HISTOPATHOLOGIC PATTERNS OF SKIN CANCER IN JIMMA UNIVERSTY MEDICAL CENTER, JIMMA, SOUTH WEST ETHIOPIA: FOUR YEAR RETROSPECTIVE STUDY

RESEARCH PAPER SUBMITTED TO DEPARTMENT OF PATHOLOGY, JIMMA UNIVERSITY FOR PARTIAL FULLFILMENT OF SPECIALITY DIPLOMA IN HUMAN ANATOMIC PATHOLOGY

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Histopathologic patterns of skin cancer in Jimma University Medical Center, Jimma, South West Ethiopia**,**2022

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Abstract

Background: Skin cancer is a major global public health problem and the incidence has been increasing at an alarming rate worldwide. In our country the incidence of skin cancer is unknow due to very few researches are done on skin cancer.

Objective: To determine histopathologic patterns of skin cancer in Jimma Medical Center,2022.

Method and materials: A retrospective cross-sectional study was done for all cases with histologically diagnosed skin cancer at the Jimma university medical center between August 2018 and August 2022. Data was entered into Epi data version 3.1and analyzed by SPSS version 20. For all statistical significance tests, $p<0.05$ and AOR with 95% CI were used. Descriptive and analytic studies were done. Cross tabulation and logistic regression with multivariate analysis were done to identify independent predictor factors and determine the association between variables.

Results: Among a total of 548 skin biopsies, 207 cases were skin cancer constituting 37.8% of all skin lesions with biopsy request form completeness rate of 91.2%. The majority of skin cancer occurred on the 7^{th} decade 49 (23.7%) followed by 6^{th} decade 47 (22.7%) with male to female ratio of 1: 1.1 and mean age of 50 ± 16.1. The commonest site for skin cancer was lower extremity 113 (54.6%) and ulceration 162 (78.3%) was the most common presenting symptom. Squamous cell carcinoma (SCC) 98 (47.3%) was the commonest skin cancer followed by cutaneous melanoma (CM) 50 (24.2%) and DFSP 19 (9.2%). Using lower extremity as reference group, head and neck skin cancer cases had AOR of 6.03 being diagnosed as NMSC (CI: 2.23-16.31, P= 0.000) and trunk skin cancer cases had AOR of 9.204 (CI: 1.16- 73, p= 0.036) being diagnosed as NMSC.

Conclusion: NMSC was 3 times more common than MSC and squamous cell carcinoma is the most common skin cancer followed by cutaneous melanoma. Skin cancer was commonly seen in 7^{th} and $6^{th.}$ Decades. Lower extremity was the most common site of involvement, further studies needed to determine predisposing risk factors. NMSC and MSC were associated with anatomic site warrants further study.

Key words: Skin cancer, Squamous cell carcinoma, Cutaneous melanoma, Basal cell carcinoma, Histopathology, Ethiopia

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Abbreviations and Acronyms

AJCC---------- American Joint Committee on Cancer

BCC----------Basal cell carcinoma

CM---------- Cutaneous melanoma

DFSP---------- Dermatofibrosarcoma protuberance

JUMC---------- Jimma University Medical Center

KS---------- Kaposi sarcoma

MCC---------- Merkel cell carcinoma

MSC---------- Melanoma skin cancer

NMSC---------- Non melanoma skin cancer

NHL---------- Non-Hodgkin Lymphoma

SCC---------- Squamous cell carcinoma

USA---------- Unites states of America

UV---------- Ultraviolet

WHO---------- World health organization

Chapter One: Introduction

1.1 Background

Skin cancer is a group of heterogenous malignancies broadly classified in to melanoma skin cancer (MSC) and non-melanoma skin cancer (NMSC). The most common NMSC are basal cell carcinoma (BCC) and squamous cell carcinoma (SCC). The three most frequent primary skin cancers are BCC, SCC and cutaneous melanoma (CM) (1,2). NMSC is the commonest cancer in white skinned individuals with a worldwide increasing incidence. It is not reported in global total cancer cases. This is because it is very common and commonly treated within primary care and likely to be under-reported in national cancer registry data. The incidence of MSC is much lower than NMSC but has been rising in fair skinned population throughout the world. Melanoma of skin is the 17th most common cancer worldwide (3–5)

Skin cancer can affect any one regardless of skin color but the incidence is varied from area to area. Skin cancer is the most common malignancy in the United States and represents ~ 35–45% of all neoplasms in Caucasians, 4–5% in Hispanics, 2–4% in Asians, and 1–2% in dark skinned population (6). The incidence of skin cancers has been reported to have risen in many parts of the world with the highest incidence in locations such as Australia, New Zealand and United states of America (USA) but in Asian and African countries, the incidence of skin cancer is low despite Suny hot weather (6,7). Limited data could be related to low incidence of skin cancer in these countries (8). Various sociodemographic, environmental, lifestyle, and genetic factors are risk factors for the development of skin cancer, especially in countries with higher incidences (3,9)

BCC is the most common skin malignancy in white skinned populations worldwide (6). SCC is the second common skin cancer in light skinned individuals after BCC but it is the most common skin cancer in dark skinned individuals, comprised of 20% of all NMSC (2,6). CM is the third most common skin cancer worldwide and the most fatal form of skin cancer in all racial groups (6,7).

There are different factors influencing the occurrence of skin cancer, among this factors sun light exposure, immunosuppression, smoking, chronic ulcer, older age, socioeconomic status and

demography (3,9). Risk factors for skin cancer development differ between population groups with varying skin color (6,10)

1.2 Statement of the problem

Skin cancer remains a major global public health treat and the incidence is increasing exponentially around the world. Globally, in 2019, there were 4.0 million BCC, 2.4 million SCC, and 0.3 million CM. CM causes approximately 62.8 thousand deaths and 1.7 million daily adjusted life years (DALYs) and 56.1 thousand deaths and 1.2 million DALYs were attributed to SCC, respectively (7). NMSC is an increasing problem for health care services worldwide which causes significant morbidity and it is responsible for over one million new cases (excluding basal cell carcinoma) and 64,000 deaths globally (3, 14).

In USA, skin cancer is the most common cancer and approximately 9,500 people in the USA are diagnosed with skin cancer every day. MSC, including basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), affects more than 3 million Americans a year (3).

Even though the data is limited in Africa, unexpectedly the incidence of skin cancer is increased. The greatest increase of SCC was observed in Sub-Saharan Africa. Also, southern sub-Saharan Africa showed the greatest Age standardize DALYs rate (ASDR) and Age standardize mortality rate (ASMR) (7). one study which is performed in four south African countries shows highest number of keratinocyte cancers and MM cases about 649,351 was recorded in south Africa from 210-2014 by using pathology results. In 2016, Statistics South Africa reported 456,612 deaths; 826 from CM and 485 from other disorders of the skin and subcutaneous tissue' which includes keratinocyte skin cancers and in 2017 the number of skin death was 1659 (10).

In addition to causing illness and death, skin cancer is costly to the nation. Skin cancer treatment is estimated to cost about $8.1 billion in the United States each year, $4.8 billion of which is for NMSC and $3.3 billion of which is for melanoma. Annual costs associated with lost workdays and restricted-activity days are estimated at $76.8 million for NMSC and $29.4 million for melanoma an individual in the United States dying from melanoma loses an average of 20.4 years of potential life, compared with an average of 16.6 years for all malignant cancers. Annual

productivity losses associated with these lost years is estimated to cost an additional $4.5 billion (11). In South Africa the estimated total annual cost of treating skin cancers were US$15.7 million per year (12).

Skin cancer often has a substantial psychological and social impact on patients. Skin cancer patients are visibly sick and they face stigma and develop depression and anxiety (13)

The true incidence of skin cancer in Ethiopia isn't established. In our hospital among different dermatology cases skin cancer is the major one. Even though in Ethiopia skin cancer is arising, only few researches are done on this area

1.3 Significance of the study

This research is intended to determine the histopathologic patterns of skin cancer and to assess age, sex and site wise of distribution of skin cancers. In addition to this it helps to identify associated factors of skin cancer. Knowing the diagnosis of skin cancer patients help to improve the life condition of the patients through provision of appropriate treatment.

The result of this study will benefit JUMC, regional health bureau and other health institutions to know the burden of skin cancer. create awareness, to set targets of intervention, to monitor and improve treatment quality and outcomes of patients with skin cancer by helping provide data about skin cancer coming to the institution which indirectly reflects what happens in the community.

In addition, the final result of this paper will serve as basis of reference for further research on the area for interested individuals.

Chapter Two: Literature review

2.1 An Overview of Skin Cancer

Skin cancers, including melanoma and nonmelanoma, are a common malignancy increasingly reported worldwide, with the highest incidence in locations such as the United States, Europe, Australia, and New Zealand (6,5). Among NMSCs BCC is the most common type followed by SCC (15). MSC is the 3rd common skin cancer worldwide (7). But the prevalence of skin cancer is varied on different racial groups. Different studies show SCC is the commonest skin cancer in dark skinned population compared with white population (6,16). UV radiation, smoking, being male, rural dwelling, older age, chronic ulcer are risk factors for skin cancer (3,9).

2.2 Histopathologic patterns of skin cancer

The prevalence of each histologic type of skin cancer are varied from one region to the other. Basal cell cancer (BCC) is the most common type of skin cancer in Caucasians, Hispanics, and Asians but it is the second most common skin cancer in Blacks. SCC is the most common skin cancer in Blacks and the second most common skin cancer in Caucasians, Asians, and Hispanics (6). In Saudi Arabia retrospective study, among 202 skin cancer cases 124 (61.4%) cases were BCC, 33 (16.3%) cases of SCC, 14 (6.8%) cases of MF, 12 (5.8%) cases of DFSP, 7 (3.7%) cases of CM, 3 (1.5%) cases of metastatic carcinoma, 3 (1.5%) cases of adnexal carcinoma, 1 (0.5%) case of Kaposi's sarcoma and 1 (0.5%) case of MCC (8). In Poland retrospective study over 21 years study period among 13,913 NMSC cases, 11,848 were BCCs and 2065 were SCCs with BCC:SCC ratio of 5.7:1 (2). A study in Turkey shows among 31 SCC cases 64.5% were well differentiated and 35.5 were moderately differentiated carcinoma. Poorly differentiated and anaplastic or undifferentiated tumors were not detected (15).

In Sudan retrospective study was done over 15 years period, from a total of 535 reviewed skin cancer cases 228 (42.6%) were SCC constituting the commonest type followed by BCC cases 171 (32%) and CM in 68 (12.7%) of patients. Also, Kaposi Sarcoma was 50 (9.3%) cases and Dermatofibrosarcoma in 8 (1.5%) cases (16). In Nigeria retrospective study during the 25-year

period of study a total of 187 skin cancers CM was the commonest skin cancer (33%). In addition, Kaposi sarcoma was 56 cases (30%), SCC was 45 cases (24%), BCC was 18 cases (10%) and DFSP was 7 cases (4%) (17). In South Africa 4 years retrospective study from a total of 4270 skin cancer cases SCC (45.4%) was the most common skin cancer followed by BCC (27.8%) (18). A study done in Nigeria shows Sebaceous carcinoma was the commonest adnexal carcinoma which accounts 17/47 (36.2%) (19)

In our county Ethiopia, one-year retrospective study was done in Tikur Anbesa specialized Hospital and 228 skin cancer cases were revised, the result shows SCC (55.2%) was the commonest skin cancer followed by CM (28.1%) then BCC (16.7%). BCC to SCC ratio was (38/126) 1:3.3 (20).

2.3. Factors associated with skin cancer

Factors which categorized as socio-demographic (age, sex and address) and anatomic site wise distribution (head and neck, trunk, extremities,) may be associated a skin cancer.

2.3.1 Socio-demographic distribution of skin cancer

There is difference in distribution of skin cancer according to age, sex and site. In Nepal cross sectional study over 10 years study period, from a total of 208 skin cancer cases 117 (56.3%) were males and 91 (43.8%) were females with a male to female ratio of 1.3:1. There was a male predominance in both CM and SCC with percentage of 51.6% & 69.3% respectively whereas BCC shows a female predominance of 43 (54.4%). skin cancer was most frequent among the age group 61-70 years comprising of 49 (23.6%) cases followed by age group 71-80 years. The majority of BCC and CM were observed in the age group of 61 – 70 years 19 (24.1%) & 9(29%) respectively whereas SCC was more common in the age group of 71 – 80 years with 21 (28%) cases (1). Another study in Tukey shows Among 72 men (56.7% of the total) and 55 women (43.3% of the total), BCC was observed in 53 men (41.7%) and 43 women (33.8%). SCCs were detected in 19 men (15.06%) and 12 women (9.44%). No statistically significant difference was found between genders and cancer types (P= 0.556). Also, no statistically significant difference was found between age groups and cancer types (P=0.410) (15). A study in Poland shows from

a total of 13,913 NMSC cases 6899 were men and 7014 were women with the ratio of 0.98:1. There were 5881 men and 5967 women BCC cases with a ratio of 0.99:1 and 1,018 men and 1,047 women SCC cases with a ratio of 0.97:1($p<0.01$). The mean age of patients with BCC was 70.1 (range 18–101 years) whereas of patients with SCC was 77.1 years (range 19–102 years) $p<0.01$ (2). A study in USA shows factors for the presence of NMC group findings on screening clinical skin examination; male sex, age 50 years or older were all associated with an increased frequency of NMC findings (both P values < .0001) (21). Another study in USA shows In USA a study shows Skin cancer prevalence increased significantly with age ($p<.001$). Participants aged 65 and older experienced the highest skin cancer prevalence at 54.4%. Multivariate analysis also illustrate increased age were all associated with increased likelihood of skin cancer (22).

In Nigeria eight years retrospective study shows from a total of 72 skin cancer cases 35 (48.6%) were males and 37 (51.4%) were females with a ratio of 1:1.06. Both SCC (35 cases) and DFSP (9 cases) shows female predominance with percentage of 60% and 66.7% respectively whereas BCC and CM have equal sex distribution. 37.5% of skin cancer patients were in their middle age (45-64years) with mean age of 57.2±17.0. SCC was noticed in < 45 years age (36%) and 45-64 age group (36%) whereas 65% of CM cases were >65 years age (23). Another study in Nigeria shows of the 187 malignant cases, 109 (59%) were males while 78 (41%) were females with a male to female ratio of 1.4:1, with a mean age of 47 ± 3 years. Among 45 SCC cases 32 was males and 13 was females giving a male to female ratio of 3:1 ($p<0.05$). For both CM and BCC M:F 1: 1.04 and 2:1 respectively (17). A study in Tanzania shows from a total of 154 skin cancer cases males were 89 (57.8%) and females were 65 (42.2%) with male to female ratio of 1.4:1. SCC, BCC and KS shows male predominance with percentage of 7.8%, 5.2% and 6.5% respectively whereas CM shows female predominance with percentage of 34.4%. the age ranged from 10 to 98 years (mean 54.5 ± 17.65 years) and modal age group was 51-60 years (24). Another study in Tanzania shows 60 (93.8%) came from the rural areas (25). In south Africa among 4,270 skin cancer cases males were 2,108 (49.4%) and females were 2,095 (49.1%) with male to female ratio was 1:1. Sex was unspecified in 67 patients. Age range is 2 - 101 years with mean age of 51.6. BCC occurred most frequently in the age group 60 - 69 years, while CM and SCC presented most commonly in those aged 50 - 59 years (18). Another study in South Africa

shows males were shown to have an OR of 2.56 for developing keratinocyte skin cancers when compared to females (CI: 1.60–4.10, p < .001) and similarly males were shown to have OR of 1.99 for having MSC when compared to females (CI: 1.09–3.64, p = .025). The rural dwelling has significant association with skin cancer for both keratinocyte skin cancers and MSC (OR = 4.5, CI: 1.58–13.06 p = .005) and (OR = 2.88, CI: 1.01–8.18, p = .048) respectively (9). In Sudan 4 years cross sectional study shows among 49 CM cases 57.1% were males and 42.9% were females. Ages ranged from 30 to 94 years old and most commonly affected age group were 46-61 years (40.8%) followed by 62-77 years (28.6%) (26).

A study done in our county Ethiopia among 228 skin cancer cases males were 141 (61.8%) and females were 87 (38.25) with male to female ratio of 1.6:1. All skin cancers shows male predominance with male to female ratio of 1.2:1 for BCC, 1.6:1 for SCC and 1.8:1 for CM. Most commonly affected age group for all SCC, BCC and CM was >60 years with percent of 52.1, 21.9 and 26 respectively. As age of patients increased there was an increase in SCC and BCC (p>0.05) and there was no significant age trend association with CM (p>0.05) (20). Other study in Ethiopia shows among 746 skin cancer cases 40% were SCC (27). Another study in Ethiopia, Tikur Anbesa Hospital from 50 cases of primary cutaneous malignant melanoma, there were equal numbers of male and female patients; the mean age was 51.6 years (28).

2.3 .2 Host related factor (Anatomic site wise distribution of skin cancer)

In Nepal study shows head and neck region 113 (54.3%) were the commonest site for skin cancer. Both the BCC and SCC were commonly seen in the head and neck region comprising 75 (94.9%) and 29 (38.7%) respectively but lower extremity (24%) was the commonest site for CM (1). Another study shows People of color develop SCC predominantly in areas infrequently exposed to the sun, such as the legs, in contrast to Caucasians, who develop them in chronically sun-exposed skin (6) In India head and neck region (44.6%) was the commonest site for skin cancer followed by lower extremity (18.5%). For DFSP trunk (66.7%) was the commonest site (29). In Japan lower extremity (59%) was the commonest site for CM followed by upper extremity (17%) (30). A study in New Zealand shows the lower limb was the most common site in females with SCC compared to the head and neck in males. Head and neck were the

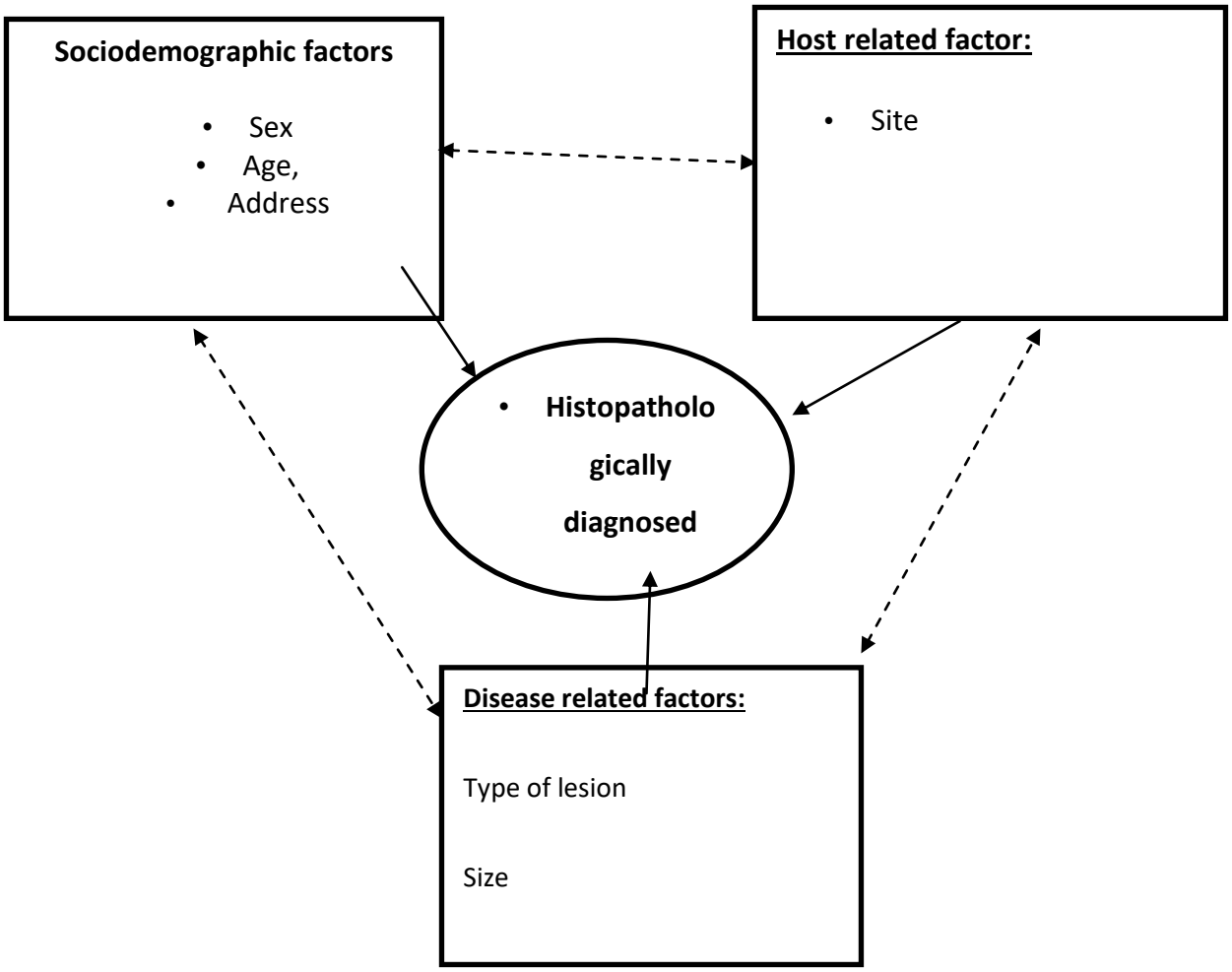
commonest site for BCC in both sexes (31). In Nigeria a study shows lower extremity (50%) was the commonest site for skin cancer followed by head (19.4%) (23). In Tanzania lower extremity (55.8%) was the commonest site for skin cancer followed by head and neck (16.2%). The lower extremity was the most frequent site of CM, KS, and SCC in (42.9%), (7.1%) and (3.9%) patients respectively, whereas BCC was most common on the head and neck in (7.1%) (24).

A study done in our country Tikur Anbesa Hospital lower extremity (50%) was the commonest site for skin cancer followed by face (18.4%). SCC was most frequently 53.2% seen in the lower extremity followed by face 15.1% whereas BCC was seen most frequently on the face in 39.5%. CM was commonly seen in lower extremity (67.2%) followed by face (12.5%). The upper extremity was more commonly affected by SCC 15/21 (71.4%) than BCC and CM (20).

2.3.3 Disease related factors (size, duration, stage and type of lesion)

In Turkey in NMSC study, Ulceration was observed in 58.1% of all tumors. Ulceration was detected in 55.3% of BCCs and 66.7% of SCCs. No statistically significant difference was found between ulceration and cancer types (P = 0.247) (15). A study done in Ethiopia shows 84% were pigmented melanomas (28). A study in Tanzania shows duration of illness ranged from 2 to 60 months (mean 24.16□12.14) and the majority of patients, 110(71.4%) presented between 2 and 24 months of onset of illness. Involvement of regional lymph node was recorded in 30(19.5%) patients (24). Another study in Tanzania shows the duration of illness ranged from 2 to 56 months (mean 26.16±10.23, median = 24 months) and the majority of patients, 48 (75%) presented between 2 and 24 months of onset of illness. Most of the patients presented late with ulcers/fungating fleshy lesions, with a median time at presentation of 24 months. The median tumor size at presentation was 7 cm (range 2 to 18 cm) and the vast majority of patients, 52 (81.3%) presented with large tumors of more than 5 cm in diameter. Most patients, 52 (81.3%) had no evidence of metastases. Lymph node metastasis at the time of diagnosis was recorded in 8(12.5%) patients (25). A study in Sudan shows among 575 skin cancer cases 39.4% was size< 2cm, 40.5% was 2-5cm and 20.1% was > 5cm (16)

2.4. Conceptual Frame Work



Key:

Solid line ——> To show association between each independent variables and skin cancer

Broken line <……>To show only the existence of a relationship between independent variables

Figure1*:* Conceptual framework of histopathologic patterns of skin cancer https://doi.org/10.1016/j.jddst.2021.102912

Chapter Three: Objectives

3.1 General objective

- To determine histopathologic patterns of skin cancer in Jimma university medical center, 2022

3.2 Specific objectives

- To assess histopathologic types of skin cancer in Jimma university medical center, 2022
- To assess distribution of histopathological patterns of skin cancer among sex and age in Jimma university medical center,2022
- To determine site wise distribution of skin cancer Jimma university medical center, 2022
- To identify factors associated with NMSC and MSC in Jimma university medical center, 2022

Chapter Four: Methods

4.1 Study area and period

Jimma university medical center is one of the oldest public hospitals in Ethiopia, located in south western part of the country, Jimma town 352Km from Addis Abeba with bed capacity of 800. Currently it is the only teaching and referral hospital in the area, providing services for approximately 16,000 in patent, 220,000 outpatient attendants, 12,000 emergency cases and 4,500 deliveries in a year with catchment population of 15 million people.

Pathology department of JUMC is one of the high burden areas with 4 pathologists, 12 residents with 10 technicians and 1 secretary. The services given by the department include histopathology(biopsy), FNAC, Hematopathology, fluid cytology, autopsy and regular teaching activity for preclinical medical and other health students. The department nearly 2500 biopsies are diagnosed yearly. JUMC is the only hospital giving histopathology and cytology services in the region.

The study were conducted from August10 , 2022 to November 15, 22

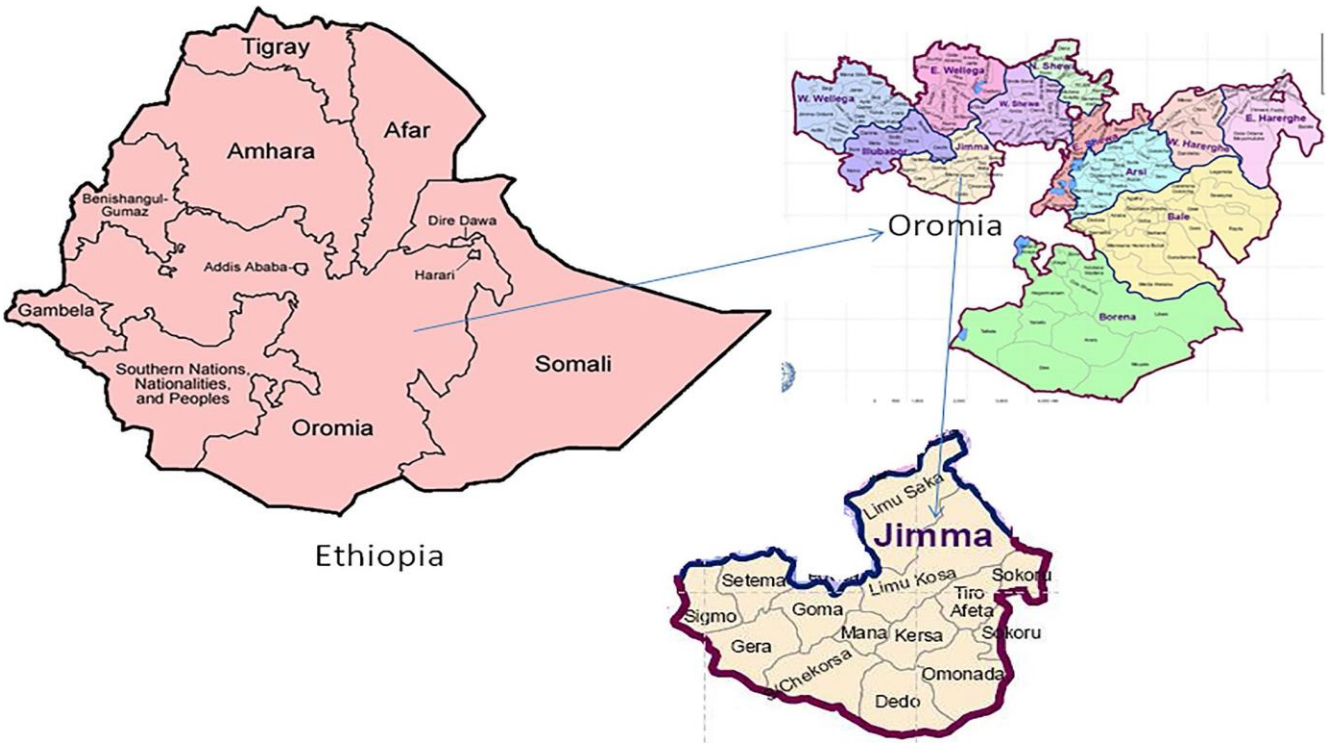


Figure 2: Map of Jimma zone/ town accessed on 2020://www.researchgate.net/figure/Map-of-Jimma-zone-Oromia-Regional State_fig1_334465038

4.2 Study design

A hospital based retrospective cross-sectional study was conducted

4.3 Source population

All 548 patients who submitted skin biopsy to pathology department of JUMC for histopathologic diagnosis from August, 2018- August 2022.

4.4 Study population

All 213 patients who are Histopathologically diagnosed with skin cancer in JUMC during 4-year period

4.4.1 Inclusion criteria

All biopsy reports of patients with the diagnosis of skin cancer which were done from August 2018 to August 2022

4.4.2 Exclusion criteria

- All biopsy requests which missed at least one of these variables: - sex, age, site and histopathologic diagnosis

4.5 Sample size and sampling technique

Conveniently, all 213 histopathology reports with histologic diagnosis of skin cancer were retrieved from JUMC pathology department those reports that full filled inclusion criteria were manually identified then grouped by year after being retrieved from the entire hard copies of 548 skin biopsy reports from the Department of Pathology archives. Six biopsy reports were excluded using exclusion criteria.

4.6 Data collection Tools and procedures

Data was reviewed and collected from the patient biopsy request forms and the department's registration books manually by 2 histopathology technicians working in the department. Structured checklist was adopted through reviewing of literatures and books to include information that fulfill the objective of the study. Eligible 207 Reports fulfilling inclusion and exclusion criteria were extracted and recorded into a prepared checklist containing study variables. Both technicians have experience on research data collection. one junior pathology resident was enrolled and the principal investigator supervised data collection daily.

4.7 Study variables

- Independent variables
  - Socio demographic factors: age, sex and place of residence
  - Disease related factors: size, type of lesion, duration and stage
  - Host related factors: Site

- Dependent variable
  - Histopathologic skin pattern

4.8 Operational Definitions

Non melanoma skin cancer: All types of skin cancer which are not melanoma

Place of residence:

Urban: Jimma town

Rural: Out of Jimma town

Type of lesion: Gross feature of the lesion

4.9 Data Analysis

The collected data was cleaned, coded, checked and then entered into Epi data version 3.1and analyzed by SPSS version 20. Firstly, descriptive analysis was done and the result was summarized by using proportions, percentages, tables and graphs accordingly.

Multinomial logistic regression was used to identify factors associated with skin cancer among patients who are histologically diagnosed with skin cancer in JUMC and control confounding.

Firstly, Multinomial logistic regression analysis was undertaken and factors with P-value of less than 0.25 in bivariate analysis were candidate and entered into the multivariable logistic

regression to identify independent predictor factors. For all statistical significance tests, $p<0.05$ and AOR with 95% CI were used.

Also, the goodness of fit was checked by Hosmer-Lomeshow and multicollinearity was checked by variance inflation factor (VIF) with value of 0.87 and 1.1 respectively

4.10 Data quality control

Training was given for both data collectors and supervisor on objectives of the study, data collection tools and procedures. The principal investigator and supervisor checked completeness, accuracy and clarity of collected data. Data collecting tool were structured.

4.11 Ethical considerations

The study was conducted after getting approval from the ethical clearance committee of Jimma University, institute of health. The nature of the study makes it difficult to take informed consent of the patients but in order to maintain confidentiality, only the relevant parameters excluding the name of the patent was collected.

4.12 Dissemination of findings

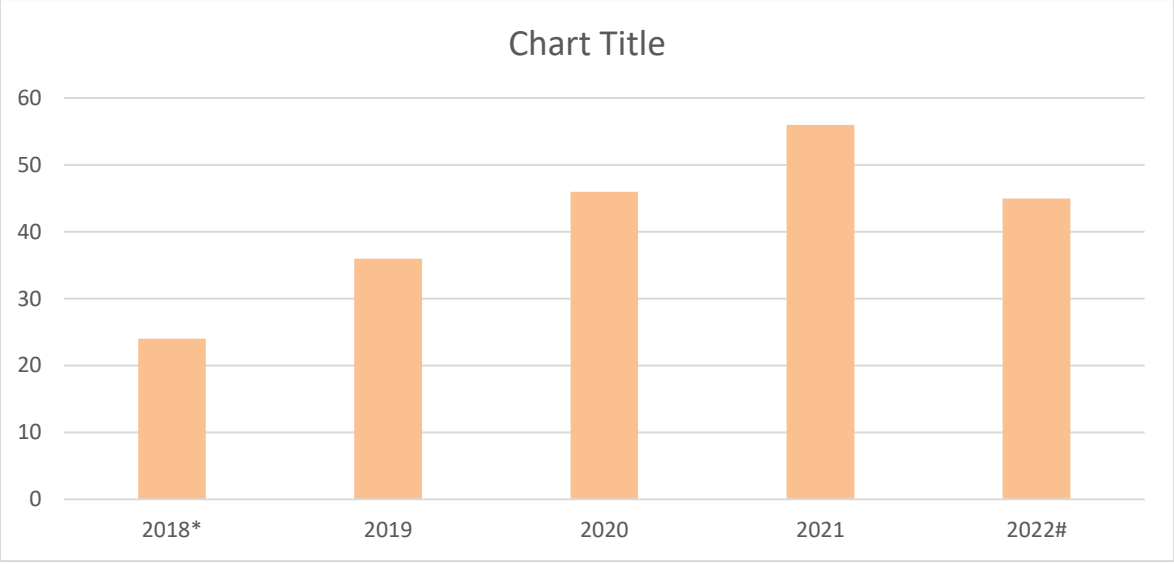
Results will be presented to the pathology, public health departments and interested university community and copies will be available in the University library. The study findings will be submitted to the department and published in the university press.

Chapter five: Result

5.1 Demographic characteristics

A total of 548 skin biopsies were received by the department in four-year period between 2018 and 2022. Out of these, 207 (37.8%) were skin cancers with biopsy request form completeness rate of 91.2%. There were 109 (52.7%) females with male to female ratio of 1:1.1. The age distribution ranges from 12 years to 98 years with mean age of 50 and the standard deviation of 16.1(50±16.1). The age group (60-69 years) was most commonly affected by skin cancer which comprised 49 (23.7%) of total cases (Table 1). In females more affected age group was 40-49 years 26(23.8%) while in males more affected age group was 60-69 years (26.5%). Most of skin cancer patients, 176 (85%), were from rural areas (Table 1).

Figure 3. Distribution of Skin cancers with the corresponding year of biopsy at JUMC, Jimma, Ethiopia, 2022.



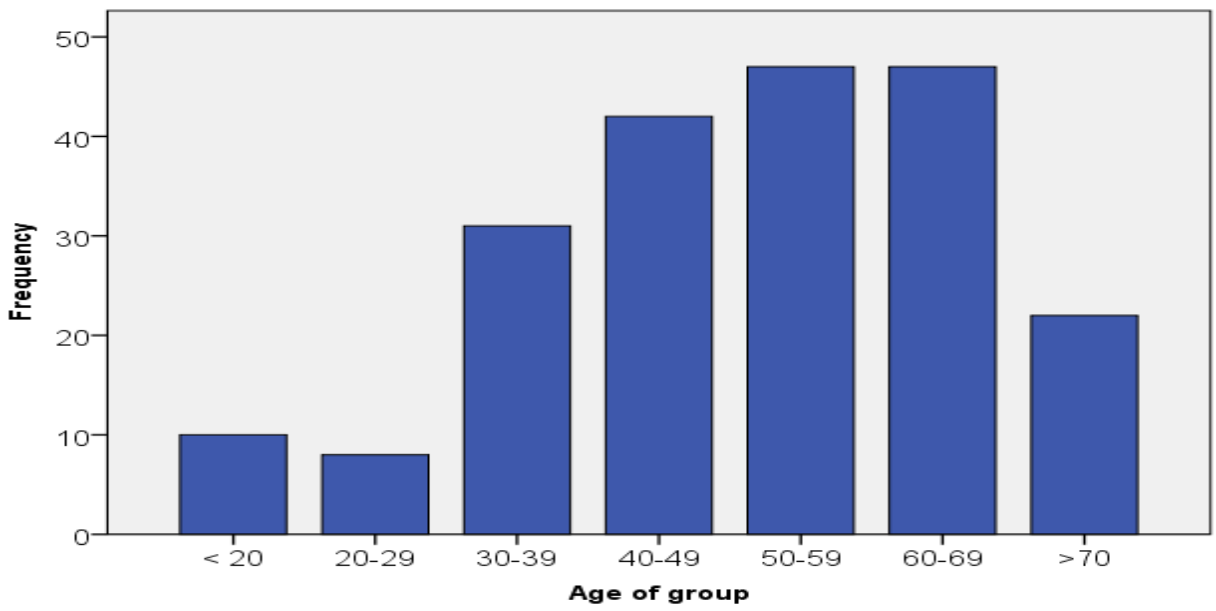
2018*= August 1, 2018-December 30, 2018

2022# = January1, 2022-August 1, 2022

Table 1. Demographic Characteristics of Skin cancers at JUMC, Jimma, Ethiopia, 2022.

Variables	Categories	Histopathologic diagnosis of skin cancer Freq. (%)		Total Freq. (%)
		Non melanoma n= 157 (75.8)	Melanoma n= 50 (24.2)	207 (100)
Sex	Male	71 (45.3)	27 (54)	98 (47.3)
	Female	86 (54.7)	23 (46)	109 (52.7)
Residency	Urban	22 (14)	9 (18)	31 (15)
	Rural	135 (86)	41 (82)	176 (85)
Age group (years)	< 20	8 (5.1)	2 (4)	10 (4.8)
	20- 29	7 (4.4)	1 (2)	8 (3.9)
	30- 39	24 (15.3)	7 (14)	31 (15)
	40- 49	33 (21)	7 (14)	40 (19.3)
	50- 59	36 (23)	11 (22)	47 (22.7)
	60- 69	33 (21)	16 (32)	49 (23.7)
	>70	16 (10.2)	6 (12)	22 (10.6)

Figure 4. Age distribution of skin cancer at JUMC, Jimma, Ethiopia, 2022.



5.2 Histopathologic patterns of skin cancer

Category wise distribution of skin cancer showed that the majority were NMSC 157 (72%) with MSC to NMSC ratio of 1:3.1. SCC was most common skin cancer which accounts for 98 (47.3%) of the total of 207 cases followed by CM 50 (24.2%) and DFSP 19 (9.2%) (Figure 5). Among 98 SCC cases 50 (51%) were females and 48 (49%) were males with male to female ratio of 1:1.04 while CM shows slight male predominance with 27 (54%) and female 23 (46%) with female to male ratio of 1.2:1. Regarding age distribution, SCC was commonly seen in 7th decade 27 (27.6%) with mean age of 53 and CM also was commonly seen in 7th decade16 (32%) with mean age of 52.5. The mean age of DFSP was 33.7 (Table 2).

Among 98 SCC cases, 86 (87.7%) were well differentiated, 9 (9.2%) were moderately differentiated and 3 (3.1%) cases are poorly differentiated. The most common morphologic subtype of adnexal carcinoma was sebaceous carcinoma which accounts for 6 (40%) of the total of 15 cases followed by sweat duct carcinoma 4 (26.6%) and squamoid eccrine ductal carcinoma 1 (6.7%), microcytic adnexal carcinoma 1 (6.7%). Three (20%) adnexal carcinomas morphologic

subtype were not specified. Among 8 cases of metastasis skin cancer, 7 (87.5%) cases were adenocarcinoma and 1 (12.5%) case NHL.

Figure 5. Histopathologic patterns of skin cancer and their frequency at JUMC, Jimma, Ethiopia, 2022

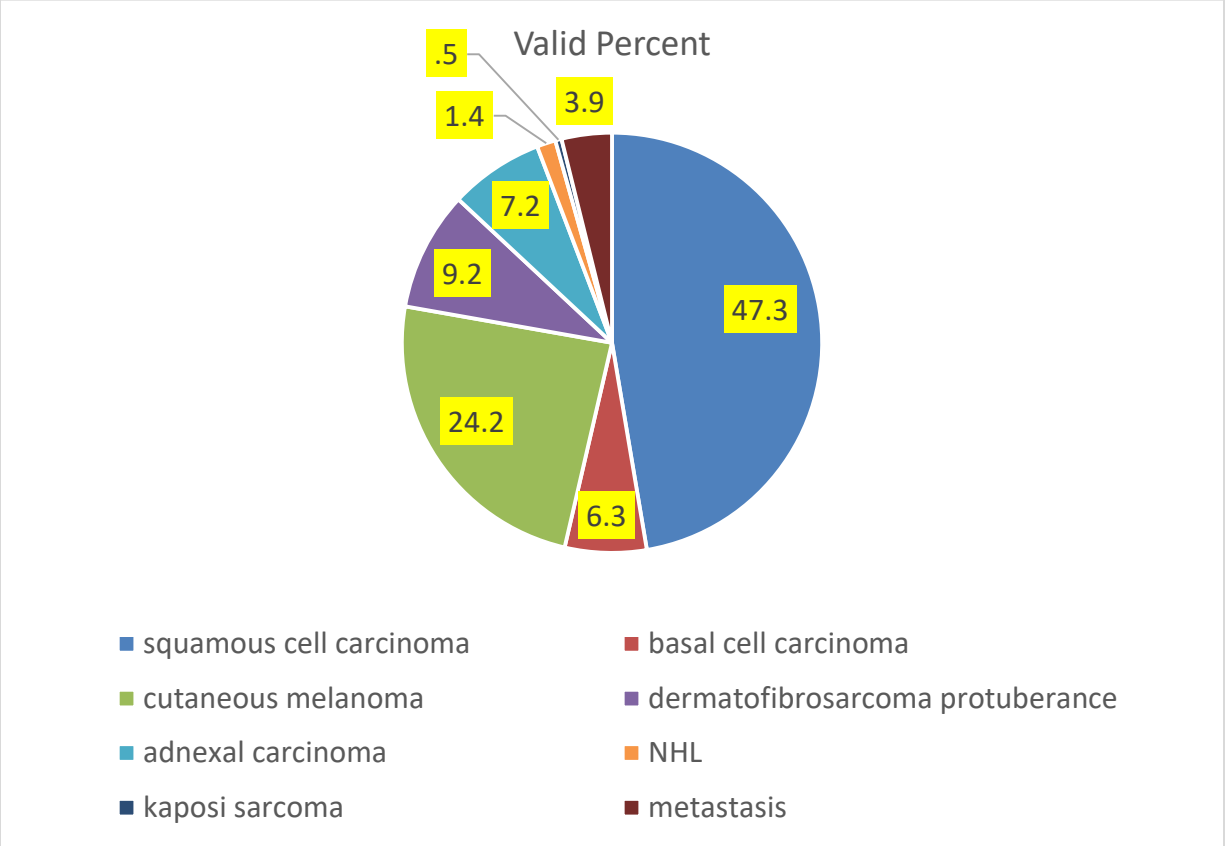


Table 2. Distributions of Histopathologic Patterns of Skin Cancer with Age and Sex at JUMC, Jimma, Ethiopia, 2022

Variable	Categories	Histopathologic diagnosis of skin cancer								Total (n) %
		Non melanoma skin cancer Frequency (%)							Melanoma skin cancer Frequency (%)	
		SCC n=98	BCC n=13	DFSP n=19	Adnexal carcinoma n=15	NHL n=3	KS n=1	Metastasis n=8	CM n=50	207 (100)
Sex	Male	48 (49)	4 (30.8)	7 (36.8)	8 (53.3)	1 (33.3)	0	3 (37.5)	27 (54)	98 (47.3)
	Female	50 (51)	9 (69.2)	12 (63.2)	7 (46.7)	2 (66.7)	1 (100)	5 (62.5)	23 (46)	109 (52.7)
Age group (Years)	< 20	2 (2)	1 (7.7)	4 (21)	0	0	0	1 (12.5)	2 (4)	10 (4.8)
	20- 29	2 (2)	0	4 (21)	1 (6.7)	0	0	0	1 (2)	8 (3.9)
	30-39	12 (12.2)	2 (15.4)	4 (21)	4 (26.7)	0	0	2 (25)	7 (14)	31 (15)
	40-49	21 (21.4)	1 (7.7)	4 (21)	2 (13.3)	3 (100)	1 (100)	1 (12.5)	7 (14)	40 (19.3)
	50-59	22 (22.4)	4 (30.8)	2 (10.5)	5 (33.3)	0	0	3 (37.5)	11 (22)	47 (22.7)
	60-69	27 (27.5)	2 (15.4)	1 (5.5)	2 (13.3)	0	0	1 (12.5)	16 (32)	49 (23.7)
	>70	12 (12.2)	3 (23)	0	1 (6.7)	0	0	0	6 (12)	22 (10.6)

5.3 Clinical presentation

Most skin cancer patients 162 (78.3%) presented with ulcer. Among 98 SCC patients, 97 (99%) cases were presented with ulcer from which 92 were fungating ulcer 5 were ulcerated nodule. Ten (84.6%) BCC patients were presented with ulcer. The majority of CM patients ((41 (82%)) presented with ulcer and 33 (66%) CM lesions were pigmented and 17 (34%) were non pigmented (Table 3).

Among 165 excisional skin cancer biopsies, the majority cases 81 (49.1%) were greater than 5cm with the mean tumor size of 6.5cm and with range of 1-30cm. The majority of skin cancer patients, 177(84.5%) presented between 1-24 months of onset of illness, with range of 1- 132 months (mean 15.3 and median= 10 months).

Only 19 skin cancer cases are staged, 15 cases were CM and 4 cases were SCC. Thirteen CM cases staged as T4b (Breslow thickness were greater than 4mm) and 2 cases were staged as T3b (Breslow depth is between 2-4mm). Lymph node status was mentioned in only 20 skin cancers. Seven SCC and 13 CM patients presented with regional lymph node involvement

Table 3. Histopathologic patterns of Skin cancer with their duration and type of lesion at JUMC, Jimma, Ethiopia, 2022

Variables	Categories	Histopathologic diagnosis Frequency								Total (n)
		SCC n=98	BCC n=13	DFSP n=19	Adnexal carcinoma n=15	NHL n=3	KS n=1	Metastasis N=8	CM n=50	207
Type of lesion	Fungating ulcer	92	10	0	7	0	0	0	10	122
	Pigmented Ulcer	0	1	0	0	0	0	0	28	29
	Ulcerated nodule	5	0	6	0	0	0	0	3	14
	Nodular swelling	1	1	13	8	3	1	8	4	39
	Pigmented nodule	0	1	0	0	0	0	0	5	6
Duration in months	<1	0	2	1	0	0	0	2	1	6
	1-24	84	9	17	13	3	1	6	44	177
	24-48	9	1	1	1	0	0	0	3	15
	48-72	2	1	0	0	0	0	0	1	4
	>72	3	0	0	1	0	0	0	1	5

Table 4. Histopathologic patterns of Skin cancer with their size at JUMC, Jimma, Ethiopia, 2022

Variable	Category	Histopathologic diagnosis Freq. (%)								Total n (%)
		SCC n=70	BCC n=12	DFSP n= 17	Adnexal carcinoma n= 13	NHL n= 2	KS n=1	Metastasis n=8	CM n=42	165 (100)
Size in CM	<2	5 (7.1)	2 (16.7)	0	0	0		1 (12.5)	6 (14.3)	14 (8.5)
	2-5	29 (41.4)	7 (58.3)	5 (29.4)	10 (77)	2 (100)		4 (50)	13 (31)	70 (42.4)
	>5	36 (51.4)	3 (25)	12 (70.6)	3 (23.1)	0	1	3 (37.5)	23 (54.8)	81 (49.1)

5.4 Anatomic site wise distribution of skin cancer

According to anatomic site distribution, lower extremity 113 (54.6%) was the commonest site for skin cancer followed by head and neck 63 (30.4%) (Figure 6). Both SCC and CM were commonly seen in lower extremity comprising 60 (61.2%) and 40 (80%) respectively. DFSP was commonly seen on Trunk 8 (42.1%) (Table 5). SCC was shown to affect the lower extremity in both males (58.3%, 28/48) and females (64%, 32/50) and similarly CM were commonest site for both male (85.2%, 23/27) and female (74%, 17/23). BCC was commonly seen on head and neck region in both males (50%, 2/4) and females (88.9%, 8/9).

Figure 6. Anatomic Wise Distribution of Skin Cancer and Their Frequency at JUMC, Jimma, Ethiopia, 2022

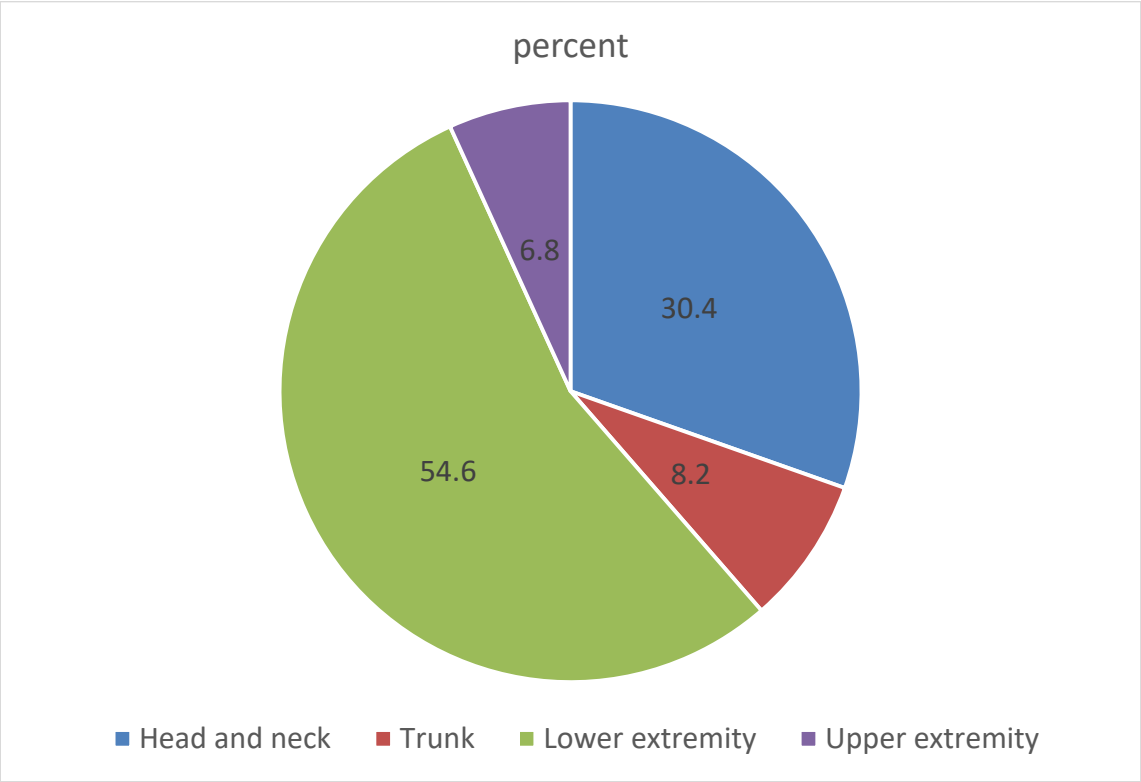


Table 5 Distribution of Histopathologic Patterns of Skin Cancer with anatomic site at JUMC, Jimma, Ethiopia, 2022

Variable	Category	Histopathologic diagnosis								Total n (%)
		SCC n (%)	BCC n (%)	DFSP n (%)	Adnexal carcinoma n (%)	NHL n (%)	KS n (%)	Metastasis n (%)	CM n (%)	
Anatomic Site	Lower extremity	60 (61.2)	3 (23.1)	6 (31.6)	1 (6.7)	0	1 (100%)	2 (25)	40 (80)	113 (54.6)
	Head and neck	29 (29.6)	10 (76.9)	5 (26.3)	10 (66.6)	2 (66.7)	0	0	5 (10)	61 (30.4)
	Trunk	3 (3.1)	0	8 (42.1)	1 (6.7)	0	0	6 (75)	1 (2)	19 (8.2)
	Upper extremity	6 (6.1)	0	0	3 (20)	1 (33.3)	0	0	4 (8)	14 (6.8)
Total (n)		98	13	19	15	3	1	8	50	207 (100)

5.5 Factors associated with skin cancer

Firstly, age, sex, place of residence, duration of the lesion, site and type of lesion were tested at $p<0.25$ for their association in bivariate analysis then age and anatomic site selected as candidate for multivariate analysis. Binomial logistic regression was performed and site were statistically significant associated with NMSC and MSC ($p= 0.01$). But Both MSC and NMSC were not statistically significant associated with age ($p= 0.645$), sex ($p= 0.28$), place of residence ($p= 0.492$) and type of lesion ($p= 0.30$) (table 6). Lower extremity was the commonest site for NMSC but there was no statistically significant association between lower extremity and both NMSC and MSC rather trunk and head and neck were statistical significantly associated with both MSC and NMSC ($p<0.05$). The chance that a skin cancer which occurs on head and neck being diagnosed as NMSC is 6 times higher than a skin cancer which occurs on lower extremity

(AOR= 6.030, CI (2.229-16.313). The chance a skin cancer which occurs on trunk being diagnosed as NMSC is 9.2 times higher than a skin cancer which occurs on lower extremity (AOR= 9.204, CI (1.161-72.996) (table 7)

Table 6. Bivariate analysis to identify factors associated with NMSC and MSC at JUMC, Jimma, Ethiopia, 2022

Variables	category	Total Freq. (%)	Histopathologic diagnosis of skin cancer		COR (95% CI)	P-Value
			NMSC Freq. (%)	MSC freq. (%)		
Age	Mean± SD		48.96±16.25	52.48±15.42	0.987 (0.98- 1.007)	0.211
Sex	Male	98	71	27	0.703(0.371-1.332)	0.280
	Female	109	86	23	1	
Place of residency	Urban	31	22	9	0.742(0.317-1.738)	0.49
	Rural	176	135	41	1	
Site	Head and neck	61	56	5	6.137 (2.274-16.562	.000
	Trunk	29	18	1	9.863 (1.269-76.634	0.029
	Upper extremity	14	10	4	1.370 (0.404-4.649	0.614
	Lower extremity	113	73	40		
Type of lesion	ulcer				0.640 (0.276-1.487)	0.30
	swelling				1	
Duration	<1	6	5	1	1.25 (0.508-26.869)	0.89
	1-24	177	133	44	0.756 (0.802- 6.942)	0.80
	24-48	15	12	3	1.00 (0.08-12.557)	1.00
	48-72	4	3	1	0.75(0.032-17.506)	0.86
	>72	5	4	1	1	

Table 7. Multivariate analysis to identify factors associated with NMSC and MSC, at JUMC, Jimma, Ethiopia, 2022

Variables	category	Total Freq. (%)	Histopathologic diagnosis of skin cancer		COR (95% CI)	AOR (95% CI)	P-Value
			Non melanoma Freq. (%)	Melanoma Freq. (%)			
Age	Mean ± SD		48.96±16.25	52.48±15.42	0.987 (0.98-1.007)	0.995 (0.973-1.017)	0.645
Site	Head and neck	61	56	5	6.137 (2.274-16.562	6.030 (2.229-16.313) *	.000
	Trunk	29	18	1	9.863 (1.269-76.634	9.204 (1.161-72.996) *	0.036
	Upper extremity	14	10	4	1.370 (0.404-4.649	1.333 (0.391-4.552)	0.646
	Lower extremity	113	73	40		1	

*Significant association at p-value <0.05

Chapter Six: Discussion

The incidence of skin cancer has increased dramatically over the last few decades (5,7) and it varies widely in different parts of the world. It is higher in Caucasians than dark skin colored people due to amount of melanin pigment (6,7).The rising incidence may be due to many factors, such as sociodemographic, environmental and occupational factors, infection and immunosuppression (3). In this study, skin cancer accounted for 37.8% of all skin biopsies done when we compared with a study done in South Nigeria (27%), our result is slightly higher (24). It may be due to of majority of non-neoplastic and benign lesions were not sent for histopathologic examination. The commonest affected age group in this study was the 7th decade with mean age of 50 year, our finding was consistent with previous studies in Ethiopia, Saudi Arabia and Yemen (8,20,33). Many other previous studies shows skin cancer most commonly seen in elderly population (3,10,21) The male to female ratio was comparable 1:1.1 which is consistent with studies done in South west Nigeria (1:1.06), Nepal (1:1.3) and Iraqi (1:1.2) (26,34,35).This study also shows the majority of skin cancer patients (85%) came from rural areas. This is consistent with a study conducted in Tanzania in which 93.8% skin cancer patients came from rural areas (25).This may be due to the fact that majority of our population lives in rural areas.

The commonest site of involvement of skin cancer in this study was lower extremity which accounts for 113 (54.6%) followed by head and neck 63 (30.4%). This is consistent with a study conducted in Tikur Anbesa Hospital, Ethiopia where lower extremity was the commonest site involvement followed by head and neck which constitute 114 (50%) and 69 (30.3%), respectively (20). Similar finding were seen also in studies conducted in South west Nigeria and Tanzania (23,24). However, studies conducted in western and Asian countries shows sun exposed areas (head and neck) was the commonest site for skin cancer which indicates difference in histopathology and predisposing factor for skin cancer in different areas (2,6,8).

The commonest clinical presentation of skin cancer was ulcerated lesion in 162 (78.3%) of patients in this study, which is consistent with other studies conducted in Turkey and Tanzania (15,25). Most our skin cancer patients, 177 (84.5) presented between 1 and 24 months of onset of

illness with median duration of 15.3 months which is consistent with previous two studies conducted in Tanzania (24,25). Eighty (49.1%) skin cancer patients presented with size of > 5cm skin lesion and 70 (42.4%) 2-5cm skin lesion in this study. A study done in Tanzania shows the majority of skin cancer patients presented with a size of > 5cm skin lesion which accounts 52 (81.3%) even if the percentage is higher than our study (25). In contrast a study done in Sudan most skin cancer patients presented with a size of 2-5cm which accounts 189 (40.5%) but size >5cm were 94 (20.1%) (16). This difference may be due to access to health care services and health seeking behavior.

NMSC was the commonest histopathology seen in our study, 3 times higher than MSC which was consistent with a study conducted in Nigeria where it was 2.7 times higher than MSC (23). SCC is the commonest skin cancer which accounts 98 (47.3%). It is the commonest skin cancer in dark skinned population but it is the second common skin cancer in Caucasians, Hispanics, and Asians (6). This is consistent with a study done in Tikur Anbesa Hospital in which 55.2% of cases were SCC and Tigray region (40%) (20,27). This finding also is an agreement with a study done in Sudan 228 (42.6%), South west Nigeria 25 (34.7%), South Africa 1938 (45.4%)and India 40 (43.6%) (16,18,23,29). In contrast to this study, Studies done in Nepal, Turkey, Poland and Yemen shows SCC were the second common skin cancer after BCC (1,2,15,33). There was slight female predominance of SCC in the present study which is similar to a study done in South west Nigeria and Poland (2,23). But most studies done in Ethiopia, Tanzania, Turkey and Yemen shows male predominance of SCC (12,23,26,31).The mean age of SCC was 53 in our study which is consistent with a study done in India and south west Nigeria where the mean age was 53.7 and 53.6 respectively (23,36). In our study lower extremity is the commonest site for SCC in both sexes which accounts for 60 (61.2%), which is consistent with a previous study done in Ethiopia where lower extremity 67 (58.8%) was the commonest site for SCC. Similarly, studies done in Tanzania, Nigeria and India show lower extremity is the commonest site for SCC (23,24,36). Non exposed areas to the sun (lower extremity) is the commonest site for SCC in dark skinned population but chronically sun exposed areas (head and neck) is the commonest site for Caucasians (6). In addition chronic ulcer, burn scars and chronic inflammations are risk factors for SCC in dark skinned population (6,10,24). In New Zealand, a study shows the lower limb was the most common site in females with SCC compared to the head and neck in males

(31). Most SCC patients, 97 (99%) were presented with ulcer in this study which is comparable with a study done in Turkey shows 66.7% SCC were presented with ulcer (15). In this study, Histologically the majority (86/98 (87.7%)) SCC cases were diagnosed as well differentiated SCC which was consistent with studies done in Nepal (81.3%) and Turkey (64.5%) (1,15).

The incidence of CM is lower in black population than white population, in our study CM was the second most common skin cancer with 50 (24.2%) cases, which is consistent with a study conducted in Ethiopia 41 (28.1%) and south west Nigeria 20 (27.8%) (20,23). CM was more common in males 27 (54%) than females 23 (46%) which is comparable with study done in south Africa in which 57% were males and 43% were females and a previous study conducted in Ethiopia also shows male (64.1%) predominance (18,20). Also other studies done in Yemen and Nepal shows male predominance (1,33). In this study, CM were commonly seen in 60- 69 years age group 16 (32%) which is consistent with a previous study in Ethiopia 19 (29.7%) (20). Studies in Malawi and Japan also showed CM was common in the 7^{th} decade of life (30,37). In this study, the mean age of CM was 52.5 year which is an consistent with a study done in South Nigeria where the mean age were 52 (19). The current study also showed lower extremities 40 (80%) as the commonest site of involvement for CM which is comparable with a study done in Ethiopia where lower extremity 43 (67.2%) were the commonest site for CM even if the percentage is lower than our study result. Studies in other African (25,30,33) and Asian countries (8,31) also showed lower extremity was the commonest site for CM. The majority of CM patients presented with ulcer which accounts 41 (82%) in this study which is consistent with a previous study done in Ethiopia where CM patients presented with ulcer were 83.3% (30). The majority of CM lesions were pigmented which accounts for 33 (66%) in our study. A study in Sudan also shows the majority of CM lesions were pigmented which accounts for 83.7% even if the percentage is slightly higher than our study (29).

In a recent review of cutaneous soft tissue tumors, dark skinned individuals were found to have higher incidence rates of DFSP than Caucasians and Asians (6). In our study DFSP was the 3^{rd} common skin cancer which accounts for 19 (9.2%) with female predominance 12 (63.2%). It is consistent with a study done in South west Nigeria where DFSP accounts for 9 (12.5%) with female predominance 66.7% (26). The mean age of DFSP were 33.7 in this study which is

consistent with a study done in Saudi Arabia where the mean age was 32.3 (8). The commonest site of DFSP was on the trunk on this study which is consistent with a study done in India (23).

BCC was the 5th skin cancer 13/207 (6.3%) among all skin cancers in this study. Basal cell cancer was found to be generally low in many African studies ((19,22,26,27) than studies in most western countries where it considered to be the most common form of skin cancer (2,4,16). It may be due to melanin pigment in dark skinned individuals which absorb UV radiation and prevent sun burn and skin cancer. BCC showed female predominance with male to female ratio of 1:2.3 in our study which is consistent with studies done in Yemen, Nepal, India, and Poland (1,2,18,23). In the current study BCC was commonly seen in 50-59 years age group which accounts for 4 (30.8%) which is consistent with a study done in Iraqi (27.1%) (35). The current study showed head and neck is the commonest site for BCC which is consistent with most African countries including Ethiopia ((17,22,27) and western countries ((2,4,16). In our study head and neck was the commonest site for BCC in both sexes, which is consistent with a study done in New Zealand (32). Most BCC patients 10 (84.6%) were presented with ulcer in this study, which is consistent with a study done in Turkey, 55.3% of BCC cases were ulcerated (16).

Sebaceous carcinoma was the commonest adnexal carcinoma which accounts for 6 (40%) in this study, which is consistent with a study done in Nigeria 17/47(36.2%) (21). In contrast a study in Nepal shows trichilemmal carcinoma 5/10 (50%) was the commonest adnexal carcinoma followed by sebaceous carcinoma 2/10 (20%) (1). Head and neck 10(66.6%) were the commonest site for adnexal carcinoma in this study. A study done in Nigeria shows head and neck 23/43 (49%) were the commonest site for adnexal carcinoma even if the percentage is slightly lower than our study (21).

Metastasis skin cancer is rare diagnosis ranking 6th most common skin cancer and making up 8 (3.9%) of all cases in our study which is consistent with a study done in Nepal (3.3%) (34). The commonest metastasis skin cancer were adenocarcinoma which accounts for 7/8 (87.5%) in this study, which is an agreement with a study done in USA (38).

In our study, using lower extremity as reference group, head and neck had AOR of 6.03 being diagnosed as NMSC (CI: 2.23-16.31, P= 0.000) and trunk had AOR of 9.204 (CI: 1.16- 73, p=

0.036) being diagnosed as NMSC. But there wasn't study done on association between skin cancer and anatomic site. NMSC was not statistically significant associated with age (p= 0.645), sex (p= 0.28) and type of lesion (p= 0.30) in this study which is consistent with a study done in Turkey (16). In contrast to this study, studied done in USA and South Africa shows both NMSC and MSC was statistically significant associated with age and sex (9,24,25). In our study both NMSC and MSC was not statistically significant associated with place of residence (p= 0.492) but a study done in south Africa shows place of residency was statistically associated with MSC and NMSC (9).

Strength and Limitation of the Study

The strength of the current study is that it addresses the existing gap in knowledge of histopathologic patterns of skin cancer and associated factors in JUMC.

The limitation of our study was retrospective assessment of records due to which complete clinical details including occupational history, presence of immunosuppression, history of trauma and smoking could not be assessed. The other limitation was missing or incomplete information about the lesions, including lymph node infiltration, tumor thickness and distant metastasis and most skin cancers were not staged. Only morphologic diagnosis of the cases is practiced and other molecular and immunohistochemical (IHC) markers are not available for confirmatory diagnosis. There are no national skin cancer statistics to refer to or compare with, so comparisons with previous national skin cancer statistics had to be made

Chapter Seven: Conclusion and Recommendation

7.1 Conclusion

In conclusion, NMSC was 3 times more common than MSC. The most common types seen in this study of skin cancer were SCC and CM, followed by DFSP. In contrast to Western countries, BCC was a rare skin cancer and lower extremity was the commonest site for skin cancer. The majority of cases diagnosed as skin cancer were seen in the 7th and 6th decades of life. With male to female ratio of 1:1.1. Ulcer was most common presentation for skin cancer patients. Both NMSC and MSC statistically significant associated with anatomic site of the lesion but was not statistically significant associated with age, sex, place of residence and duration of the lesion.

7.2 Recommendation

For pathology department I recommend that to use College of America pathologist (CAP) synoptic reporting system when we report histopathologic results.

There is no documented result on prevalence of skin cancer and I recommend community-based study on skin cancer and national skin cancer statistic.

Most of our results are differing from western countries, requires further studies to reveal the factors behind such figures

Anatomic site was associated with skin cancer and warrants further study

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Annex I: Questioner

Data collection tool used to assess histopathologic patterns of skin cancer in Jimma University Medical Center, Jimma, South West Ethiopia,2022.

S.No.	Questions	Possible Responses	Skip Rule
	Socio demographic factors		
1	Age	_____	
2	Sex	1. Female 2. Male	
3	Address	1. Rural 2. Urban 3. Not recorded	
	Disease related factors (Clinical presentation)		
	Duration	----------	
	Type of lesion	1. Fungating ulcer 2. Pigmented ulcer 3. Ulcerated nodular swelling 4. Swelling 5. pigmented nodular swelling	
	Size	----------	
	Pathologic Stage	1. Tumor thickness (T1, T2, T3, T4) 2. Lymph node involvement (N1, N2, N3), secondary deposit	

5	Year of biopsy taken	1. 2018 4. 2021 2. 2020 5. 2022 . 3. 2019	
6			
	Host related factor		
7	Site	1. Head and neck (face, scalp, cheek, lip, eye lid, supraorbital, ear and neck) 2. Trunk (chest, back, flank and abdomen) 3. Lower extremities (thigh, leg, ankle, knee, heel and foot) 4. Upper extremities (hand, palm, forearm, arm, finger)	
8	Histopathological diagnosis		

	1. Squamous cell carcinoma/ well differentiated/ moderately differentiated/poorly differentiated/ 2. Basal cell carcinoma 3. Malignant melanoma 4. Dermatofibrosarcoma protuberance 5. Skin adnexal carcinoma 6. Merkle cell carcinoma 7. Lymphoma 8. Kaposi sarcoma 9. Metastasis (Secondary deposit) –		
9	Grade of SCC	1. Well differentiated 2. Moderately differentiated 3. Poorly differentiated	
10	Type of adnexal carcinoma	1. Sebaceous carcinoma 2. Eccrine duct carcinoma 3. Microcystic carcinoma 4. Mucinous carcinoma	
11	Type of metastasis	1. Adenocarcinoma 2. Melanoma 3. Lymphoma	

DECLARATION

I, the undersigned, declare that this thesis is my original work, has not been presented for a degree in this or any other university and that all sources of materials used for the thesis have been fully acknowledged.

Name: Dr Birtukan Ewunetu

Signature: _____

Name of the institution: Jimma University Medical Center

Date of submission: 6/11/2022

This thesis has been submitted for examination with my approval as university advisor

Name and Signature of the first advisor _____

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Name and Signature of the second advisor _____

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