancy, childhood, later fade	Hamartomas GI, respiratory and GU tracts. Intussusception children	3–30%. GI malignancy up to 12%. Increased risk gonadal tumours, carcinoma lung and breast
Cowden	Facial warty trichilemmoma, oral mucosa papillomatosis (cobblestones), acral keratoses, lipoma, angioma	Fibrocystic breast disease, thyroid adenoma, GI polyposis, ovarian cysts	Breast cancer 30% women. Increased risk thyroid and uterine carcinoma
Muir-Torre	Sebaceous adenoma, carcinoma, epithelioma, keratoacanthoma	GI polyps	100% risk malignancy. 61% GI, 22% GU cancer. Often multiple cancers, but clinically indolent
Multiple endocrine neoplasia type 2b	Small smooth nodules lips, buccal mucosa, hands, feet. Appear in childhood	Multiple neuromas. Medullary thyroid carcinoma. Phaeochromocytoma. 50% patients show complete triad	85% medullary thyroid carcinoma. Prophylactic total thyroidectomy in early childhood
Neurofibromatosis	Café au lait macules, neurofibroma, pigmented hamartoma iris	Intellectual impairment, short stature, seizures, precocious puberty, GI symptoms from mucosal neurofibromas	3–15%. Malignant schwannoma, neurofibrosarcoma, phaeochromocytoma, carcinoid, astrocytoma, melanoma

*All the syndromes have autosomal dominant inheritance.

GI = gastrointestinal; GU = genitourinary.

Cutaneous indicators of exposure to eco-friendly carcinogens

Arsenic, ionizing radioactivity, and vinyl chloride are all examples of environmental carcinogens or chemical substances.[17] The cutaneous consequences of exposure and the neoplasms that are related to it have been reviewed in another location.[18]

Paraneoplastic syndromes

These syndromes might specify the incidence of a primary malignancy. Numerous syndromes are alike and have variant connections with malignancy. [19]

Some of them include

- Acanthosis nigricans; palmaris and ichthyosis
- Amyloidosis
- Carcinoid
- Cryoglobulinemia
- Cushing's
- Dermatomyositis
- Erthroderma
- Leser-Treat Sign
- Migratory

- Pruritus
- Sweet syndrome

Cushing's syndrome

It is the result of ectopic construction of adrenocorticotropic hormone (ACTH), which is seen in neural crest, SCC, carcinoid tumors, pancreatic and medullary thyroid cancer, and thymoma.[18] Ectopic structures instead of pituitary-dependent Cushing's syndrome:

- Quick beginning of liberal signs
- Mass loss
- Simple strength degenerative
- Noticeable hyperpigmentation
- Hypokalaemia
- Diabetes

Carcinoid syndrome

Profound red or purple pâté and neck flushes and oedema are carcinoid syndrome skin topographies. Cyanosis, pellagra, and telangiectasia are the characteristics of this syndrome. [19]The glowing is linked with systemic geographies, which include diarrhea, restriction, belly pain, asthma, and right-sided heart letdown. G1 region carcinoid tumors version for 85% of cases.[20] The removal of biologically active peptides that are generated by these tumors in the portal movement is an indication that liver metastases are previously established at the time that symptoms begin to appear. Early in the progression of the disease, symptoms may be produced by bronchial and ovarian carcinoids, which account for fifteen percent of all cases.[21]

Necrolytic migratory erythema

It is branded by a persistent erythematous scaly hasty with annular boundaries. This type of erythema is most commonly found in the perioral, genital, and flexural regions of the body. [22]A painful glossitis and angular stomatitis are frequently present in this condition. This condition is linked to glucagonoma, which is a pancreatic cancer. In more than fifty per hundred of patients, metastases are present at the period of presentation.[23]

Acanthosis nigricans

In the progression of a condition it is characterized by a velvety, diffuse hyperpigmentation and deepening of flexural areas, the condition can take on a verrucous or papillomatous appearance.[24] Indicators that point to a malicious cause include the following:

- Beginning after 40 years
- More widespread and simple contribution
- Mucosal scratches
- Overstatement of usual skin patterns on the projections and tributes, and
- Heaviness damage and degenerative

Related cancers comprise those of the gastrointestinal (especially stomach) or gastrointestinal system, chest, lung, or lymphoma. The start of the ailment may occur before or concurrently with the introduction of the malice.

Dermatomyositis

The development of dermatomyositis in adults has been linked to the presence of cancer. This risk is estimated to range anywhere from 15–41%.[25]Cancers of the breast, lung, pancreas, and capsule are the most frequently associated with this condition.

There is a possibility that they will be diagnosed either concurrently with or after the diagnosis of dermatomyositis. [26]A few examples of cutaneous displays are:

A heliotrope periorbital impulsive, often related to oedema

Gottrons pimples over the lumps

Periungual telangiectasia and

Paraneoplastic pemphigus

Haematological malignancy and paraneoplastic pemphigus predominate. It has severe mucous skin ulcers, sores, and corrosions on the upper frame and palmoplantar target grazes.[25]

Cutaneous indices of systemic and embattled growth therapy

Traditional cytotoxic chemotherapy is known to cause nonspecific cutaneous symptoms, such as baldness, xerosis, and mucositis. These manifestations involve the skin. Extravasation, darkening of the membrane, hair or nails, and acral erythema are some of the other cutaneous adverse effects that may occur. Acral erythema, also known as palmar-plantar erythron dysaesthesia syndrome or hand-foot syndrome, is most frequently observed in patients who are receiving 5-fluorouracil and its prodrug capecitabine, in addition to being them with doxorubicin. The condition begins with a prodroma of prickly on the palms and soles, and it progresses over a insufficient days to scorching pain, soreness, and oedema that are linked with clearly marked erythematous

inscriptions.[25] It goes away after the chemotherapy is stopped, and it is frequently accompanied by peeling. Inhibitors of signal transduction are among the new targeted cancer medicines that have been developed. These inhibitors include multikinase inhibitors of the epidermal growth factor receptor (EGFR) (Table 2). Both groups have dermal side properties that have been thoroughly reported.[27]

Table 2: New battered cancer treatments: signal transduction inhibitors.

Epidermal growth factor receptor inhibitors	
Small-molecule tyrosine kinase	Gefitinib Erlotinib
Monoclonal antibodies	Cetuximab Pantitumumab
Multikinase inhibitors	Dasatinib Sorafenib Sunitinib

Epidermal growth aspect receptors

EGFR is a transmembrane protein that helps cells grow, migrate, and make new blood vessels through different signaling pathways. In later stages of cancers that overexpress the receptor, EGFR inhibitors are used. These include cetuximab for colorectal and head and neck, erlotinib and gefitinib for prostate cancer. EGFR is normally found in a lot of epithelial tissues, like the skin. Treatment often has side effects on the skin (Table 3). A papulopustular eruption is the most common skin side effect. It can happen to 24–91% of patients, based on the drug they are taking. [28] It happens most often in people who are given cetuximab. It shows up as numerous follicular sores on the head, superior chest, and back, but it can also spread to the limbs and abdomen. In serious cases, crusting and the lack of comedones can be seen[29,30]. There is a dose-dependent link between how bad the rash is and how often it happens. Several studies have found a link between how bad the eruption is and how long it stays clear, and how long the person lives overall after treatment. The swelling usually starts in the first two weeks of treatment and goes away when the treatment stops.[30]

Table 3: Cutaneous side paraphernalia of epidermal growth factor element

Site	Abnormalities
Hair	Extended eyelashes Brittle, Wavy scalp hair
Nail	Pyogenic granuloma Fissuring
Mucous membrane	Mucositis
Skin	Papulopustular response Aversion reactions Telangiectasia Hyperpigmenatation

Case studies and reviews recommend emollients, antibiotics for subordinate infections, ordinary acne treatments (oral tetracyclines), and dosage decrease or cessation.

Isotretinoin has been used to treat cetuximab eruptions in three case rumors. Additional side effects include xerosis and pyogenic granuloma, hair anomalies, curled scalp, and long eyebrows, pigmentary change, and telangiectasia.[28]

Multikinase inhibitors

Among them, Imatinib and medicines of the subsequent generation are utilized in the treatment of continuing myeloid leukemia and gastrointestinal tumors. Additionally, sorafenib are utilized in the treatment of renal cell carcinoma. Two-thirds of patients treated with sorafenib get a rash or desquamation, and some also develop acral erythema. Additionally, fifty percent of patients administered sunitinib experience mild to moderate facial oedema.[28]

MATERIALS &

METHODS

Materials & Methods

Study design: Observational cross-sectional study

Study duration: May 2023 to November 2024

Study setting: The study was conducted in the Clinic of Dermatology and the inpatient of the Department of Oncology in our Hospital, attached to Sri Devaraj Urs Medical College, Tamaka, Kolar.

Study participants: Patients diagnosed with internal malignancy and attending the Department of Dermatology and Oncology in RL Jalappa Hospital and Research Centre, and also diagnosed with cutaneous manifestations, were evaluated.

Inclusion criteria:

Patients with the diagnosis of inner malignancy awarding with dermatologic manifestations were involved in the study.

Exclusion criteria:

Patients were reluctant the study.

Sample size:

By taking the prevalence of cutaneous manifestations in cancer patients as 5% in a study done by Jinal Tandel, Rutoo Polra, and a 95% self-confidence level with 5% absolute accuracy, the sample size was attained as 207.

Procedure

This was a cross-sectional experimental study permitted by the Institutional Ethical Committee. Patients with internal malignancies who presented with skin lesions in the Dermatology and Oncology outpatient department and ward were recruited after obtaining their written consent in the local language. A comprehensive history was gathered to obtain demographic information, details concerning complaints, treatment types, onset, duration, and progression of cutaneous lesions, along with past and family medical histories using a prestructured proforma. A clinical examination of the skin, hair, nails, and mucosa was conducted, and photographs were captured. Appropriate investigations, including Hemogram, C-reactive protein, ESR, Renal function tests, Blood sugar, Lipid profile, vitamin B12, dermatoscopy, Biopsy, and KOH, were conducted as necessary.

Statistical analysis

The pooled data were entered into a custom case record form and analyzed using percentage and Chi-square tests. P-value <0.05 indicated statistical significance.

RESULTS

Results

The total sample size was 207.

There were 111 males and 96 females with a mean age of 45.4 years.

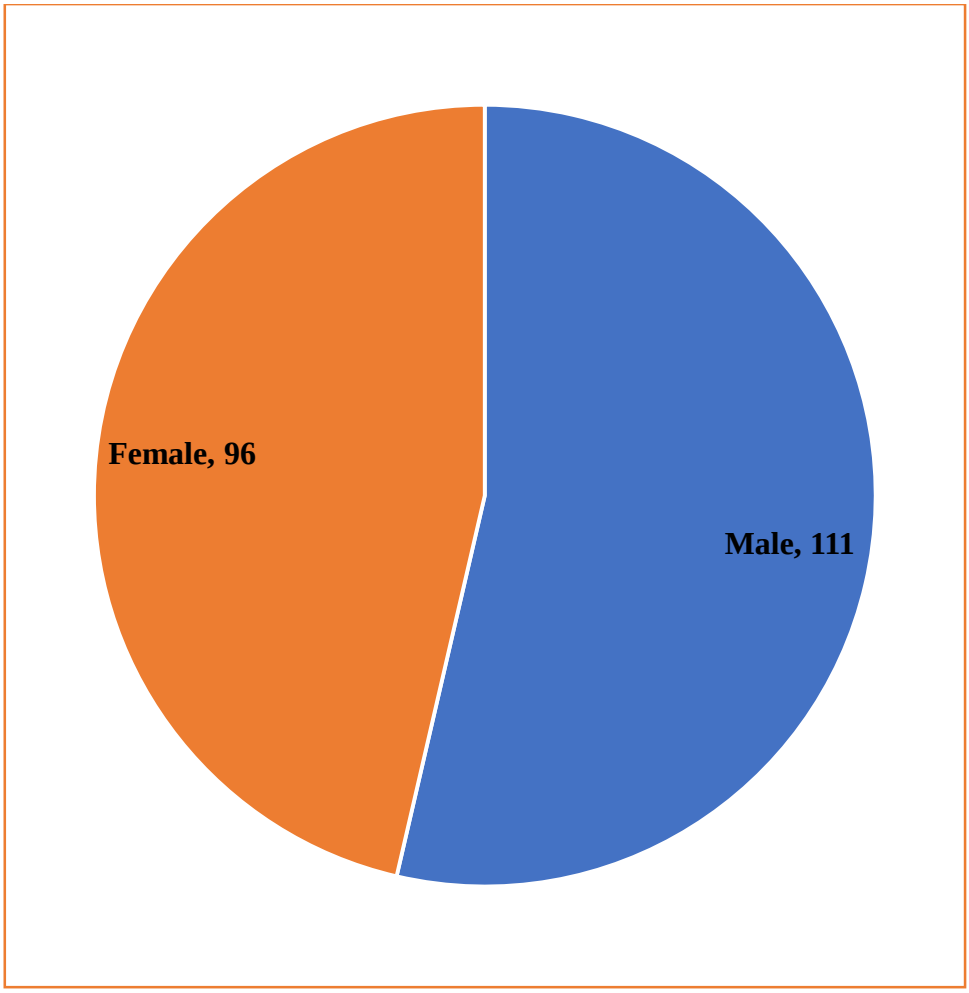

Figure 6: Gender of the study participants

There were 111 males and 96 females in the study population

Age-wise distribution of the study subjects is as follows.

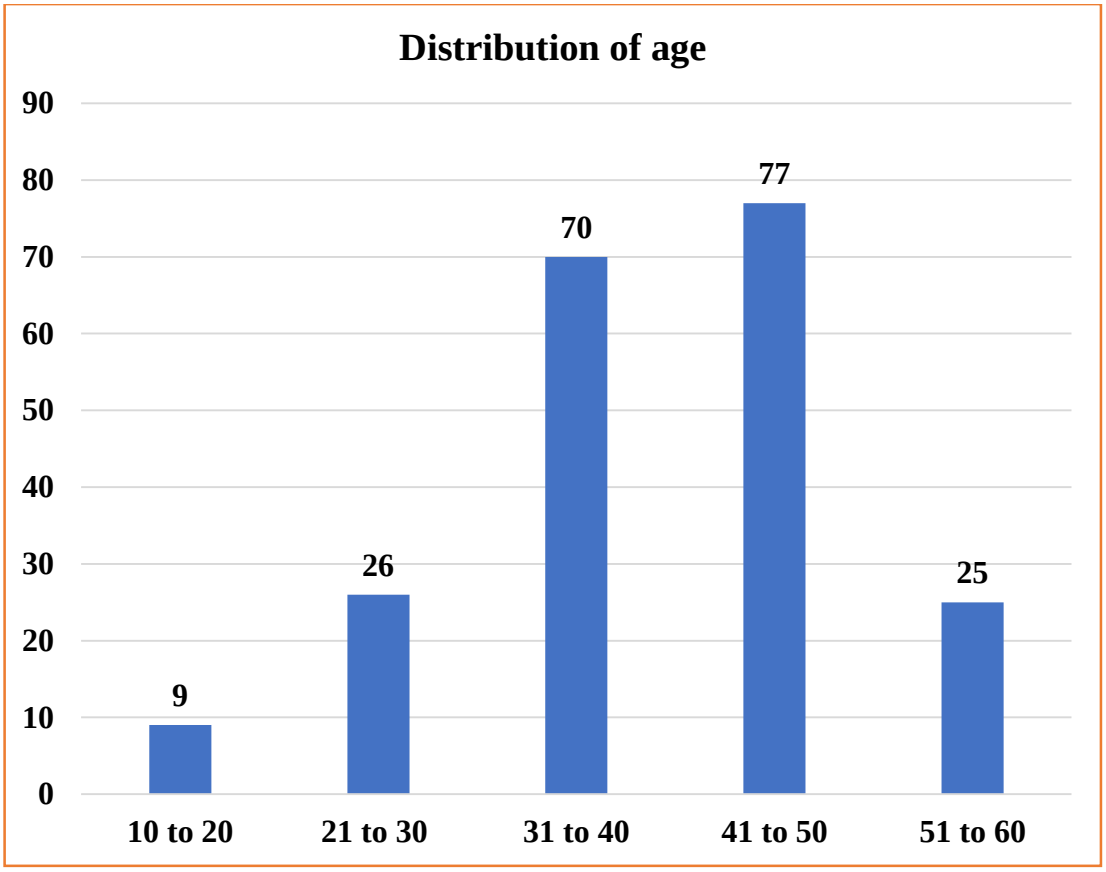

Figure 7: Age-wise distribution of study subjects

The predominant cases were within the specified age group.of 41 to 50 years

And then 31 to 40 years, followed by 21 to 30 and 51 to 60 years.

Table 4: Age distribution

Age in years	Number	Percent

10 to 20	9	4%
21 to 30	26	12%
31 to 40	70	33%
41 to 50	77	37%
51 to 60	25	12%

- 37% of the patients were in the age group of 41 to 50 years
- 33% of 31 to 40
- 12% of 21 to 30 years, followed by 51 to 60 years
- 4% of patients were in between 10 to 20 years

Among 207 study subjects with internal malignancies, 82 were on chemotherapy, 56 were receiving radiotherapy, and 71 were on both treatments.

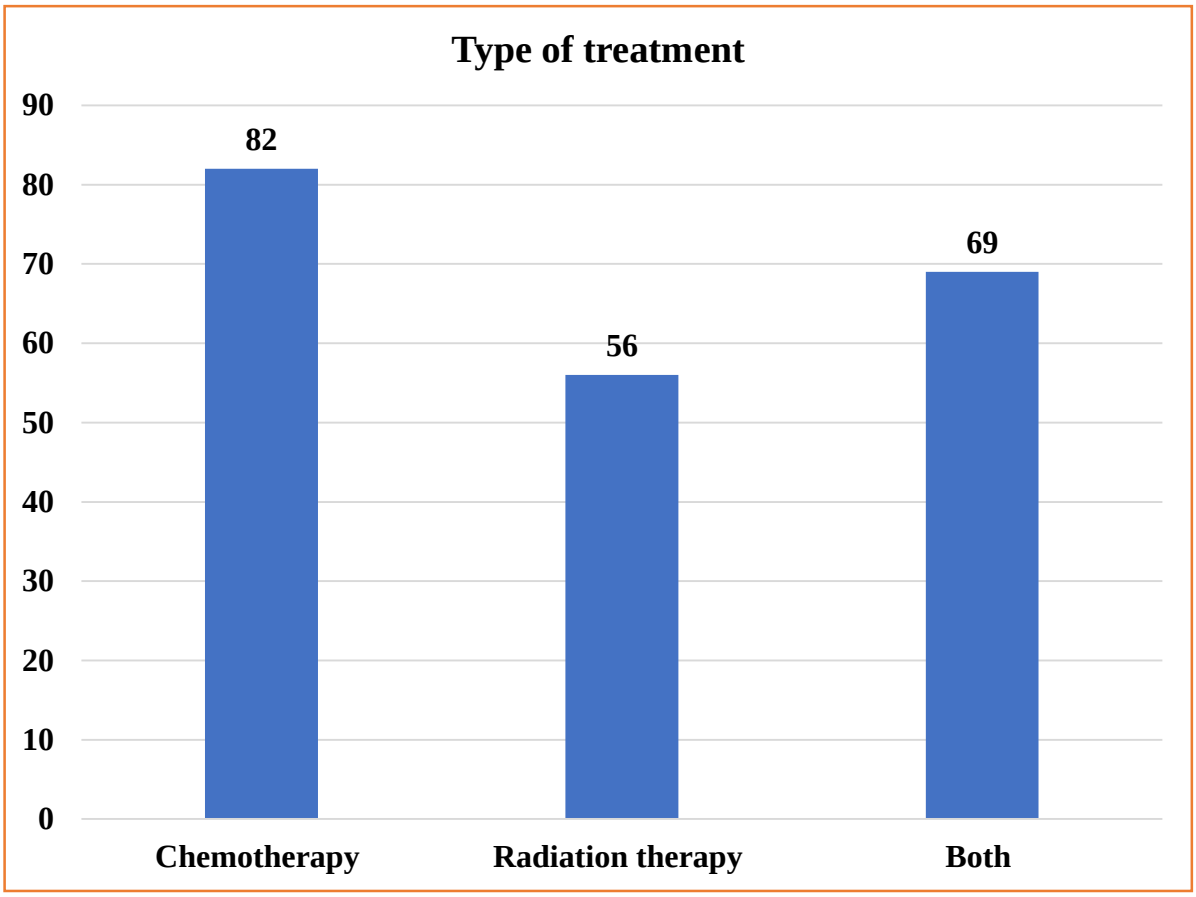

Figure 8: Type of Treatment

In a total of 207, 82 received chemotherapy, 56 received radiation therapy, and 71 received both.

Table 5: Treatment types

Type of treatment	Number	Percentage
Chemotherapy	82	39%
Radiation therapy	56	27%
Both	69	33%

39% received chemotherapy

27% received radiation therapy and

33% received both

Chemotherapy

The most common indications for chemotherapy were Breast carcinoma and buccal carcinoma. The details of the same are depicted below.

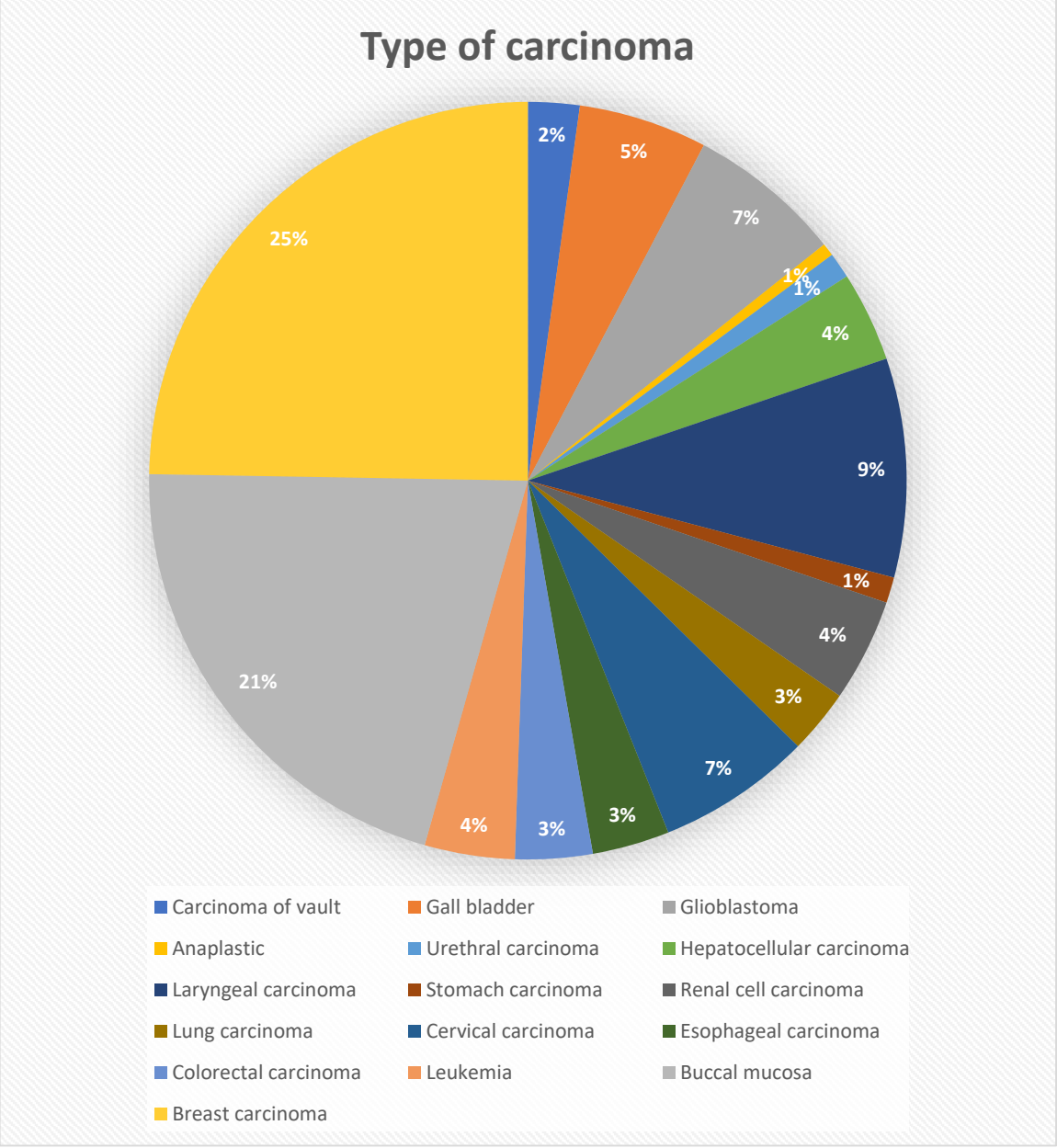

Figure 9: Types of carcinomas

Table 6: Carcinoma types

Type of Carcinoma	No. of affected individuals
Breast carcinoma	45(25%)
Buccal mucosa	38(20.87%)
Laryngeal carcinoma	17(9.34%)
Cervical carcinoma	12(6.59%)
Glioblastoma	12(6.59%)
Gall bladder	10 (5.49%)
Hepatocellular carcinoma	7(3.84%)
Leukemia	7(3.84%)
Esophageal carcinoma	6(3.29%)
Colorectal carcinoma	6(3.29%)
Lung carcinoma	5(2.74%)
Carcinoma of the vault	4 (2.19%)
Stomach carcinoma	2(1.09%)
Urethral carcinoma	2(1.09%)
Anaplastic	1(0.54%)

Chemotherapy drugs

There are a vast number of drugs that are being used for chemotherapy. The list of the drugs and the subsequent patient numbers is displayed below.

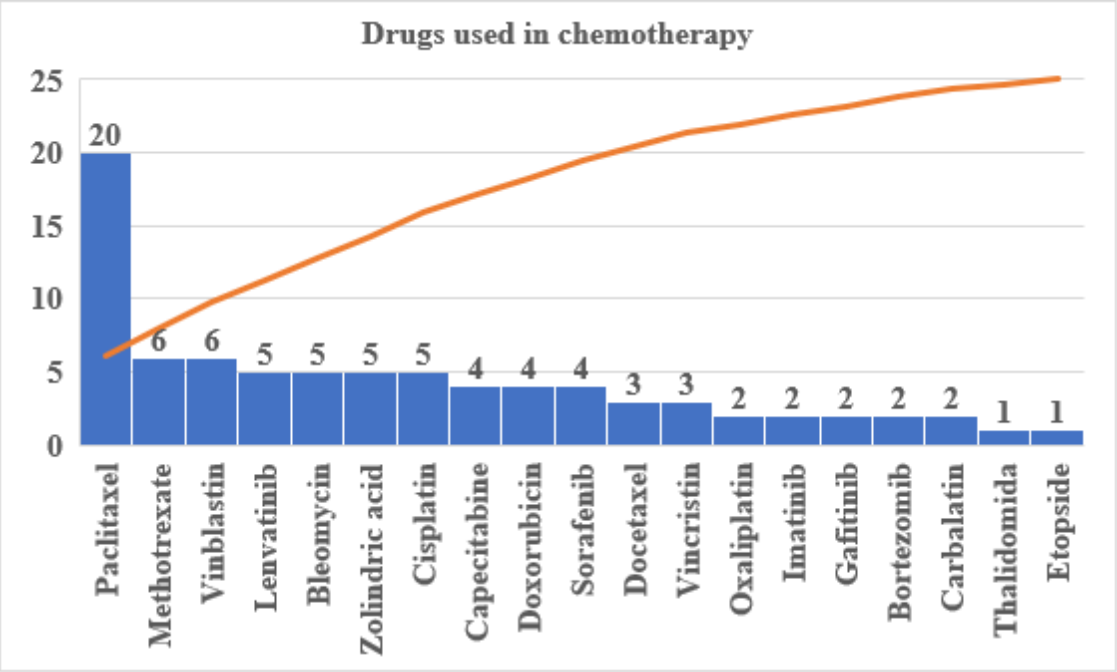

Figure 10: Drugs used in chemotherapy

Table 7: Chemotherapy drugs

Name of the drug	Number of patients (%)
Paclitaxel	20(24.3%)
Vinblastin	6(7.31%)
Methotrexate	6(7.31%)
Cisplatin	5(6.09%)
Zolindric acid	5(6.09%)
Bleomycin	5(6.09%)
Lenvatinib	5(6.09%)
Sorafenib	4(4.87%)
Doxorubicin	4(4.87%)
Capecitabine	4(4.87%)
Vincristin	3(3.65%)
Docetaxel	3(3.65%)
Carbaplatin	2(2.43%)
Bortezomib	2(2.43%)
Gafitinib	2(2.43%)
Imatinib	2(2.43%)
Oxaliplatin	2(2.43%)
Etopside	1(1.21%)
Thalidomide	1(1.21%)

The majority of the patients had a treatment with paclitaxel and cisplatin drugs, followed by others.

Some of the adverse reactions were caused by a few drugs, which are depicted as follows.

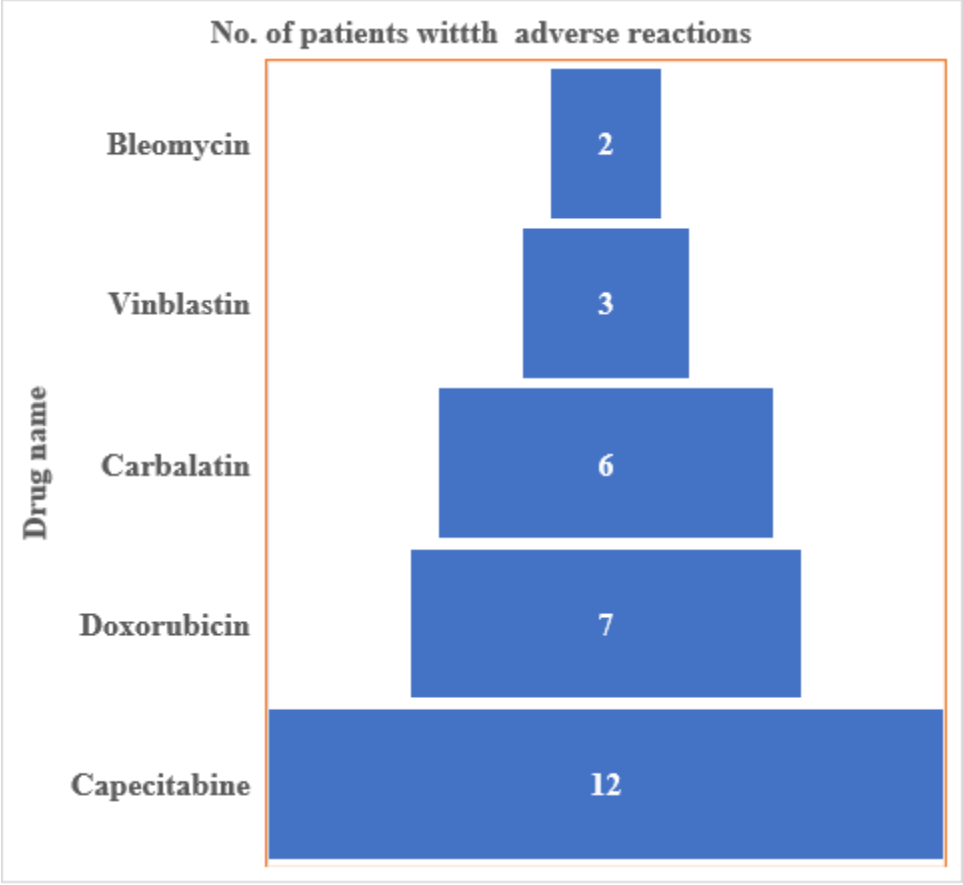

Figure 11: Patients showing adverse reactions to drugs

Capecitabine stands as the first drug in showing adverse reactions, followed by carbalatin, doxorubicin, vinblastine, and bleomycin.

Table 8: No. of patients showing adverse reactions to drugs

Adverse drug reactions	Number
Capecitabine	12
Doxorubicin	7
Carbalatin	6
Vinblastin	3
Bleomycin	2

- Capecitabine had shown adverse reactions in 12 subjects

- Carbalatin was depicted on 6 subjects
- Doxorubicin on 7 patients
- Vinblastin on 3 and Bleomycin on 2 participants

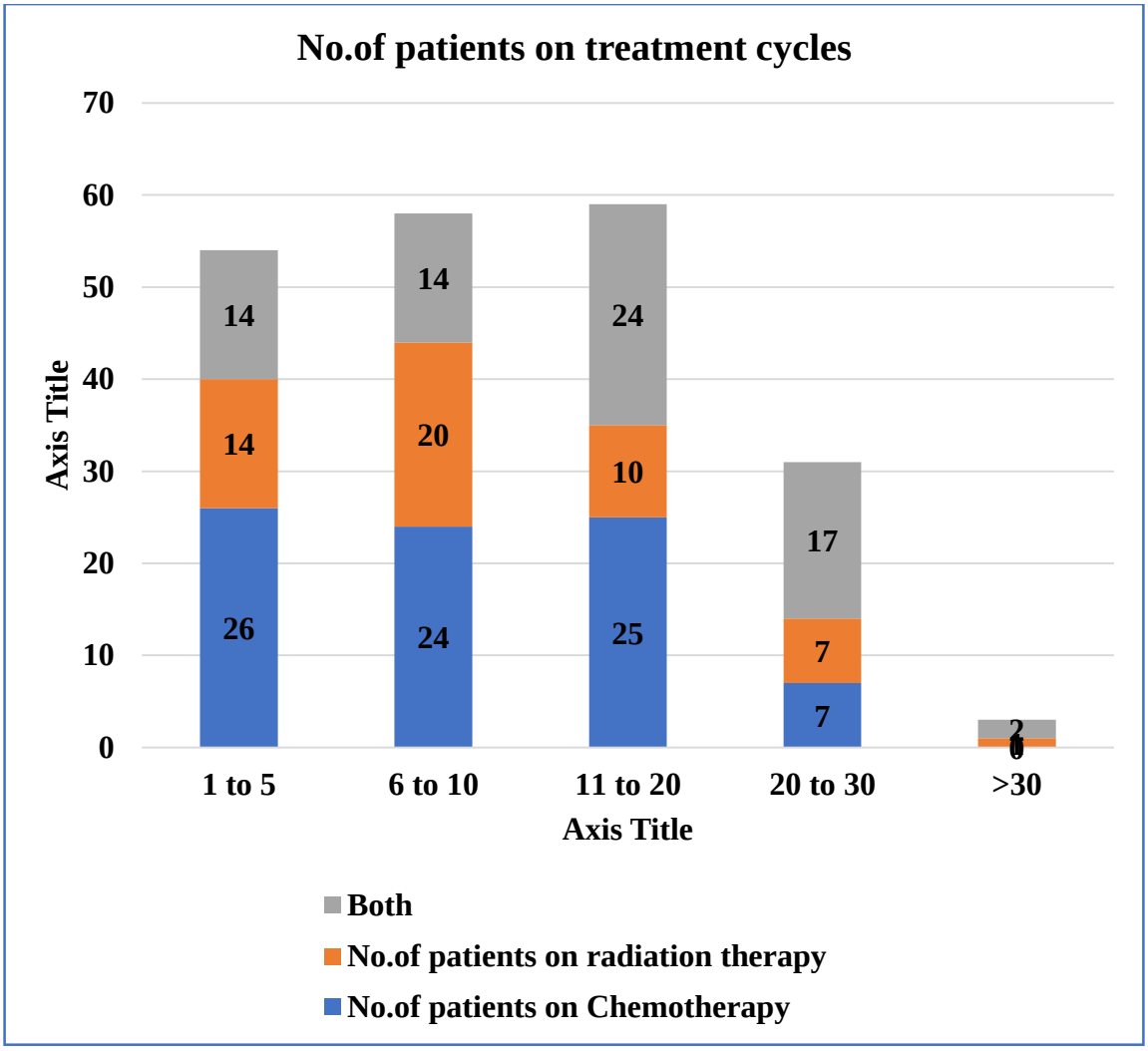

Figure 12: No. of Chemotherapy and Radiation cycles taken by the patients

- 26 patients took chemotherapy in the 1 to 5 cycle range
- 20 patients were the highest in radiotherapy, whose fraction range was 20 to 30
- 24 received both treatment cycles

Table 9: No. of chemotherapy/radiation cycles

No.of chemotherapy cycles/fractions	No. of patients on Chemotherapy	No.of patients on Radiation therapy	Both
1 to 5	26(31.7%)	14(25%)	14(19.71%)
6 to 10	24(29.2%)	20(35.7%)	14(19.71%)
11 to 20	25(30.48%)	10(17.85%)	24(33.8%)
20 to 30	7(8.53%)	7(12.5%)	17(24.7%)
>30	0	1(1.78%)	2(2.81%)

- 31% had chemotherapy from cycles 1 to 5
- 35% had radiation therapy cycles 6 to 10
- 33% had both treatments from 11 to 20

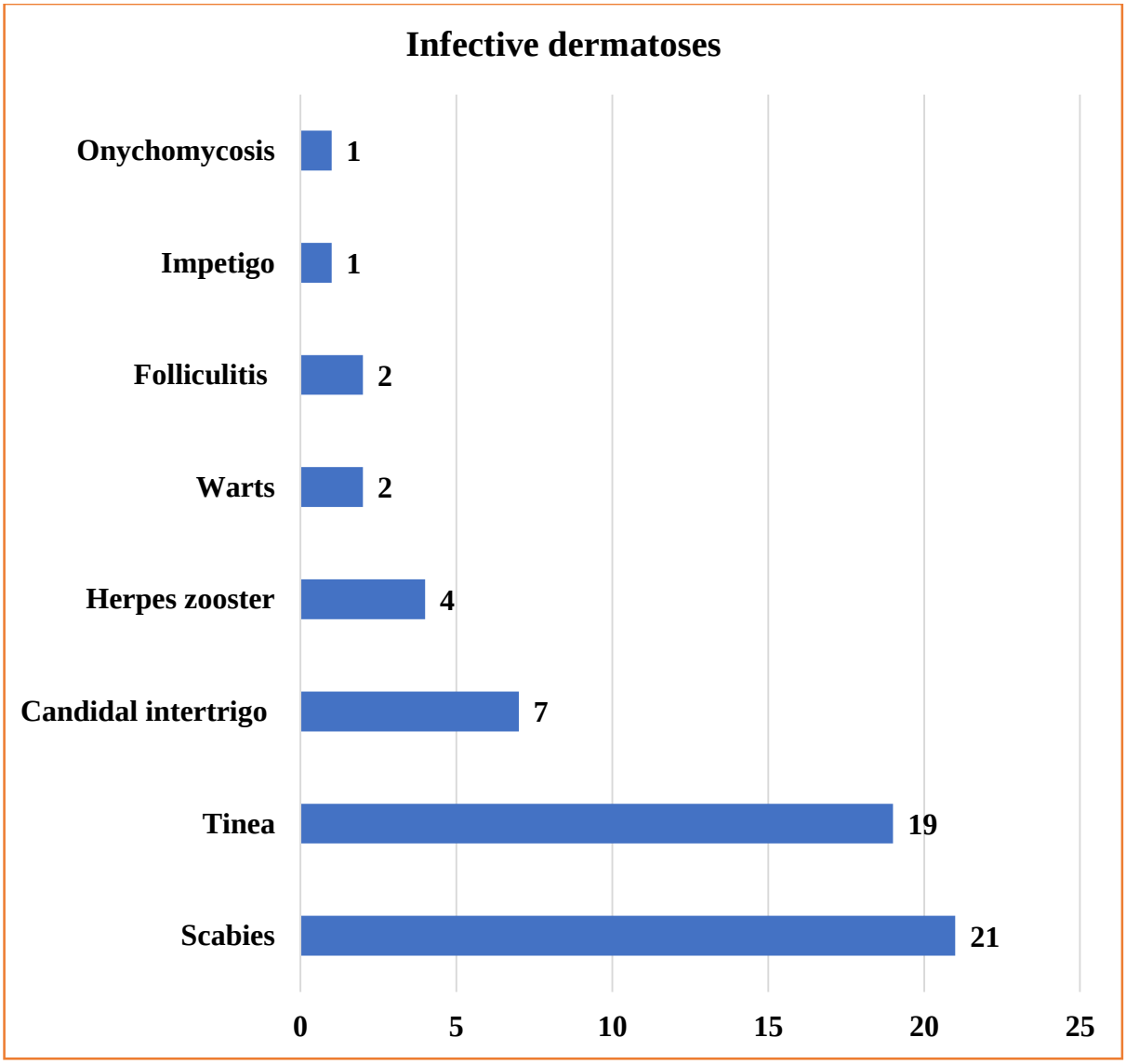

Figure 13: Infective Dermatoses

Scabies was seen in 21 subjects; Tinea in 19 subjects; 1 in Onychomycosis

Table 10: Infective dermatoses

Scabies	**21(10.60%)**
Tinea	19(9.59%)
Candidal intertrigo	7(3.53%)
Herpes zoster	4(2.02%)
Warts	2(1.01%)
Folliculitis	2(1.01%)
Impetigo	1(0.50%)
Onychomycosis	1(0.50%)

There were 21 scabies individuals; 19 had tinea; 7 had Candidal intertrigo; 4 had Herpes Zooster; 2 had warts; 2 had folliculitis; 1 each had Impetigo and Onychomycosis.

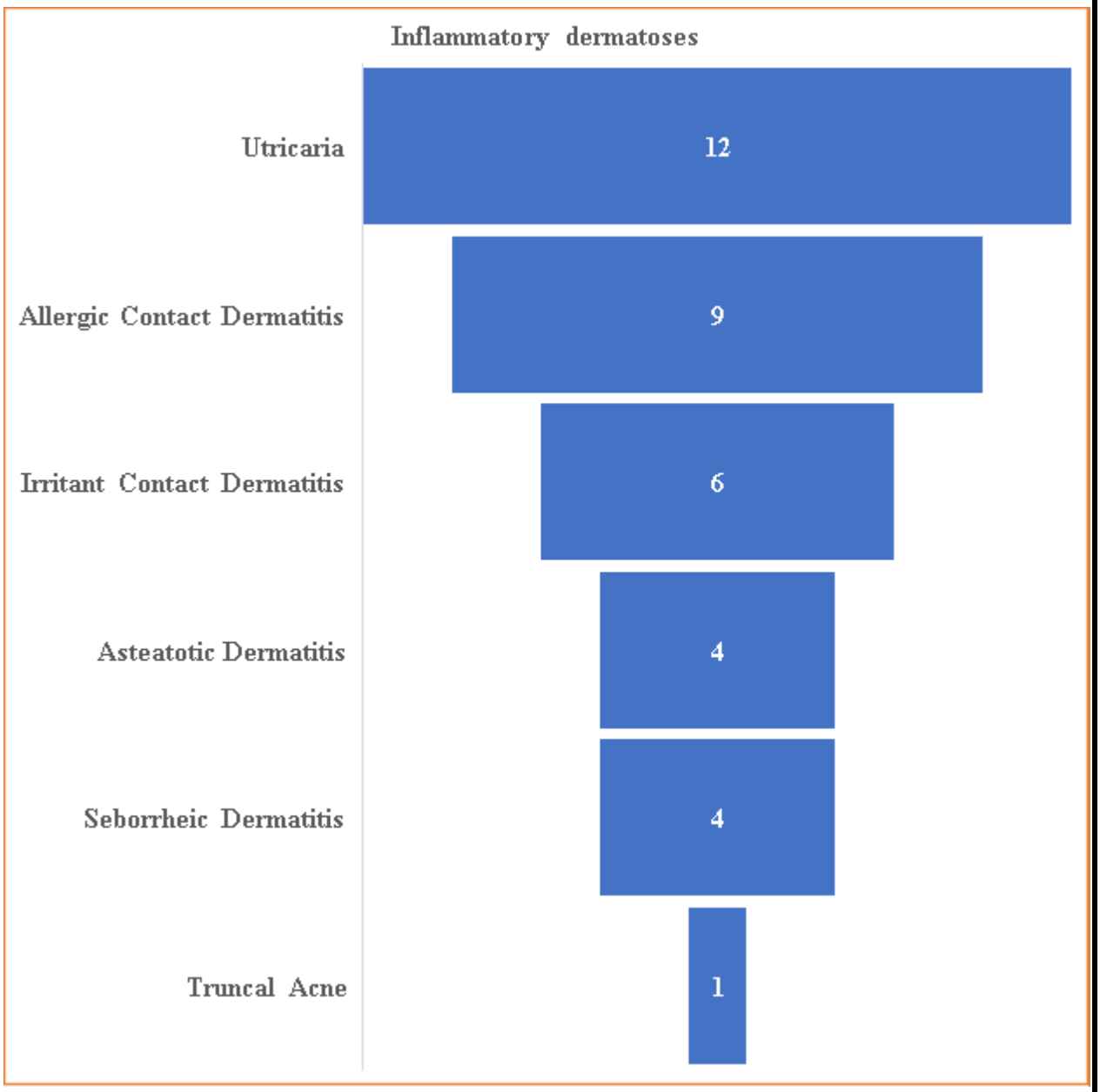

Figure 14: Inflammatory dermatoses

Urticaria was seen in 12 subjects, Allergic contact dermatitis in 9 subjects, and at last 1 had truncal acne.

Table 11: Inflammatory dermatoses

Utricaria	**12 (6.06%)**
Allergic Contact Dermatitis	9(4.54%)
Irritant Contact Dermatitis	6(3.03%)
Asteatotic Dermatitis	4(2.02%)
Seborrheic Dermatitis	4(2.02%)
Truncal Acne	1(0.52%)

- Utricaria was seen in 12 subjects
- Allergic contact dermatitis in 9 individuals
- Irritant contact dermatitis in 6 subjects
- Asteatotic dermatitis in 4 subjects
- Seborrheic dermatitis in 4 subjects
- Truncal acne in 1 subject

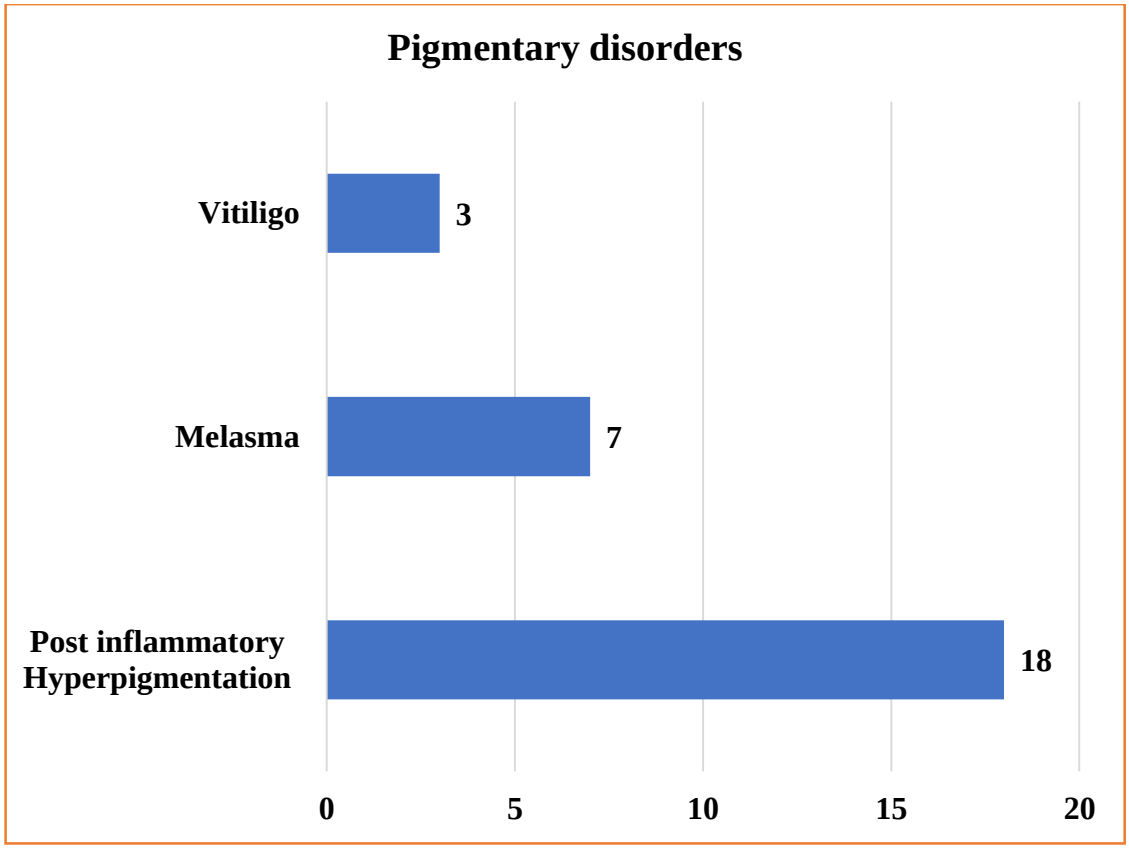

Figure 15: Pigmentary disorders

Post-Inflammatory Hyperpigmentation was in 18 subjects

Melasma was noted in 7 subjects and vitiligo in 3 subjects

Table 12: Pigmentary dermatoses

Post inflammatory Hyperpigmentation	**18(9.09%)**
Melasma	7(3.53%)
Vitiligo	3(1.51%)

• Eighteen subjects exhibited post-inflammatory hyperpigmentation.

• Melasma was observed in 7 subjects

• Vitiligo was observed in three subjects

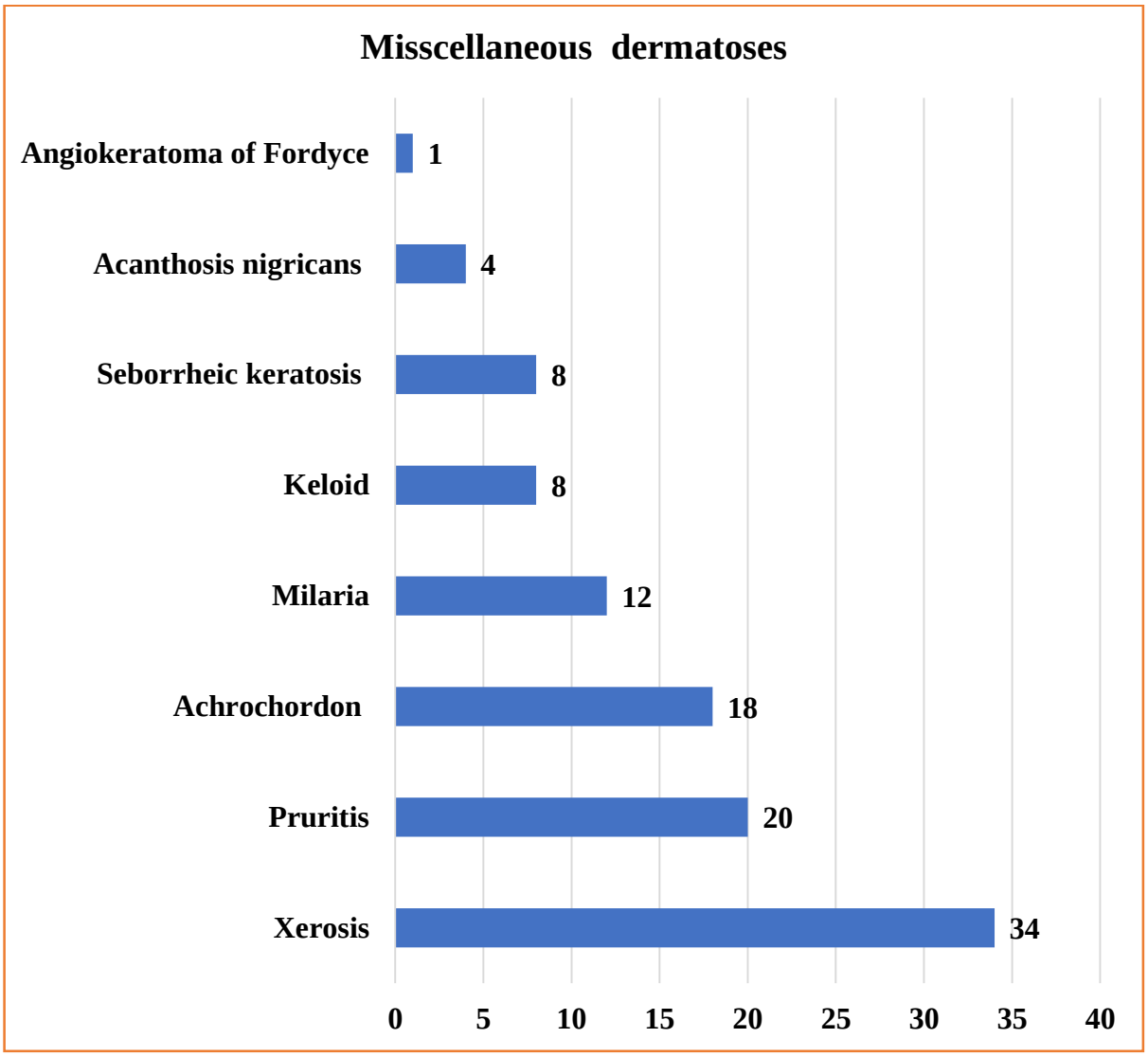

Figure 16: Miscellaneous dermatoses

- Xerosis is documented in 34 subjects
- Pruritus in 20 subjects
- Achrochordon in 18 subjects
- Miliaria in 12 subjects

Table 13: Miscellaneous dermatoses

Xerosis	**34(17.17%)**
Pruritis	20(10.10%)
Achrochordon	18(9%)
Milaria	12(6.06%)
Keloid	8(4.05%)
Seborrheic keratosis	8(4.05%)
Acanthosis nigricans	4(2.02%)
Angiokeratoma of Fordyce	1(0.50%)

The study population exhibited a variety of miscellaneous dermatoses. The most commonly observed dermatosis is Xerosis. Pruritus was observed in 20 subjects, Achrochordon was identified in 18 subjects, and Milaria was recorded in 12 subjects.

There were changes noted in the nair, hair, and oral system, which are depicted below.

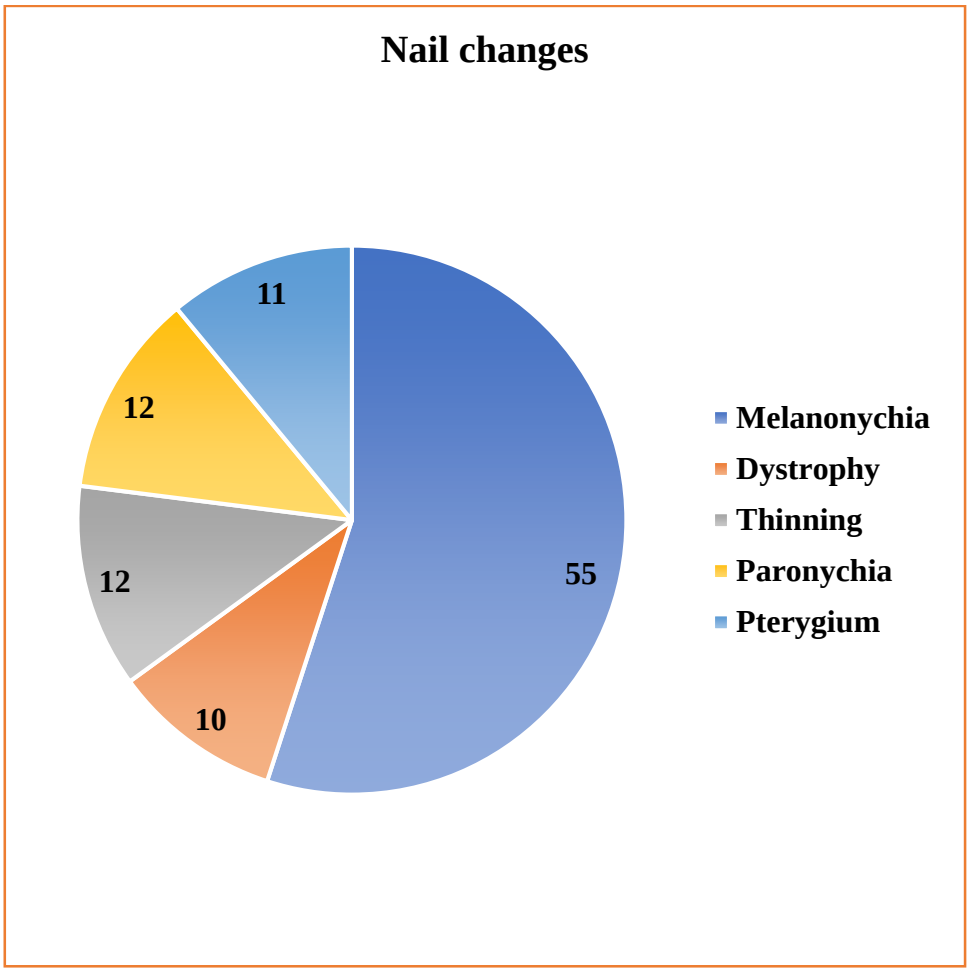

Figure 17: Nail changes

The following are the changes in the nail

55 patients exhibited melanonychia, and 11 showed Pterygium

Table 14: Nail changes

Melanonychia	**55(28%)**
Thinning	12(6.2%)
Paronychia	12(6.2%)
Pterygium	11(5.55%)
Dystrophy	10(5.05%)

The most common nail change was melanonychia

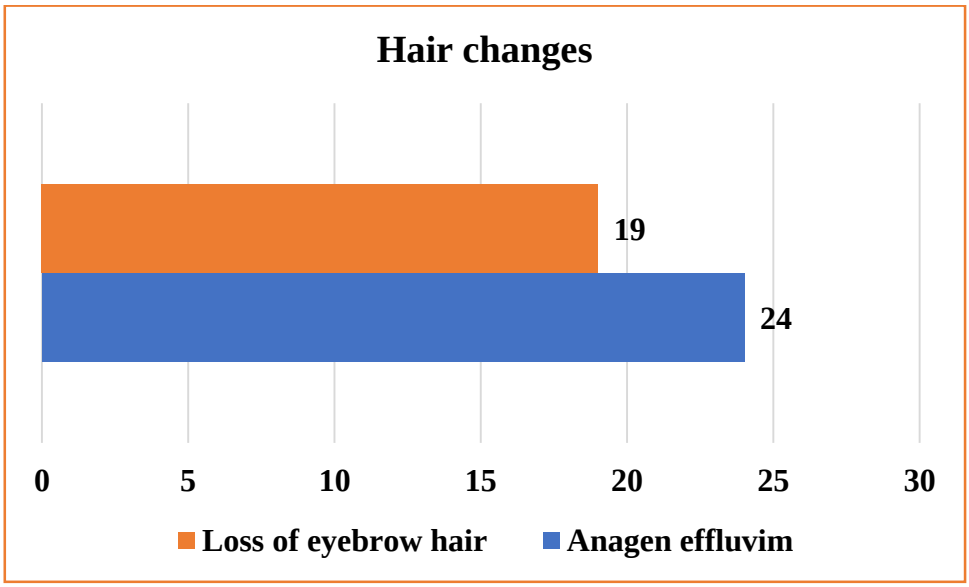

Figure 18: Hair changes for women

Table 15: Hair changes

Hair Change	No. of patients
Anagen effluvim	**24**
Loss of eyebrow hair	**19**

Figure 19: Oral changes of patients

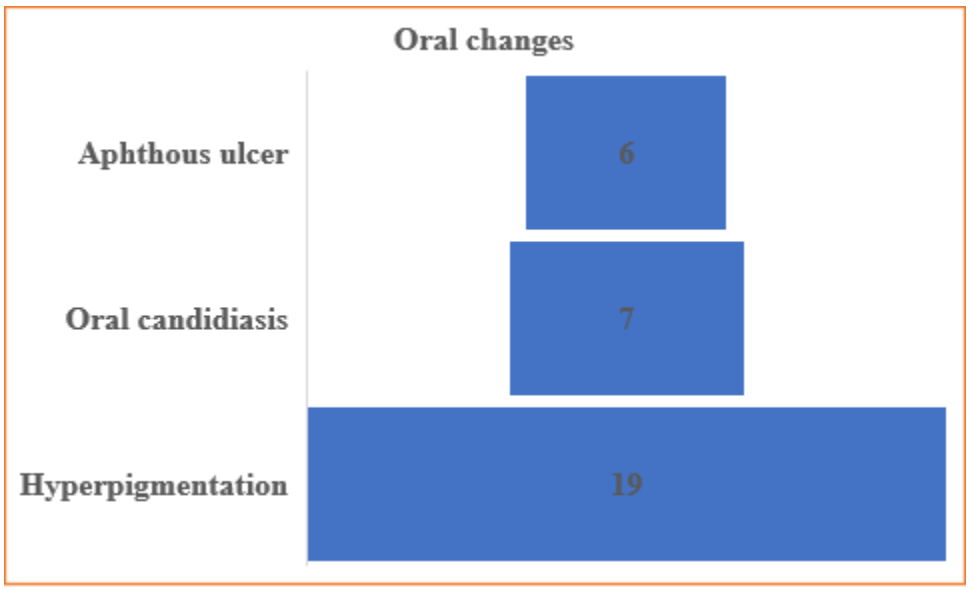

Table 16: Oral changes

Hyperpigmentation	**19(9.59%)**
Oral candidiasis	7(3.53%)
Aphthous ulcer	6(3.03%)

DISCUSSION

Discussion

This was a cross-sectional experimental study performed in the Department of Venereology and Leprosy in association with the Division of Oncology**.** The study aims to identify the various cutaneous manifestations in cancer patients.

The age of the study subjects was as follows. 9 patients were between 10 to 20 years of age; 26 patients were between 21 to 30 years of age; 70 patients were between 31 to 40 years; 77 patients were in the middle of 41 and 50 25 were between 51 to 60 years of age. The age of the study group has a larger number of patients in the 41 to 50 years which is similar to the reports of Menon, Biswal et al, and Fabrrocini et al., [31]

With respect to the treatment, among 207 subjects, 82 (39%) were on chemotherapy, 56(27%) were on were on radiation therapy and 69 (33%) received both the treatments. treatment. This research was similar to the reports of Hassan et al., in which 72.4% were given chemotherapy. In a few other studies, 100% of the patients received chemotherapy. [32,33]

Breast cancer treatment options include chemotherapy, radiation, hormonal therapy, surgery, or a combination of these approaches. The choice of treatment is prejudiced by features such as the patient's age, the potential for benign or malignant

growth, and the presence of metastasis. In our study, the predominant indication for chemotherapy was breast carcinoma, accounting for 23%, whereas Menon et al. reported oropharyngeal carcinoma as the leading indication at 22%. Chemotherapeutic agents were administered in a range of combinations as demonstrated in our study. Paclitaxel is utilized in the conduct of breast cancer, ovarian cancer, and lung cancer.[34] In our study, it was the most regularly directed chemotherapeutic agent, accounting for 25% of patients. This contrasts with the findings of Hassan et al., where 5-fluorouracil was predominant, used in 43.2% of cases.[32,35] In the study by Fabbrocini et al., epidermal growth factor receptor (EGFR) inhibitors were employed in 34% of patients, while Menon et al. and Muralidhar et al. reported cisplatin usage in 48% and 50% of patients, respectively.[31]

According to the findings of this study, the most prevalent forms of infectious dermatoses include scabies (10%), Tinea (9%), which was in contrast to the study by J Tandel et.al, where Herpes Zoster (15.3%) was the most common infective dermatosis.[2,36]

Among all the inflammatory conditions, the prevalence of urticaria (12%) was more than other conditions, followed by Allergic Contact Dermatitis(4.54%), which was in contrast to the study led by Kilaru KR et.al, where Seborrheic dermatitis (5%) was the most common inflammatory dermatosis.[7,37,38]

The most common pigmentary change seen was post-inflammatory hyperpigmentation(18%), followed by periorbital hyperpigmentation(5%) and perioral hyperpigmentation (3%), respectively.[38,39] The findings of these investigations were comparable to those of Rajagopal et al. and Naveed et al., who also indicated that hyperpigmentation was the greatest common type of dermatosis in their research. [38]

Among all the miscellaneous dermatoses, Xerosis (21%) was the most shared presentation, which was in contrast to the study directed by J Tandel et.al, where pruritus (13%) was the most common manifestation. [2,39]

Our research found that 28% of patients exhibited nail modifications that were lower than those found in studies conducted by Fabbrocini et al.[36] and Pavey et al.,[38] with 53% and 62.2% of patients, respectively, but nearer to the result of study conducted by Menon et al., with 30% of cases.[31]

Chemotherapeutic agents that are frequently associated with nail discoloration include bleomycin sulfate, cyclophosphamide, methotrexate, dacarbazine, and doxorubicin. The predominant nail change observed in the current study associated with chemotherapy was melanonychia, occurring in 29% of cases.[40] These findings are lower than the study steered by Naveed et al., which testified a prevalence of 64.28%. In contrast, the incidence was lower than that reported by Pavey et al., who found a rate of 78.7%, and higher than the findings of Biswal et al. and Muralidhar et al., which documented rates of 2.9% and 5%, respectively. Beau's line was observed in 8% of cases in the study conducted by Menon et al. In our training, patients with melanonychia were administered paclitaxel, carboplatin, doxorubicin, capecitabine, docetaxel, oxaliplatin, bleomycin, methotrexate, gefitinib, imatinib, vinblastine, bortezomib, zoledronic acid, thalidomide, and sunitinib. Menon et al. identified adriamycin, epirubicin, etoposide, and cisplatin as drugs associated with melanonychia, whereas Muralidhar et al. attributed this condition to epirubicin and cisplatin [40,41]

Hair loss is considered one of the greatest challenging side possessions associated with chemotherapy. Hair changes were observed in 52% of cases in our study, which is contradictory to the findings of Pavey et al. However, this bring into line with the results reported by Fabbrocini et al. and Menon et al., which indicated 52.93% and 100% of cases, respectively.[31] The variability of hair loss associated with chemotherapy is influenced by the specific chemotherapeutic agents used and the treatment protocols

followed. The termination of mitotic movement in the hair matrix leads to a narrowed and deteriorated segment of the hair shaft referred to as Pohl-Pinkus compression, which is susceptible to breakage.[36] Doxorubicin, daunorubicin, paclitaxel, and docetaxel are known to potentially induce anagen effluvium. Hair loss is typically reversible, with significant regrowth observed following the discontinuation of treatment.[37,42] Anagen effluvium was identified as the predominant hair change in 88.23% of cases in our study, surpassing findings from other studies. Research conducted by Menon et al. and Naveed et al. indicated that alopecia was prevalent in 68% and 37.16% of cases, respectively.[34]

Drugs such as cytarabine, paclitaxel, and vinca alkaloids are examples of those that can cause oral ulcerations due to their direct toxicity to the rapidly dividing oral epithelial cells. Oral mucosal alterations were found in 16 % of patients in our analysis, which is a higher percentage than the 3.7% of individuals who were found in Pavey et al.'s study.[43] Although mucositis is a well-known and widespread affliction, it came as a surprise to us that none of the patients exhibited any signs of having it. This may be because the patients were provided with the appropriate counseling regarding dental hygiene. Aphthous ulcers were observed very rarely in the current study, which is a negligible percentage than in earlier investigations.[44]

LIMITATIONS

Limitations

The study is constrained by a small sample size and the challenge of identifying a specific drug linked to a particular dermatological side effect.

SUMMARY

Summary

- A cross-sectional observational study with 207 patients diagnosed with internal malignancy
- There were 111 males and 96 females
- 82 patients had undergone chemotherapy
- 56 patients had experienced radiation therapy
- 69 patients were on both the treatment therapies
- Breast and Buccal mucosa were the most frequent carcinomas noted in the study
- Paclitaxel was the most common drug used
- A total of 26 patients represents the highest number who have undergone chemotherapy across 1 to 5 cycles.
- 20 patients in radiation therapy are the highest number that fall under 6 to 10 cycles
- Scabies is the predominant infectious dermatosis; Utricaria is a frequent inflammatory dermatosis; hyperpigmentation is dominant in pigmentary dermatoses
- Melanchia is a frequent nail change
- Anagen effluvium is the common hair change noted
- Hyperpigmentation is a frequent oral change

CONCLUSION

Conclusion

The study provided valuable insights into the side effects associated with chemotherapy and radiation therapy-related dermatosis, enabling timely interventions to mitigate additional treatment-related adverse effects. It is essential for physicians to recognize the potential effects of dermatological toxicity, particularly when choosing suitable chemotherapy agents.

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