



**ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCES
SCHOOL OF MEDICINE
DEPARTMENT OF DERMATOLOGY & VENEREOLOGY**

**A THESIS SUBMITTED TO THE DEPARTMENT OF DERMATOLOGY &
VENEREOLOGY, COLLEGE OF HEALTH SCIENCES, ADDIS ABABA UNIVERSITY
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE SPECIALITY
CERTIFICATE IN DERMATOLOGY & VENEREOLOGY
ON**

**PATTERN OF SKIN DISEASES IN PATIENTS ADMITTED TO DERMATOLOGY
WARDS AT ALERT CENTER FROM JANUARY, 2016 TO DECEMBER, 2020**

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Full title of the Research project	Pattern Of Skin Diseases In Patients Admitted To Dermatology Wards At ALERT Center From January, 2016 To December, 2020
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I also extend my sincere gratitude to ALERT Center administration and data clerks for their support.

LIST OF ABBREVIATIONS

ALERT All African Leprosy Rehabilitation and Training Center

GBD Global burden of disease

IPD In- patient Department

Km Kilometers

Los Length of stay

OPD Out-patient Department

PF Pemphigus Foliaceus

BP Bullous Pemphigoid

AD Atopic Dermatitis

SD Seborrheic Dermatitis

MF Mycosis Fungoides

AAU Addis Ababa University

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ABSTRACT

Background: Inpatient dermatology pattern has been described only in few countries, similarly it has not been done for ALERT Center. Epidemiological studies to determine the pattern of skin diseases are important for proper health care planning and management. Identifying the patterns will help to stress on groups of common skin diseases at all levels of health care so that proper diagnosis, treatment, and referral can be practiced.

Objective: To evaluate the pattern of skin diseases of inpatients at ALERT Center Addis Ababa Ethiopia

Methodology: A retrospective analysis of admission and discharge record of Dermatology inpatient department at ALERT Center from January 2016 to December 2020 was done. The five years record of patients was analyzed focusing mainly on the number of admission, demographic profile of patients, clinical diagnosis, readmission rate, length of hospital stay, and outcome.

Result: A total of 1823 cases admitted during this 5 years period were identified for analysis. The common age group is 11 to 20 in females with 296 admissions and 21 to 30 in males with 156 admissions. 508 (27.92%) admissions were in pediatric age group i.e. below 18 years. The most common admission is for infection 1250(68.57%) followed by Erythroderma 170(9.33%), Inflammatory Skin Diseases 106(5.81%), Bullous Diseases 99 (5.43%), Connective Tissue Disease 27 (1.48%), Drug Reaction 95 (5.21%), Ulcer 11 (0.6%) and Malignancy 6 (0.33%). The remaining 59(3.24%) cases are others. Among infection diagnostic groups Cutaneous Leishmaniasis is the most common with 787 (62.96%) followed by Leprosy 218(17.44%) and Cellulitis 175 (14%). There were 12 cases of Wound infections consisting 0.96% of infection cases. Classifying infections in four major categories namely fungal infection, viral infection, bacterial infection and parasitic infestation, parasitic infestations are the common once followed by bacterial infections. The numbers of parasitic infestations are almost twice as much as the bacterial infections. The mean length of stay in hospital was 29.52 ± 42.76 days (Ranging from 1 day to 1312 days). 545 (29.9 %) patients stayed 21 to 30 days which is the common length of stay. Out of 1823 admissions there were 1584 (87.04%) discharges after improvement, 29 (1.59%) patients left against medical advice, 25 (1.37%) referred to other facilities and 6(0.33 %) transferred to other wards. 35 (1.92%) died and 42(2.30%) patients discharged with the same status. 102(5.60) patients are with missing outcome data.

Conclusion: Infection, Erythroderma, Inflammatory Skin Diseases, Bullous Diseases, Drug Reaction, Connective Tissue Disease, Ulcer and Malignancy were the common conditions for the admission in a descending order. Policy makers could take these data as evidence to allocate beds and other facilities for Dermatological patients for better management of these subsets of patients. 68.57% of admissions were because of infections. Among the infection admissions the top three cases are Cutaneous Leishmaniasis, Leprosy and Cellulitis.

CHAPTER ONE

1. BACKGROUND

1.1 INTRODUCTION

Skin diseases and their complications are a significant burden on the health system of many nations. Epidemiological studies to determine the burden of skin diseases are important for proper healthcare planning. A scarcity of data exists concerning the epidemiological status among patients attending dermatologic consultations prompting a need for conducting studies in this area (4).

The importance of skin disease is usually over looked. However; dermatological conditions and sexually transmitted infections (STIs) are highly prevalent in Africa including our country and some of the conditions are on the rise. Although most of the dermatological conditions do not result in death, they lead to misery and incapacitations. The quality of life in this group of patients is compromised in different ways. Apart from the morbidity that is usually chronic, patients face a lot of agony from social stigma and low self-esteem due to deformities and disabilities of various degrees. For one or more of the reasons they become unproductive and live in poverty of a deeper degree. Despite the extent of the problem, dermatology service delivery in our country has remained poor. Some of the reasons are poverty, lack of trained staff and lack of knowledge. Identifying patterns of skin diseases of the inpatients will highlight the Health Officers, Nurses, Medical Laboratory Technicians and Environmental Health Technicians with the diagnosis, management, control, and prevention of common dermatological conditions in our country (5).

Although skin diseases are associated with low rate of hospitalization, dermatological manifestations are frequent in hospitalized patients (6). The pattern of skin diseases varies from country to country and even from region to region within the same country due to ecological

factors, hygienic standards, social customs and genetics (7). This study described patterns of skin disease among admitted patients based on age, sex, length of stay and outcome of the treatment during hospital stay.

Inpatient dermatology has been described only in few countries. Characteristics of inpatient might be important in the evaluation of its usefulness and best use of dermatological beds for the care of the patient (8).

Dermatology inpatient consultations have significance both in terms of patient care and resident learning program (9). Identifying the patterns will help to stress on groups of common skin diseases at all levels of health care so that proper diagnosis, treatment, and referral can be practiced.

1.2 STATEMENT OF THE PROBLEM

Although skin diseases and their complications are substantial problems of the health system of the world only a very few potential studies are available in the literature which are mainly from developed countries. Especially, documentation on patterns of dermatological diseases in hospitalized patients is very poor, globally in general and in Ethiopia in particular. Although analysis of the patterns of skin diseases in out-patients in Ethiopia has been conducted including in ALERT Center, the patterns of skin disease in admitted patients remains untouched.

This study dealt with the patterns of inpatient skin diseases in ALERT Center in Addis Ababa, Ethiopia from January, 2016 to December, 2020. There are very little elaborative studies in Ethiopia about various patterns of skin diseases. Epidemiological studies to determine the pattern of skin diseases are important for proper health care planning and management (3). Identifying the patterns will help to stress on groups of common skin diseases at all levels of health care so that proper diagnosis, treatment, and referral can be practiced.

Patients with several dermatological conditions require inpatient admission for severity of their disease and comorbidities. The conditions requiring admission vary from one geographic region to another. Since many of the diseases are chronic in nature, they may require prolonged hospital

stay. Most of the admitted patients can benefit from inpatient care. Thus, there is a need for expansion of specialized dermatological inpatient facilities (10). Expansion of specialized dermatological inpatient facilities calls for knowing the patterns of the disease so that emphasis should be given to groups of common skin diseases in the hospital for proper practice of diagnosis, treatment, and referral.

1.3 SIGNIFICANCE OF THE STUDY

Inpatient dermatology pattern has been described only in few countries; similarly, it has not been done for ALERT Center. Characteristics of inpatients might be important in the evaluation of its usefulness and best use of dermatological beds for the care of patients.

My study aimed to examine the patterns of skin diseases in patients admitted to dermatology wards at ALERT Center. So awareness of the patterns of skin diseases can help us to develop an efficient strategy for diagnosis and appropriate management of skin diseases.

Therefore, this study may provide some insight into the most common cases of skin diseases at ALERT Center which is the largest dermatology referral center in the country and serves as a basis for future studies on the subject matter.

1.4 OBJECTIVES

1.4.1 GENERAL OBJECTIVE

To evaluate the pattern of skin diseases of inpatients at ALERT Center, Addis Ababa, Ethiopia

1.4.2 SPECIFIC OBJECTIVES

- To classify admission cases into diagnostic groups
- To determine the common admission case for ALERT CENTER
- To determine distribution of patients with respect to sex
- To determine the common age groups of patients

- To determine the length of hospital stay
- To determine the outcome of hospital stay
- To determine extent of readmissions

CHAPTER TWO

2.1 LITERATURE REVIEW

Research in an epidemiological profile of in-patient workload in dermatology Unit of Health-Care Epidemiology, Department of Public Health and Primary Care, University of Oxford and *Department of Dermatology, The Slade Hospital, Oxford showed that Age-specific admission rates were broadly similar in each 5-year age group up to the age of about 50 years, except that there was a small peak of admissions in young adult women. After 50 years of age, admission rates increased strikingly with age. Admission rates declined over time in most age-sex groups below the age of 70 years; and increased over time thereafter. The all-ages admission rates in dermatology, expressed as person-based annual rates, averaged 2.38 per 10000 for males and 3.07 per 10 000 for females, and showed no consistent trend over the period studied. A comparison with contemporaneous data from the national Hospital Inpatient Enquiry, which was published from the 1950s until its cessation in 1985," shows that overall admission rates in the Oxford region in dermatology were consistently somewhat lower than corresponding rates for England and Wales. The comparison is limited to episode-based data as person-based data are not available nationally (11).

Analysis of Common and Unusual cases seen by an Inpatient Dermatology Consult Service described common consult requests and presents case studies from the dermatology consult service of an academic hospital in Boston USA. Drug Rash, Stasis Dermatitis, Eczematid Reactions, Allogeneic Bone Marrow Transplants, Back and Groin Rash were the common consult requests. (12)

A study of inpatient dermatology similarities in United Kingdom and United States showed that dermatology inpatient services are being progressively rationalized. In some centers, specialist inpatient services have been lost completely. Financial and managerial containment are given as the prime reasons for this reduction in beds, not that alternative management strategies are more appropriate. Although advances in dermatologic therapy account for some reduction in the number of patients requiring admission, the scale of the bed loss suggests that the services available for patients are being compromised (13).

Analysis in Inpatient dermatology: characteristics of patients and admissions in secondary care hospital of the National Health Service in Pontevedra, Spain to describe inpatient activity and readmission rates in 1048 patients from May 1997 to December 2000 showed that surgery was the reason for admission in

37% of the inpatients. The most frequent diagnosis were: neoplasm (36%), infection (15%), psoriasis (10%), other (10%), dermatitis (6%) and drug reaction (5%). Readmission rates were 1.8% within 30 days, and 12.5% within 1 year. The study concluded that inpatient dermatology is different in different countries. Compared with what has been described in the USA or UK, the data suggest an important surgical content of inpatient dermatology in Spain, not reported in those countries. Medical diagnoses also differ, consisting of more infections, and less psoriasis and dermatitis in Spanish setting. Readmission rates are low when compared with previously published ones, a finding that supports a long-term benefit of hospitalization. (14)

Analysis of pattern of Skin Diseases in the In-Patient Department of Comilla Medical College Hospital in Bangladesh shows that male patients were found to be visiting the inpatient department more than females. The majority of the patients were within the age groups of 10-20, and 20-30. Ninety-four separate categories of skin diseases were clinically diagnosed including some rare ones. Scabies, fungal infections, atopic dermatitis, and psychosexual diseases were however the more common ones. (15)

A study of experience with the dermatology inpatient hospital service for adults to describe the role of a dermatology-run inpatient service in treatment of severe dermatologic disease from 2000 to 2010 at Department of Internal Medicine, Mayo Clinic, Rochester, Minnesota, USA showed that a total of 1732 patients had 2216 inpatient admissions to the adult service from 2000 to 2010. The mean (SD) age was 61.3 (17.7) years (age range 18–100 years). Median duration of admission was 3 days interquartile range (IQR), 2–5 days. The most common indications for admission were dermatitis (44.2%), psoriasis (17.4%) and cutaneous T-cell lymphoma (9.2%). We compared admissions from 2000 to mid-2005 (n = 1260) to admissions from mid-2005 to 2010 (n = 956). Statistically significant changes included median length of stay (decreased from 4 days [IQR, 3–6 days] to 3 days [IQR, 2–4 days] $P < 0.01$), admissions for psoriasis (decreased from 20.7% to 13.0%; $P < .01$) and admissions for dermatitis (increased from 41.6% to 47.6%; $P < .01$). The study concluded that the number of patients admitted and the median length of stay decreased between the 2 periods. Indications for admission have changed significantly across the two time periods. (16)

Analysis of Inpatient dermatology: characteristics of patients and admissions in Tribhuvan University(TU) Teaching Hospital in Kathmandu, Nepal to describe inpatient activity in dermatology

department in a total of 505 admissions in a four years period shows that 283(56%) were new admissions and 222(44%) were readmissions. The most common diagnosis among new admissions was drug reaction (21.6%), followed by immunobullous disease (14.5%) and connective tissue diseases (14.1%). The other most common reasons for admission were infections, erythroderma, eczema, erythema multiforme, urticarial and vasculitis. The mean length of stay in the hospital was 6.83 ± 6.150 days. Out of 505 admissions there were 487(96.4%) discharges after improvement, 12(2.4%) cases were transferred to other wards and ICU for management. There were 4(0.8%) mortalities in this 4 years period. The study concluded that immunobullous disease, connective tissue diseases, drug reaction, infections, erythroderma, eczema, psoriasis, erythema multiforme, urticarial and vasculitis were the top 10 conditions for admission. The study recommends policy makers to take these data as evidence to allocate beds for Dermatology patients for better management of these subsets of patients. (8)

Investigation of Inpatient dermatology: Pattern of admissions and patients' characteristics in an Australian hospital conducted at a tertiary referral hospital in New South Wales, Australia in 97 patients admitted during 12-month period, showed that 44% were female and 56% male. The most frequent reasons for admission were found to be dermatitis or eczema and ulcers. The average length of stay was 10 days, with a median of 5 days. A total of 80% of patients had a stay duration of 10 days or less, and 6% were in hospital for more than 30 days. The diagnosis that accounted for the longest length of stay was ulcers. A large proportion of patients required consultation from another medical specialty during their admission with 91 specialist consultations taking place for the study group. The study concluded that Inpatient treatment plays a fundamental role in the management of complex and severe dermatological disease and comparison of these results to future studies in other dermatology units around Australia and internationally may be a valuable area of further work. (17)

Research in Inpatient dermatology: profile of patients and characteristics of admissions to a tertiary dermatology inpatient unit in Saõ Paulo, Brazil in a total of 3308 patients admitted during 8-year period identified for analysis showed that the most frequent admissions were for eczema/dermatitis (17.5%) and cutaneous infections (15.9%). The mean LoS was 13.0 days. The mean $\pm$ standard deviation (SD) number of comorbidities per patient was 1.0 ± 1.2 , among the most frequent of which were hypertension and diabetes mellitus. The rate of HAI was 6.2%; bloodstream infection was regarded as the most commonly acquired type and *Staphylococcus aureus* as the infectious agent most commonly found in culture. Of the patients admitted, 3.7% were transferred to the ICU and 2.5% died. In these latter two groups, the most common dermatologic diagnoses were immunobullous diseases, and the mean hospital LoS and rate of HAI were higher than in the total admissions cohort. The study concluded that higher value should be placed on dermatology inpatient services in order to expand the availability of dermatology beds, mainly

in tertiary hospitals, in view of the potentially high severity of the dermatologic diseases found in many patients referred to this type of service (18).

Investigation in to frequency assessment of dermatologic diseases in patients admitted to Shiraz referral dermatology ward, Southern Iran during 2008- 2011 in medical records of 1450 patients, who completed a questionnaire showed that Pemphigus (12.5%), drug rash (11.7%) and eczema (10.5%) were the most common causes of referral to dermatology ward. The mean age of patients was 41.89 ± 20.79 and the average length of hospitalization in this study was 9.34 days. The study concluded that high occurrence rate of Pemphigus and drug rash indicates that further study is required to root out underlying causes. Proper health policies should be implemented to manage these diseases (19).

Analysis of the clinical spectrum and outcome of skin conditions in patients admitted to dermatology wards at king Edward VIII hospital, Durban to describe the clinical spectrum and outcome of inpatients admitted to dermatology wards in a total of 108 patients' charts showed that 52.8 % (n=57) were female and 47.2% (n=51) were male. The mean age was 34 (range 1-79 years). The average length of stay was 9 days, with a median of 7 days. The most common diagnoses made were Steven Johnson Syndrome and atopic dermatitis at 19, 4% and 12, 0% respectively. Other skin conditions included autoimmune blistering dermatoses (6.5%), psoriasis (5.6%), extensive viral infections (5.6%), deep fungal infections (5.6%), Steven Johnson Syndrome-Toxic Epidermal Necrolysis Overlap (SJS-TEN) Syndrome (4.6%), sebo-psoriasis (4.6%), Kaposi sarcoma (2.8%), severe bacterial infections (0.9%), mycosis fungoides (0.9%) and HPV (0.9%). Of all the admissions, 85% (n=92) were discharged and given a follow up date, 6% (n=6) were referred to other departments and 9% (n=10) died. The study concluded that Stevens Johnson Syndrome and atopic dermatitis were the most common reasons for admission. It is important that outpatient management and early diagnoses is optimized to avert costly and unnecessary admissions, thereby reducing morbidity and mortality which may be triggered by nosocomial infections. Timely referral is key to the positive outcome and this can be achieved by educating primary health caregivers to identify and refer relevant cases promptly. (20)

Dermatology is primarily a non-acute, outpatient-centered clinical specialty, but substantial numbers of patients need indoor admission for adequate management. A study of Inpatient Dermatology: Characteristics of Patients and Admissions in a Tertiary Level Hospital in Eastern India conducted in a total of 375 patients admitted to indoor facility during the period from 2011 to 2014 showed that Males outnumbered females, with the median age in the 5th decade. Immunobullous disorders (91 patients, 24.27%) were the most frequent reason for admissions, followed by various causes of erythroderma (80 patients, 21.33%) and infective disorders (73 patients, 19.47%). Other notable causes included were

cutaneous adverse drug reactions, psoriasis, vasculitis, and connective tissue diseases. The mean duration of hospital stay was 22.2 ± 15.7 days; ranging from 1 to 164 days. Majority of patients (312, 83.2%) improved after hospitalization; while 29 (7.73%) patients died from their illness. About 133 patients (35.64%) required referral services during their stay, while 8 patients (2.13%) were transferred to other departments for suitable management. (10)

A study of experience with the dermatology inpatient hospital service for adults to describe the role of a dermatology-run inpatient service in treatment of severe dermatologic disease from 2000 to 2010 at Department of Internal Medicine, Mayo Clinic, Rochester, Minnesota, USA showed that a total of 1732 patients had 2216 inpatient admissions to the adult service from 2000 to 2010. The mean (SD) age was 61.3 (17.7) years (age range 18–100 years). Median duration of admission was 3 days interquartile range (IQR), 2–5 days. The most common indications for admission were dermatitis (44.2%), psoriasis (17.4%) and cutaneous T-cell lymphoma (9.2%). We compared admissions from 2000 to mid-2005 ($n = 1260$) to admissions from mid-2005 to 2010 ($n = 956$). Statistically significant changes included median length of stay (decreased from 4 days [IQR, 3–6 days] to 3 days [IQR, 2–4 days] $P < 0.01$), admissions for psoriasis (decreased from 20.7% to 13.0%; $P < .01$) and admissions for dermatitis (increased from 41.6% to 47.6%; $P < .01$). The study concluded that the number of patients admitted and the median length of stay decreased between the 2 periods. Indications for admission have changed significantly across the two time periods. (21)

CHAPTER THREE

3.1 METHODS AND MATERIALS

3.1.1 STUDY AREA AND PERIOD

A retrospective analysis of admission and discharge record of Dermatology inpatient department at ALERT Center from January 2016 to December 2020 was done. The five-year record of patients was analyzed focusing mainly on the number of admission, demographic profile of patients, clinical diagnosis, readmission rate, length of hospital stay, and outcome.

ALERT Center is located in south west Addis Ababa, Ethiopia. ALERT's activities focus on rehabilitation of leprosy patients, training programs on leprosy for personnel from around the world and leprosy control. The hospital currently provides a wide range of services in various departments including Dermatology, emergency services, gynecology and obstetrics, pediatrics, HIV treatment, orthopedics and plastic surgery.

ALERT is the continuation and expansion of the leprosy hospital originally built by Dr Thomas Lambie in 1922, which was later named the Princess Zenebe Werk Hospital. A memorandum to found ALERT was signed Dec.11, 1965 by representatives of the ministry of health, Addis Ababa University, the International Society for the Rehabilitation of the Disabled.

3.1.2 STUDY DESIGN

- Hospital based retrospective descriptive study was used

3.1.3 Study population

- All patients of all age group with any skin disorder attending the dermatovenereology IPD at ALERT Center.

3.1.4 Eligibility

3.1.4.1 Inclusion criteria:

All admitted patients at dermatology wards at ALERT Center from January 2016 to December 2020

3.1.4.2 Exclusion criteria

- Patient records with unclear initial and discharge diagnosis and missing diagnosis were excluded.

3.1.5 Variables

3.1.5.1 Dependent variable

- ✓ Patterns of skin diseases

3.1.5.2 Independent variable

- ✓ Age, sex, admission diagnosis, discharge diagnosis, Length of stay and status upon leaving hospital(outcome).

3.1.6 Data collection and analysis

All medical records of the patients with skin disease admitted to Dermatology wards at ALERT Center, between January 2016 to December 2020 was collected from HMIS registration book at dermatology wards. A total of 1921 records were retrieved. From these, 98 were excluded based on the exclusion criteria. Data was collected using structured table and encoded using MS Excel software and analyzed according to the number of admission, demographic profile of patients, clinical diagnosis, readmission rate, length of hospital stay, and outcome by using SPSS version 20.

3.1.7 Data quality assurance

Data extraction from medical records of the patients was performed by the principal investigator and trained Dermatovenereology residents. The data was encoded and checked by MS Excel to assess whether all the available information are properly collected and recorded. Before processing, the collected data was checked for completeness.

3.1.8 Ethical considerations

Letter of support obtained from the dermatovenereology department was submitted to ALERT Hospital for permission to collect data from patient medical records. Anonymity and confidentiality of the patient information was kept private. The name of the patients was not included in the data collection format.

3.1.9 Dissemination plan

The study result will be submitted to AAU department of Dermatology & venereology, ALERT center and other stakeholders. The manuscript of the study will be submitted to relevant national and international journals for publication. The study will be presented in various workshops. Copy of the article will be placed in the library of College of Health Sciences, AAU for future reference.

4. RESULT

A retrospective analysis of admission and discharge record of Dermatology inpatient department at ALERT Center from January 2016 to December 2020 was done. The five-year record of patients was analyzed focusing mainly on the number of admission, demographic profile of patients, clinical diagnosis, readmission rate, length of hospital stay, and outcome.

There were a total of 1921 cases in the dermatology ward in the five-year period. Out of these record 98 cases were excluded as unclear and missing diagnosis. The number of cases analyzed in this study therefore is 1823 cases. Out of these 1823 cases 1553 (85.2%) were new admissions while 270 (14.8%) were readmissions.

Table 1 Readmissions and New admissions

	Frequency	Percent
Readmissions	270	14.8
New Admissions	1553	85.2
Total	1823	100.0

Females outnumbered males with 1063 (58.3%) and 760 (41.7%) respectively.

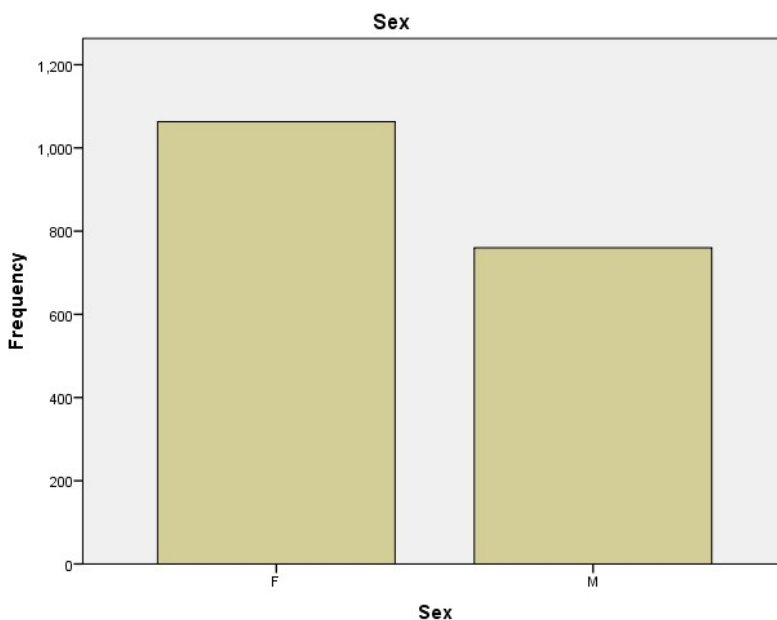


Figure 1 Patients distribution with sex

The mean age of patients is 30.4 ± 19.4 years (Ranging from 1.4 months to 100 years). The common age group is 11 to 20 in females with 296 admissions and 21 to 30 in males with 156 admissions. 508 (27.92%) admissions were in pediatric age group i.e. below 18 years. Table and Figure below:

Table 2 Patients distribution with sex and Age groups

Age Group	Sex	
	F	M
	Count	Count
Under 10	104	141
11 – 20	296	124
21 – 30	220	156
31 – 40	161	96
41 – 50	122	95
51 - 60	80	71
61 – 70	57	45
Over 71	20	29

Note: There are six cases or records that have age data missing. Therefore, in the above table the numbers of male and female cases add up to 1817 instead of 1823.

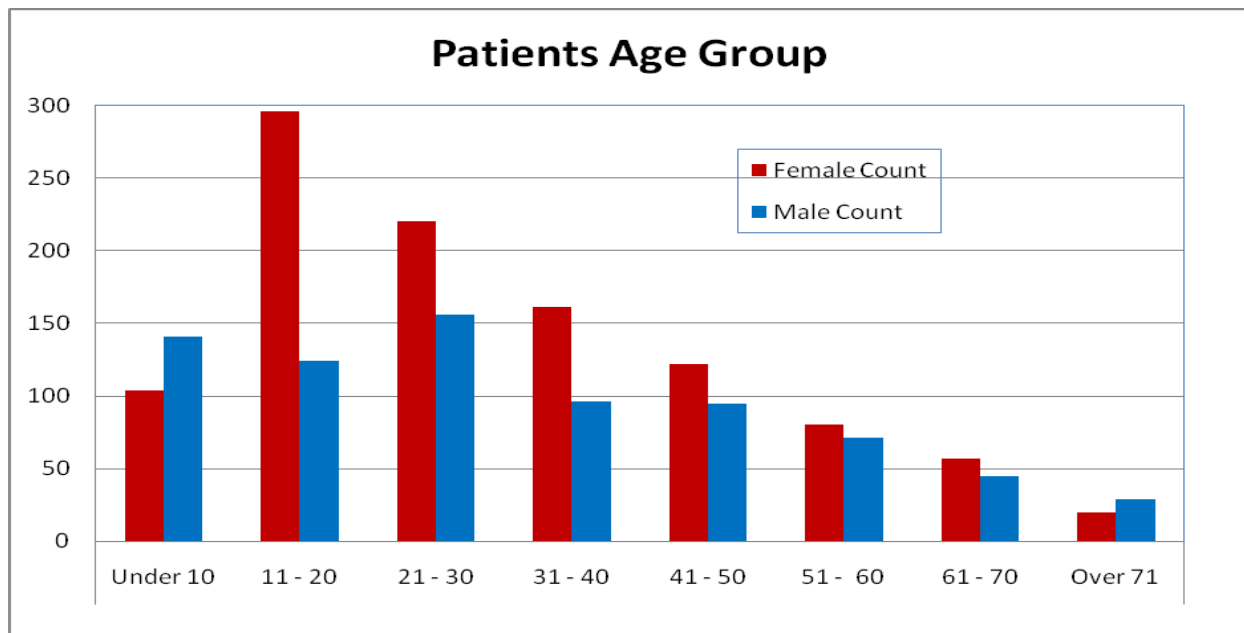


Figure 2 Distribution of cases according to age group and sex

The most common admission is for infection 1250(68.57%) followed by Erythroderma 170(9.33%), Inflammatory Skin Diseases 106(5.81%), Bullous Diseases 99 (5.43%), Connective Tissue Disease 27 (1.48%), Drug Reaction 95 (5.21%), Ulcer 11 (0.6%) and Malignancy 6 (0.33%). The remaining 59(3.24%) cases are others. Others include cutaneous Vasculitis, Nutritional Dermatoses, Hemangioma, Genodermatoses, Lymphedema, urticaria and pruritus.

Table 3 Frequency of diagnostic groups

No	Diagnostic Group	Number of Patients	Percentage (%)
1	Infection	1250	68.57
2	Erythroderma	170	9.33
3	Inflammatory Skin Diseases	106	5.81
4	Bullous Diseases	99	5.43
5	Connective Tissue Disease	27	1.48
6	Drug Reaction	95	5.21
7	Malignancy	6	0.33
8	Ulcer	11	0.60
9	Others	59	3.24
	Total	1823	100

Figure below shows the frequency of male and female patients classified in diagnostic groups. The number of female patients is well above males in infection groups which is the common diagnosis i.e. female 765 and male 485. The number of male Erythroderma patients is slightly higher than females i.e. Male 96 while Female is 74. Drug reaction female patients' number is higher than males. Similarly, the number of Bullous Diseases and Inflammatory Skin Diseases in males is higher than in female patients as shown in the table 4 below. The number of female Connective Tissue Disease patients is significantly higher than male, i.e. 23 and 4 respectively.

Table 4 Distribution of diagnostic groups according to sex

Diagnostic Group	Sex	
	F	M
Infection	765	485
Erythroderma	74	96
Inflammatory Skin Diseases	45	61
Bullous Diseases	46	53
Connective Tissue Disease	23	4
Drug Reaction	67	28
Malignancy	4	2
Ulcer	3	8
Others	36	23
Total	1063	760

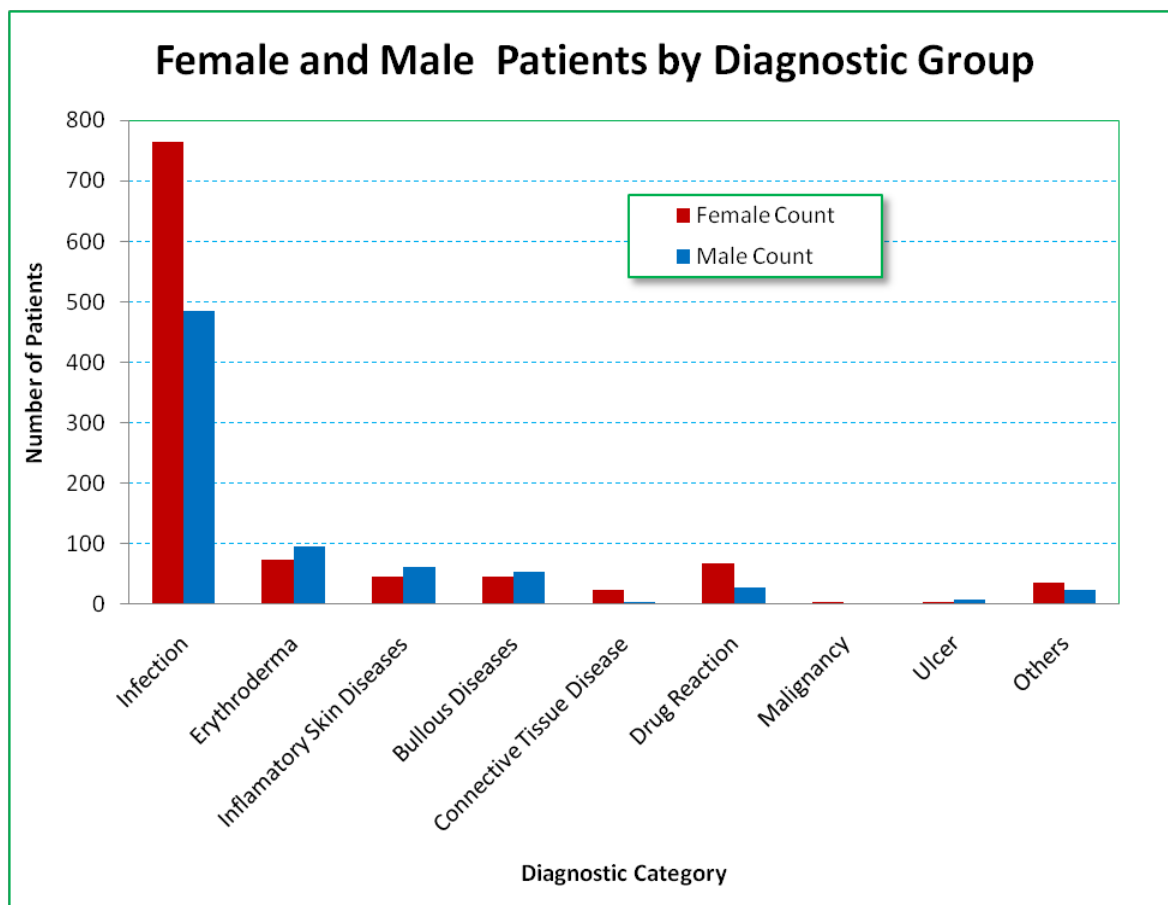


Figure 3 Distribution of diagnostic groups according to sex

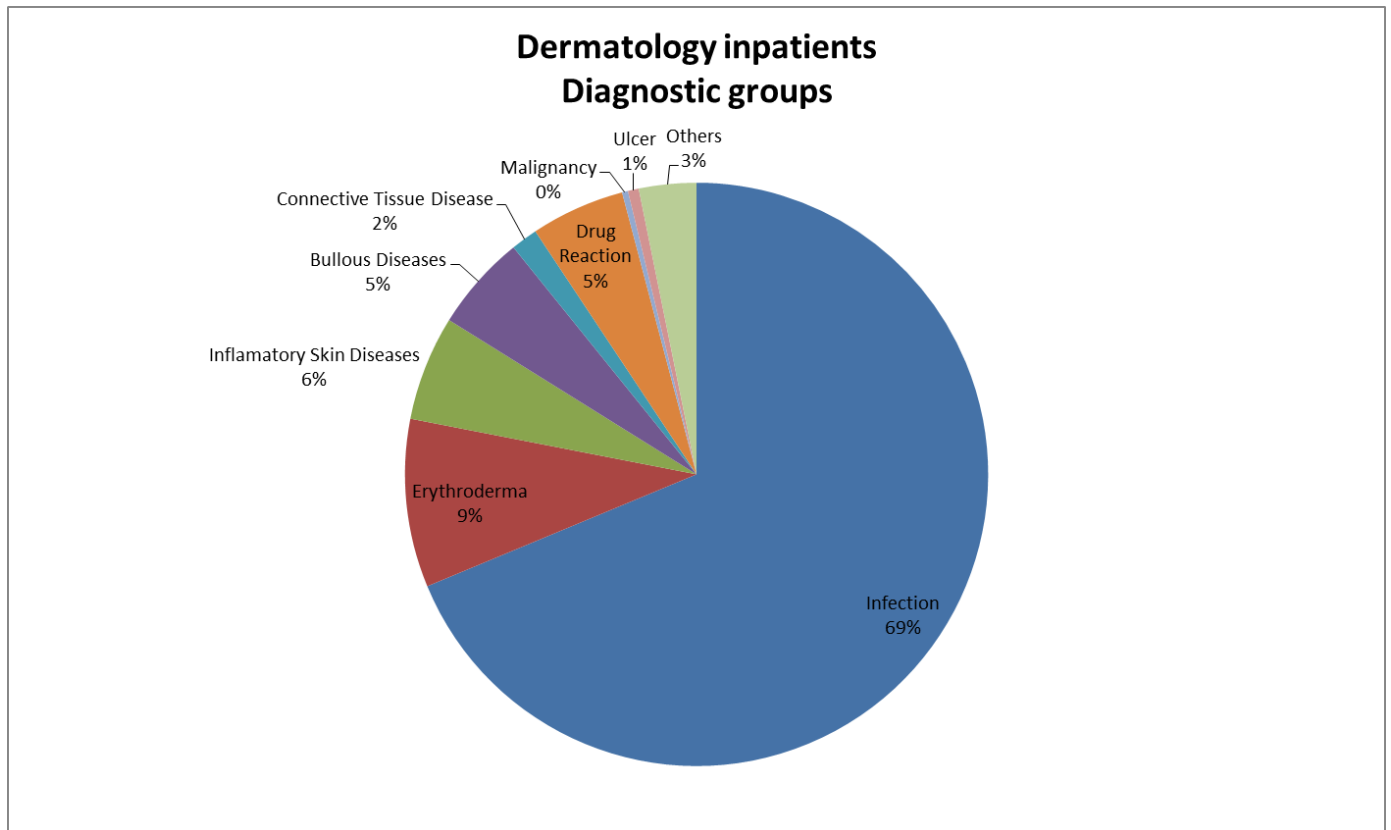


Figure 4 Dermatology Inpatients proportion of diagnostic groups

The mean age in most dermatologic diagnostic groups show similar trend i.e. the common age is between 25 and 45 years. See figure.

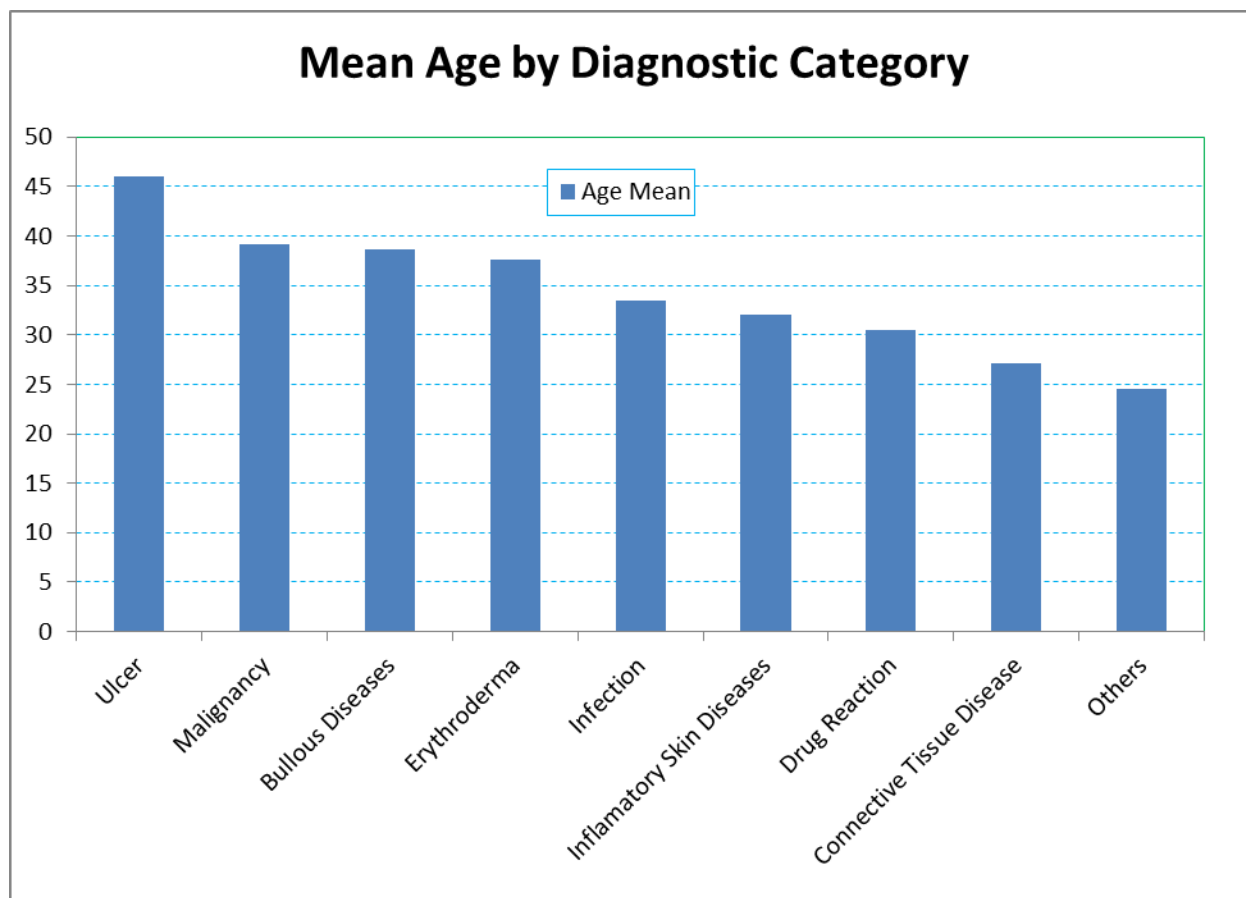


Figure 5 Mean Ages of patients in each diagnostic groups

Among infection diagnostic groups Cutaneous Leishmaniasis is the most common with 787 (62.96%) followed by Leprosy 218(17.44%) and Cellulitis 175 (14%). There were 12 cases of Wound infections consisting 0.96% of infection cases. See Table 5.

Classifying infections in four major categories namely fungal infection, viral infection, bacterial infection and parasitic infestation as shown in figure 6, parasitic infestations are the common once followed by bacterial infections. The numbers of parasitic infestations are almost twice as much as the bacterial infections.

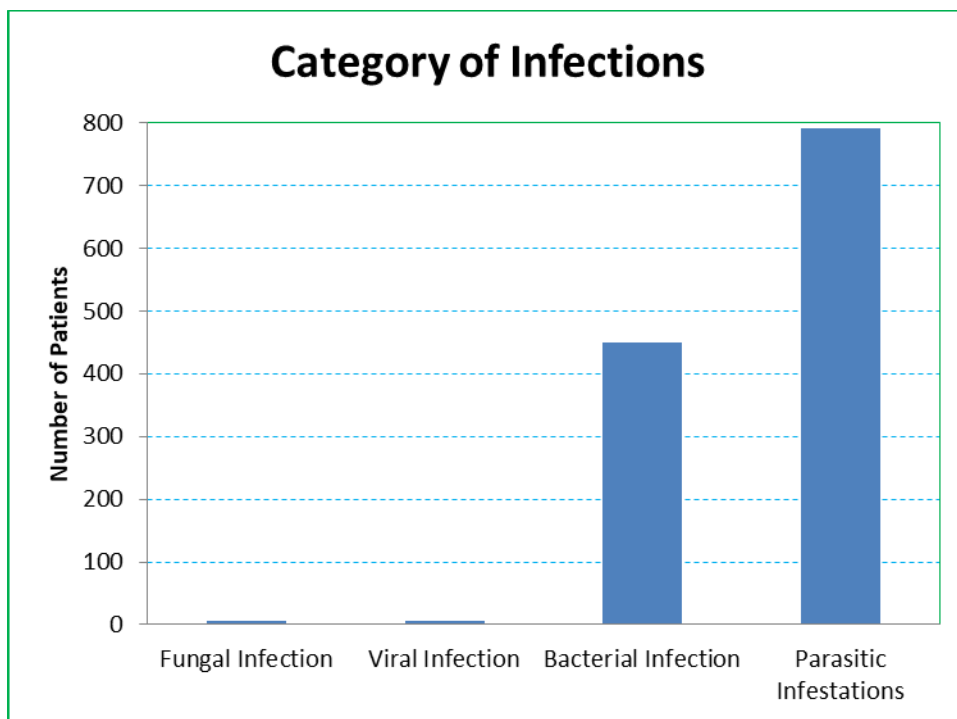


Figure 6Distribution of infections

Table 5 Distribution of infections

Infectious Skin Diseases					
Type of Infection	Infection		Frequency	Percent %	
Fungal Infection	Mycetoma		2	0.16%	
	Candidiasis (superinfected)		1	0.08%	
	Tinea Faciei +Tinea Corporis		1	0.08%	
	Tinea Capitis + ID Reaction		1	0.08%	
Bacterial Infection	Leprosy		Leprosy	132	10.56%
			Leprosy Reaction	86	6.88%
	Cellulitis		175	14.00%	
	Pyoderma		9	0.72%	
	Impetigo	Bullous Impetigo	4	0.32%	
		Impetigo	9	0.72%	
	Necrotizing Fasciitis		7	0.56%	
	Actinomycosis		5	0.40%	
	Ecthyma		3	0.24%	
	Lupus Vulgaris		3	0.24%	
	Abscess		1	0.08%	
	Folliculitis		1	0.08%	
	Rhinoscleroma		1	0.08%	
	Wound Infection		12	0.96%	
	Septic Arthritis		1	0.08%	
	Viral Infection	Herpes Zoster		2	0.16%
		Extensive Genital Wart		1	0.08%
Extensive Molluscum Contangiosum		1	0.08%		
Extensive Anal Wart		1	0.08%		
Parasitic Infestations	Cutaneous Leshmaniasis(Non specified)		296	23.68%	
	Diffuse Cutaneous Leshmaniasis(DCL)		23	1.84%	
	Localised Cutaneous Leshmaniasis(LCL)		164	13.12%	
	Mucocutaneous Leshmaniasis(MCL)		304	24.32%	
	Scabies		4	0.32%	
Total			1250	100%	

The mean length of stay in hospital was 29.52 ± 42.76 days (Ranging from 1 day to 1312 days). 545 (29.9 %) patients stayed 21 to 30 days which is the common length of stay. See figure below. Length of stays above 60 days is very rare.

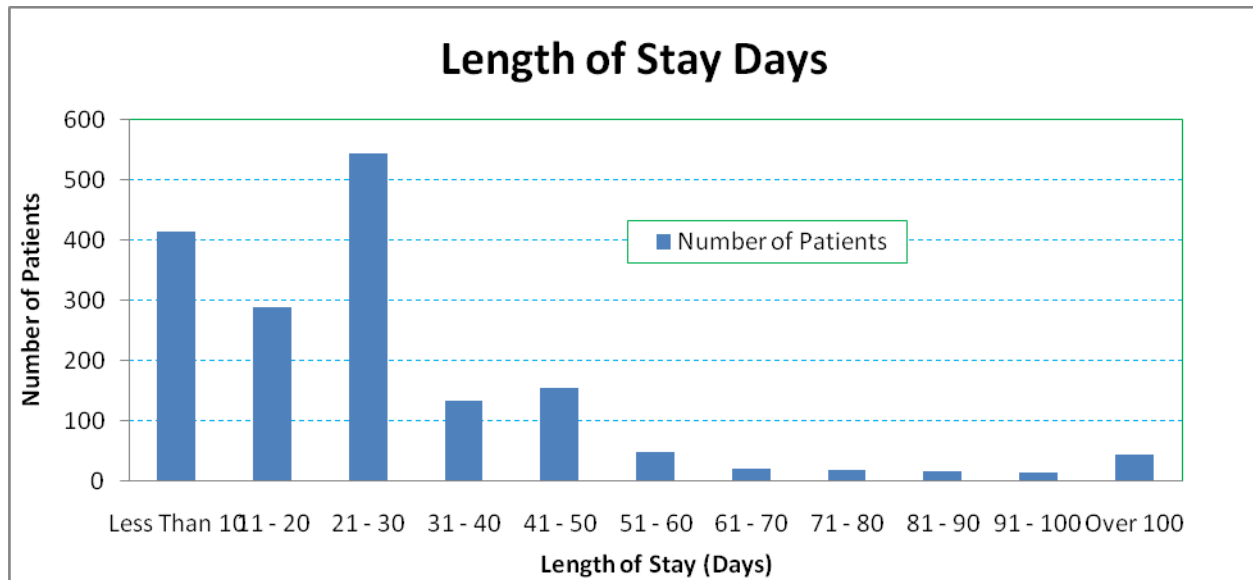


Figure 7 Distribution of LoS

Length of Stay Groups		Frequency	Percent
Valid	Less Than 10	414	22.7
	11 – 20	289	15.9
	21 – 30	545	29.9
	31 – 40	134	7.4
	41 – 50	155	8.5
	51 – 60	48	2.6
	61 – 70	21	1.2
	71 – 80	19	1.0
	81 – 90	17	0.9
	91 – 100	14	0.8
	Over 100	45	2.5
	Total	1701	93.3
Missing	Data	122	6.7
Total		1823	100

The mean number of stays among the diagnostic groups is quite similar as shown in the figure next page.

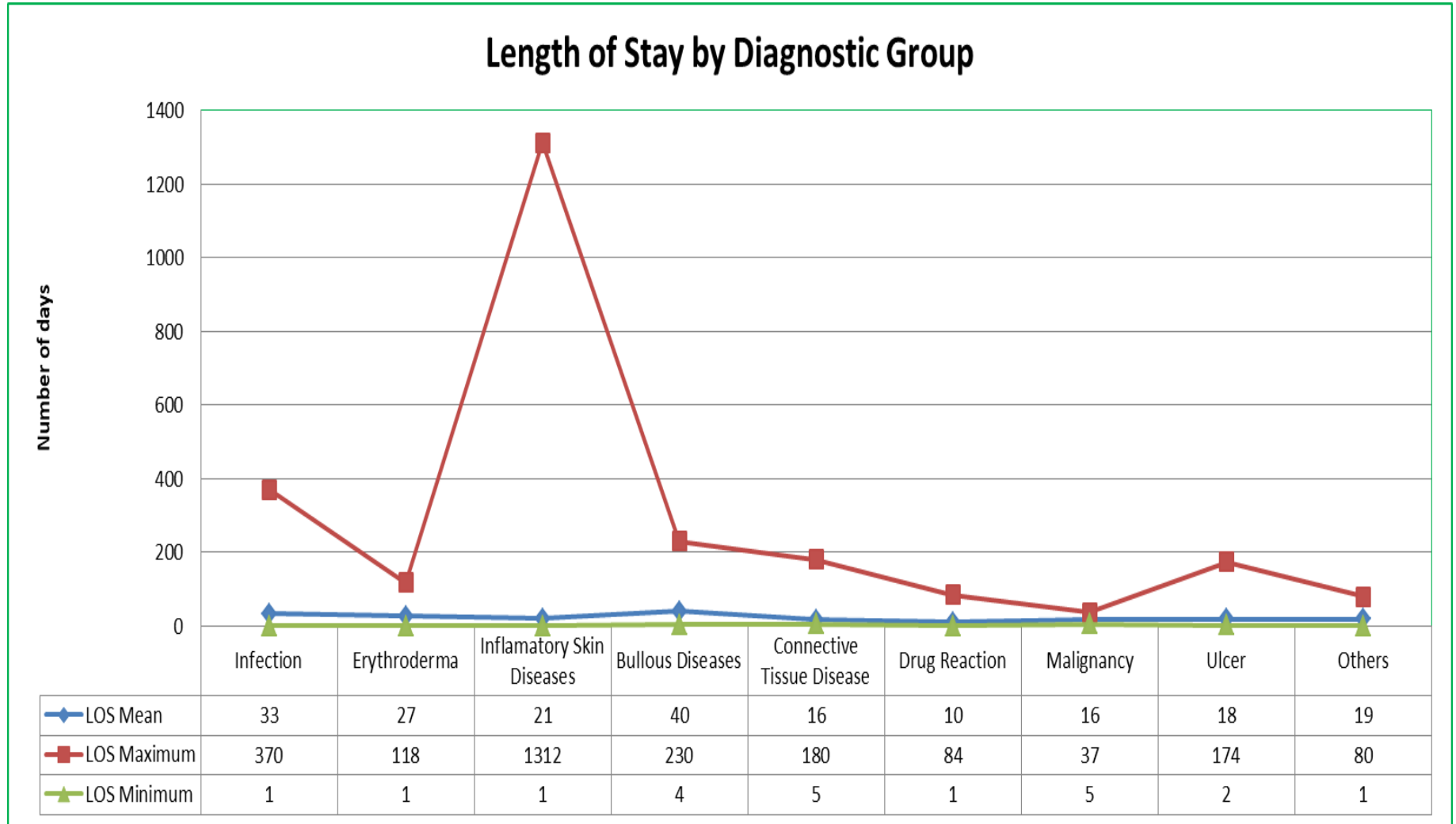


Figure 8Length of stay by diagnostic group

Out of 1823 admissions there were 1584 (87.04%) discharges after improvement, 29 (1.59%) patients left against medical advice, 25 (1.37%) referred to other facilities and 6(0.33 %) transferred to other wards. 35 (1.92%) died and 42(2.30%) patients discharged with the same status. 102(5.60) patients are with missing outcome data.

Table 6 Status at discharge/Outcome

Status at discharge	Number of Patients	Percentage %
Improved	1584	86.89
Died	35	1.92
Left against Medical Advise	29	1.59
Referred	25	1.37
Discharged with the same status	42	2.30
Transferred	6	0.33
Missing Data	102	5.60
Total	1823	100

In this study 106 patients out of 1823 were admitted with more than one dermatologic diagnosis. Out of 1823 cases 46 cases showed change in discharge diagnosis from admission diagnosis.

Out of 270 readmission cases 148 was readmitted once, 32 readmitted twice, 9 patients were readmitted three times, 4 patients were readmitted four times and 2 patients were readmitted five times. The most recurrent admission is five times and it is for leprosy reaction.

5. DISSCUSION

Dermatology is predominantly an outpatient based specialty. The scope of outpatient care has widened with the advent of cosmetically more acceptable creams outpatient based day treatment, phototherapy, and the introduction of systemic immunosuppressive agents. However, inpatient treatments remain an important therapeutic option as subsets of patients exist for whom inpatient care is essential. [22]

The result of the study shows that the most common reason for inpatient admissions in ALERT center which represent Ethiopian trend as most of the patients are from throughout the country is infection. Among the 1250 cases of infections Cutaneous Leishmaniasis is the most common with 787 (62.96%) followed by Leprosy 218(17.44%) and Cellulitis 175 (14%). Although dermatology inpatient admissions patterns differ from country to country the United States inpatient admissions show similar patterns as ALERT center. The most common reasons for inpatient admission, and therefore, the conditions accounting for the majority of inpatient costs for skin disease, were bacterial skin infections such as cellulitis in the United States.[23] The most frequent reasons for admission in Australia were dermatitis or eczema and ulcers.[24] Another study in Brazil showed that the most frequent admissions were for eczema/dermatitis (17.5%) and cutaneous infections (15.9%).[26] A similar Spanish study shows that the most frequent diagnosis were: neoplasm (36%), infection (15%), psoriasis (10%), other (10%), dermatitis (6%) and drug reaction (5%).[27] . Similar study in South Africa shows that the most common diagnoses made were Steven Johnson Syndrome and atopic dermatitis at 19, (4%) and 12, (0%) respectively. [28]. Similar study in Iran showed that Pemphigus (12.5%), drug rash (11.7%) and eczema (10.5%) were the most common causes of referral to dermatology ward. [29]

Table 7Most common diagnostic groups in other countries from previous publications

Country	Most Common diagnostic groups
United States	Infection
Australia	dermatitis or eczema and ulcers
Brazil	eczema/dermatitis and cutaneous infections
Spain	neoplasm followed by infection
Iran	Pemphigus
South Africa	Steven Johnson Syndrome

The common age group is 11 to 20 in females with 296 admissions and 21 to 30 in males with 156 admissions. 508 (27.92%) admissions were in pediatric age group i.e. below 18 years. Different result is seen in the United States with individuals ages 45 to 64 accounted for the most

number of admissions and the highest proportion of costs for inpatient dermatology in the United States. [23]

The mean age of patients in this study is 30.4 ± 19.4 years (Ranging from 1.4 months to 100 years). The mean age of patients in a study in Iran was 41.89 ± 20.79 [29].

In this study the mean length of stay in hospital was 29.52 ± 42.76 days (Ranging from 1 day to 1312 days). 545 (29.9 %) patients stayed 21 to 30 days which is the common length of stay. Length of stays above 60 days is very rare. The diagnosis that accounted for the longest length of stay was Pyoderma Gangrenosum. Similar study in Australia shows that the average length of stay was 10 days, with a median of 5 days. A total of 80% of patients had stay duration of 10 days or less and 6% were in hospital for more than 30 days. The diagnosis that accounted for the longest length of stay was ulcers. [25] In Brazil a study showed that the mean LoS was 13.0 days [27] which is lower than the ALERT case which is 31 days. A study in Iran shows that the average length of hospitalization was 9.34 days which is close to the Brazil case. [29]

Out of 1823 admissions there were 1584 (87.04%) discharges after improvement, 29 (1.59%) patients left against medical advice, 25 (1.37%) referred to other facilities and 6(0.33 %) transferred to other wards. 35 (1.92%) died and 42(2.30%) patients discharged with the same status. 102(5.60) patients are with missing outcome data. The death rate in hospitalized patients in the United states is slightly less than the ALERT case. Using the 2014 National Inpatient Sample, a retrospective cohort study of adults hospitalized for dermatologic conditions showed that in total, 3,055 individuals or 0.47% of patients hospitalized primarily for skin disease experienced in-hospital death in the United States. [25]

In this study 106 patients out of 1823 were admitted with more than one dermatologic diagnosis. Out of 1823 cases 46 cases showed change in discharge diagnosis from admission diagnosis.

Out of 270 readmission cases 148 was readmitted once, 32 readmitted twice, 9 patients were readmitted three times, 4 patients were readmitted four times and 2 patients were readmitted five times. The most recurrent admission is five times and it is for leprosy reaction case. The common readmission cases are Leishmaniasis and Leprosy Reaction.

6. LIMITATION OF THE STUDY

- Incomplete medical records affected the data quality
- Lost and damaged HMIS log book pages made assessing true frequency of the disease difficult
- Illegible handwriting

7. CONCLUSION & RECOMMENDATION

7.1 CONCLUSION

The pattern of skin disease varies from country to country. The pattern in ALERT center in Ethiopia differs from other countries. Infection, Erythroderma, Inflammatory Skin Diseases, Bullous Diseases, Drug Reaction, Connective Tissue Disease, Ulcer and Malignancy were the common conditions for the admission in a descending order. 68.57% of admissions were because of infections. Among the infection admissions the top three cases are Cutaneous Leishmaniasis, Leprosy and Cellulitis.

The common age group is 11 to 20 in females and 21 to 30 in males. 27.92% admissions were in pediatric age group i.e. below 18 years.

The mean length of stay in hospital was 29.52 ± 42.76 days (Ranging from 1 day to 1312 days). 21 to 30 days is the common length of stay.

87.04% of patients are discharged after improvement which shows that inpatient treatment plays a fundamental role in the management of complex and severe dermatological disease.

7.2 RECOMMENDATION

- Patient medical information has to be documented properly
- It is important that outpatient management and early diagnoses is optimized to avert costly and unnecessary admissions
- Policy makers could take these data as evidence to allocate beds and other facilities for Dermatological patients for better management of these subsets of patients.
- Further study has to be carried out in the future to better understand the patterns of skin disease.

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APPENDIX

Data collection sheet

No	MRN	Age	Sex	Address	Admission DX	LOS	Diagnosis of Discharge(DX)	Outcome