A retrospective study of psoriasis over five years at a tertiary hospital

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

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A research report (in the format of a "submissible" paper) submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree Master of Medicine (Dermatology)

Johannesburg, 2025

DECLARATION

I, Vidya D Bhojwani, declare that this research report is my own, unaided work. It is being submitted for the Degree of Master of Medicine in the branch of Dermatology at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

VdB

……

(Signature of candidate)

……11……day of ……SEPTEMBER……20.25……in……JOHANNESBURG……

Contribution of the candidate to the paper

Declaration: Student's contribution to the article and agreement of co-authors

I, Vidya D Bhojwani, student number 0414383V, declare that this research report is my own work and that I contributed significantly towards the research findings presented in the paper intended for publication.

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Agreement by co-authors: by signing this declaration, the co-authors listed below agree to the use of this article by the student as part of her research report. In cases where the student is not the first author of a published article, the primary supervisor must explain (under comments) why the student is entitled to use the paper for her degree purposes.

Article title: A retrospective study of psoriasis over five years at a tertiary hospital

Acknowledgements

I would like to thank my supervisors Dr Hari and Dr Pillay for their expertise, guidance and encouragement. I would also like to acknowledge and thank Professor D Modi for his input and assistance. Thank you to my husband Vaishak Vinod and to my friend Natasha Abraham.

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List of abbreviations

CD4	Cluster of differentiation 4
CYA	Cyclosporin
HIV	Human Immunodeficiency Virus
HJH	Helen Joseph Hospital
HLA	Human Leucocyte Antigen
IL-17	Interleukin 17
Interleukin 23	Interleukin 23
MHC	Major Histocompatibility Complex
MTX	Methotrexate
OPD	Outpatient department
PASI	Psoriasis Assessment and Severity Index
PsA	Psoriatic arthritis
SARS-COV 2	Severe acute respiratory syndrome coronavirus 2
TNF alpha	Tumour necrosis factor alpha

A retrospective study of psoriasis over five years at a tertiary hospital

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Abstract

Background Psoriasis is an inflammatory immune-mediated polygenic disease manifesting in the skin and/or joints. South African epidemiological data for this condition is minimal, although previous local studies have indicated ethnic bias and an association with cardiometabolic diseases.

Methods A descriptive retrospective case cohort study of psoriasis at the Helen Joseph Hospital (HJH), Johannesburg, South Africa. Adult patients with psoriasis attending the HJH dermatology outpatient clinic from 01/01/2015 to 31/12/2019 were included in the study. Epidemiological and clinical data was extracted from patient records.

Results The prevalence of psoriasis in the clinic over the five-year period was 1.1%. A bimodal peak was noted in age at diagnosis. There was no significant gender difference. The most common clinical presentation was plaque type psoriasis. The following co-morbidities were noted in our cohort: 31% were hypertensive, 9% had dyslipidemia, and 3% had ischemic heart disease. HIV prevalence was 17% amongst those tested.

Conclusion It is evident that psoriasis in our community is aligned with published data about gender representation and prevalence in the dermatology OPD setting. Cardiometabolic diseases were unexpectedly low in this cohort, possibly a consequence of the lack of acute coronary care facilities at HJH. Unfortunately, our sample size was too small to comment meaningfully on the impact of ethnicity. The relatively higher prevalence of HIV infection is reflective of the national prevalence. The management of psoriasis at our clinic is consistent with recommended practice. Continued research on this disease should be a priority due to its association with major cardiovascular diseases. Improving record keeping and screening for associated diseases will assist in ongoing research and reducing prevalence of co-morbidities. This may also provide the motivation required for newer targeted immunological therapies.

Keywords Psoriasis, South Africa, HIV

Conflicts of interest There were no conflicts of interest.

Introduction

Psoriasis is an inflammatory immune-mediated polygenic disease manifesting in the skin and/or joints. Owing to the potentially disfiguring nature of the cutaneous manifestations as well as the associated co-morbidities, psoriasis carries a significant psychological and physical burden of disease.[1]

Genetically predisposed patients are triggered by environmental factors such as stress, infection, alcohol, smoking and exposure to specific drugs.[2] This leads to activation of the innate immune system and consequently the adaptive immune system creates a self-perpetuating cycle of persistent chronic inflammation.

Psoriasis can present at any age. A bimodal age of onset has been described. The mean age of onset for the first presentation of psoriasis ranges from 30 to 39 years of age, with a second peak occurring between 60 and 69 years. There is no predilection for gender however female patients present at an earlier age.[3] There is a wide range in prevalence between various parts of the world. The global incidence rate of psoriasis was reported as 57.8 per 100000 patients in 2019.[4] The rate per 100000 patients varied between high-income (92.7 in north America and 145.5 in Australasia) and low-income regions (central sub-Saharan Africa was 51.6 and Eastern sub-Saharan African was 25.1).[4] In our region (Southern sub-Saharan Africa) it was 32.9 per 100000.[4] The lower incidence in our region is partially due to a paucity of epidemiological data from many countries. There are very few studies from Africa on the epidemiology of psoriasis. Factors shown to affect prevalence include age, sex, gross national income, geographical location and race. Increased prevalence has been noted in the white population, high income countries, higher latitude and older populations.[5]

There are no recent figures for the prevalence of psoriasis in the Gauteng province, the site of our study. A review in 1997 (based on data collected between 1969 and 1972) extrapolated a psoriasis prevalence of 3.4-3.6% at the Chris Hani Baragwanath Academic Hospital dermatology clinic in Soweto which, during that period, served the black population in the area.

Although psoriasis can present with various cutaneous manifestations, the characteristic lesion is a well demarcated thick erythematous plaque with silvery scales. The common characteristic findings are erythema, thickening and scaliness. These features and body area involved are used to calculate the Psoriasis Area and Severity Index (PASI) score to determine disease severity.[2] Plaque type psoriasis, or psoriasis vulgaris, accounts for 90% of cases. Plaques can

be extensive or few; preferred sites include extensor surfaces of the limbs, scalp and lower back. Papules and small plaques that are numerous and widely distributed over the body surface are referred to as guttate psoriasis. Erythematous plaques are found on intertriginous folds and in flexures in inverse psoriasis while erythrodermic psoriasis involve almost the entire body surface. The presence of pustules is described as pustular psoriasis or palmoplantar pustulosis according to the distribution of the lesions. Nail psoriasis affects 50% of those with plaque psoriasis and is associated with a longer disease duration and double the risk of developing psoriatic arthritis.[1,2]

Psoriatic arthritis (PsA) is a seronegative erosive inflammatory arthritis occurring in up to 30% of patients with psoriasis. It can manifest as an oligoarthritis or a polyarthritis that mimics rheumatoid arthritis. It may also present as axial arthritis, dactylitis or enthesitis. Psoriatic arthritis, like psoriasis, has a genetic component. 25% of patients with PsA are HLA-B*27 positive. HLA-C*0602 is more common in PsA and is associated with an earlier age of disease onset.[6]

Several co-morbid conditions are associated with psoriasis. A study done in a cohort of psoriasis patients across three academic hospitals in Johannesburg showed that the prevalence of metabolic syndrome amongst psoriasis patients was significantly high at 52.4%. Hypertension was especially prevalent in those with severe psoriasis.[7] Human immunodeficiency virus (HIV) associated psoriasis is a well described clinical entity. Psoriasis can be the presenting feature of HIV infection. In this population, psoriasis tends to be more severe, to have atypical presentations and higher failure rates with the usual prescribed treatment.[8] HIV is particularly prevalent in our region; in 2022 the prevalence of HIV in South Africa was 12.7%.[9]

Treatment can be divided into topical, systemic and phototherapy. Topical treatment is ideal for those with mild-moderate disease. Systemic therapy is warranted for those with moderate to severe disease as well as those with psoriatic arthritis.[1] The World Health Organization Model List of Essential Medicines includes methotrexate and cyclosporin A as systemic options for the treatment of psoriasis.[10] Retinoids can also be used in the management of psoriasis. A newer treatment option includes “biologics” which are systemic therapies that target specific molecules involved in the pathogenesis of psoriasis such as interleukin 17 (IL-17), interleukin 23 (IL-23) or tumour necrosis factor alpha (TNF alpha).

Our aim is to describe the epidemiology, clinical features, co-morbidities and management of psoriasis in adults attending a tertiary dermatology out-patient clinic.

Materials and methods

Study design

This is a descriptive retrospective case cohort study.

Study setting

This is a single center study based at Helen Joseph Hospital (HJH), Johannesburg, South Africa. HJH is a tertiary care hospital with a dedicated dermatology outpatient clinic, catering to referrals from outlying primary and secondary care facilities as well as referrals from other departments within the hospital.

Study population

Patients with psoriasis attending the HJH dermatology outpatient clinic from 01/01/2015 to 31/12/2019 were included in the study. We chose not to include the period from 2020 onwards due to the SARS-CoV-2 pandemic which would have affected patient compliance and frequency of visits.

Inclusion criteria

- Patients over the age of 18
- Diagnosis of psoriasis (based on clinical and/or histological features)

Exclusion criteria

Patients under the age of 18

Data collection

Data was extracted from patient records stored in the Helen Joseph Dermatology OPD department; each file was reviewed individually to ascertain the diagnosis. There were no identifiers on any file. Data was captured using a data collection sheet (Appendix A). This was

done by the investigator. Each patient was allocated a unique study number to preserve anonymity.

For those patients with psoriatic arthritis who attended both the Dermatology and Rheumatology Outpatient clinics, data was extracted from records at both facilities.

Data Analysis

The collected data was recorded in Microsoft Excel (Microsoft, Redmond, WA, USA), and analysis was done with the use of the STATA software, version 18 (StataCorp, College Station, TX, USA). The statistical data analysed was descriptive in nature. Different commands assisted in cleaning the data. Data cleaning processes included checking for duplicates, missing values, recording and categorising variables. Categorical variables were documented as percentages and frequencies, while continuous data was documented as mean/median and standard deviation/interquartile range. Association was done using chi-square/Fisher's exact test. Statistical significance was <0.05.

Ethics

This study was approved by the Human Research Ethics Committee (medical), University of the Witwatersrand, South Africa (M230345 MED23-02-009) (see Appendix B)

Results

Epidemiology

We identified 253 patients with psoriasis amongst the 23480 patients (both new and follow-up visits) who attended the dermatology clinic during the study period. The prevalence of psoriasis was 1.1% over the five-year period.

Demographics

There were 131 (52%) females and 115 (45%) males in our cohort. In 7 (3%) patients the gender was not recorded. One hundred and thirty patients (51%) were over the age of 60. There were 37 patients (15%) between 50-59 years old at diagnosis, with 27 (11%) in the 20-29 year old category and 28 (11%) in the 30-39 year old category; see figure 1. Racial distribution in our cohort is demonstrated in table 1.

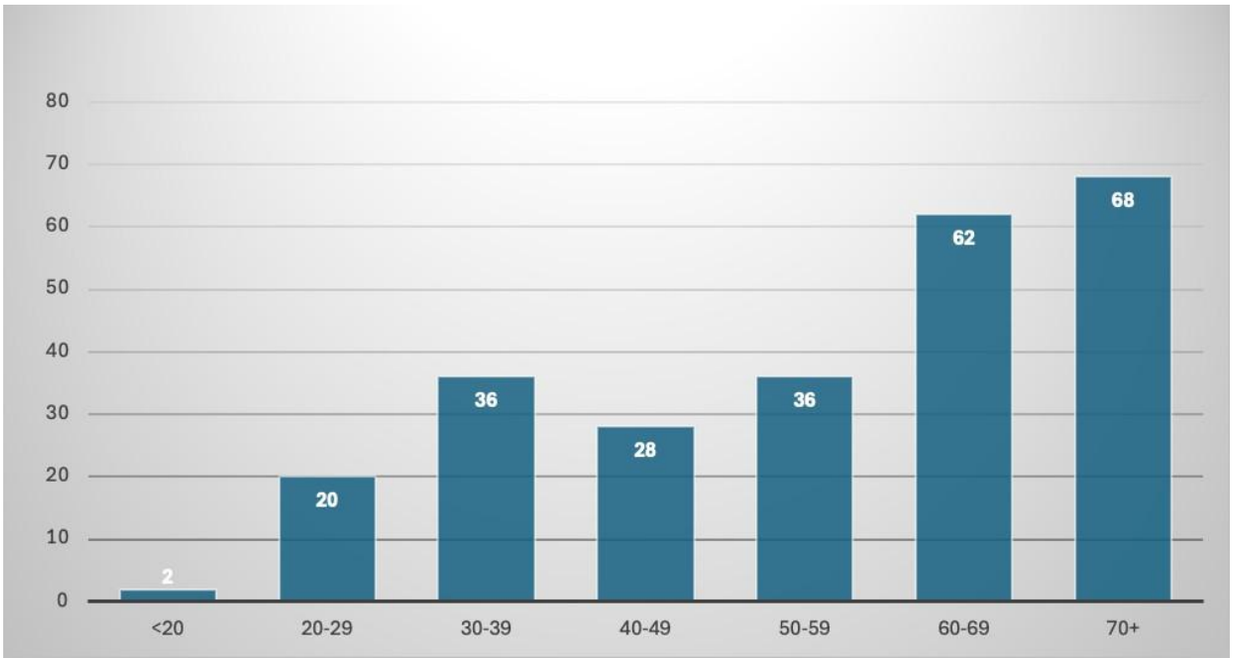

Figure 1 Age distribution of patients with psoriasis at a tertiary hospital in Johannesburg 2015-2019

Table 1 Racial demographics of psoriasis patients at a tertiary hospital in Johannesburg 2015-2019

Medication	Number of patients	Percentage
White	72	28%
Black	71	28%
Mixed-race	59	23%
Indian	50	20%
Other	1	1%
Total	253	100%

Table 2 Frequency of co-morbidities in psoriasis patients in a tertiary hospital in Johannesburg, 2015-2019

Co-morbidities	Number of patients	Percentage
Hypertension	80	32%
Diabetes Mellitus	40	16%
Dyslipidemia	23	9%
Psoriatic arthritis	21	8%
HIV	18	*17%
Ischemic heart disease	8	3%
Cancer	7	3%
Epilepsy	6	2%
Hypothyroidism	5	2%
Renal dysfunction	5	2%
Obesity	5	2%
Pregnancy	2	0.8%
Steroid-induced acne or rosacea	2	0.4%
Avascular necrosis of the hip	1	0.4%
Osteoporosis	1	0.4%
Ulcerative colitis	1	0.4%

**17% of the 105 patients who had HIV results available*

Co-morbidities

Eighty patients were hypertensive; of these 67 were hypertensive at the time of diagnosis of psoriasis/index visit to the dermatology OPD and 13 were diagnosed during their disease. Thirty-one of the 40 diabetic patients were noted at diagnosis/index visit. Twenty-three patients had dyslipidemia: 18 at diagnosis. Only one patient was recorded to have suffered from a myocardial infarction. Twenty-three patients had other documented dermatologic co-morbidities. Thirteen patients were recorded to have psoriatic arthritis. The HIV status was unknown in over half the cohort. Other co-morbidities are listed in table 2.

*HIV results were only available for 105 patients

Subtypes

An overwhelming majority of patients had plaque psoriasis at diagnosis, followed by the guttate subtype as in figure 2. Two hundred and twenty-three patients (88%) had typically described scaly erythematous plaques at index visit. Clinical features present at diagnosis are depicted in figure 2 while figure 4 depicts the most involved sites. Of the 18 HIV positive patients in the cohort, 11 had plaque type psoriasis, three presented with erythroderma, two had the guttate subtype and another two had both plaque and guttate psoriasis.

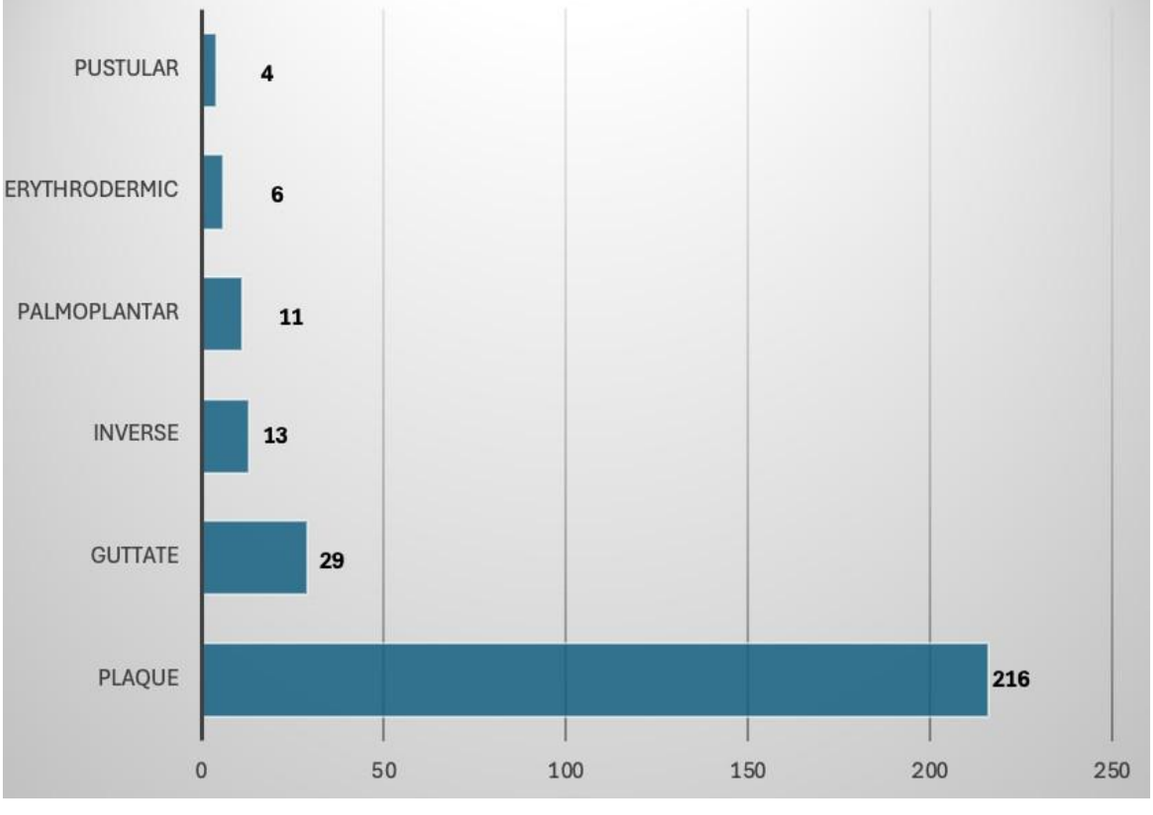

Figure 2 Frequency of subtypes of psoriasis in a tertiary hospital in Johannesburg 2015-2019

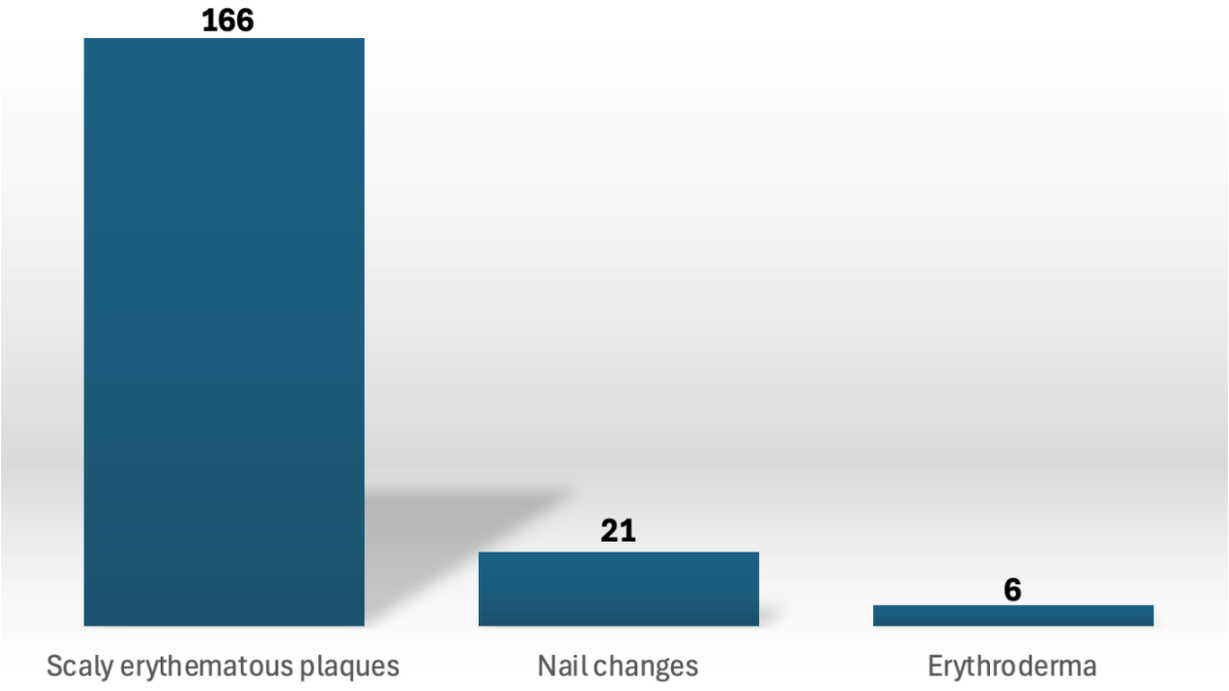

Figure 3 Frequency of clinical features of diagnosis in psoriasis patients at a tertiary hospital in Johannesburg 2015-2019

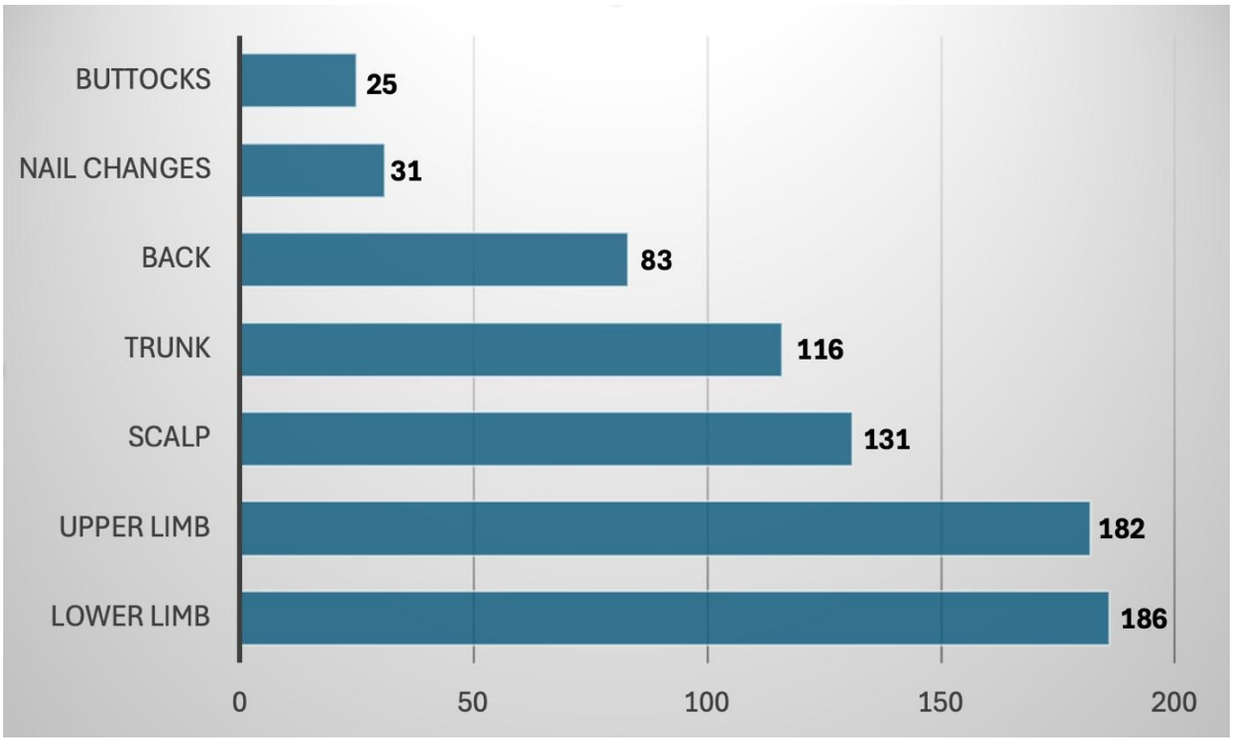

Figure 4 Frequency of various body sites involved in patients with psoriasis in a tertiary hospital in Johannesburg 2015-2019

Diagnosis

One hundred and four patients had undergone skin punch biopsy for histological confirmation. 143 patients were diagnosed based on clinical features; only 14 were diagnosed using histology alone. The method of diagnosis was not recorded in 26 patients.

Table 3 Frequency of medications prescribed to psoriasis patients in a tertiary hospital in Johannesburg 2015-2019

Medication	**Number of patients**	**Percentage**
Emollients	253	100%
Topical corticosteroids (any potency)	253	100%
Topical corticosteroids for scalp use	185	73%
Topical vitamin D analogue combined with potent topical steroid	86	34%
Coal tar shampoo	25	10%
Phototherapy	4	1.6%
Methotrexate	74	29%
Ciclosporin	4	1.6%
Acitretin	24	9.4%

Treatment and follow-up

Every patient in the cohort was prescribed emollients and topical corticosteroids of various potencies. Eighty-eight patients were on methotrexate or acitretin and four were taking ciclosporin. Of those on methotrexate or acitretin, 30 patients were given a six-monthly follow up appointment and 30 were given three to four months to follow up; 28 were given one to two months. One hundred and twenty-five patients (49%) were given a six-month appointment at their last recorded visit; implying that they were well-controlled on their prescribed medication. Of these, 30 were on methotrexate (MTX) or acitretin. In the subgroup with HIV infection (18 patients) half (9) were on antiretroviral medication.

DISCUSSION

There is a paucity of psoriasis-related epidemiological and clinical data in South Africa.

This study describes the epidemiology, clinical features, co-morbidities and management of patients with psoriasis seen at a tertiary hospital in Johannesburg, South Africa. To our knowledge this is the first in-depth description of psoriasis in our setting. Previous studies in South Africa have focused on either dermatological disorders in general (including psoriasis) or on specific aspects of the disease.[7,8,11–14] The prevalence of psoriasis in our group was 1.1%. This figure is marginally lower than the 2.9% recorded previously in a general dermatology study that included our hospital.[11] Unfortunately, we do not have the racial breakdown of all the patients seen at the dermatology clinic; this distribution would impact on the prevalence and may skew the figures. Black and white patients accounted for an equal number of the cohort followed by mixed-race and then Indian patients. It is most likely that the racial distribution of our cohort is in keeping with the racial composition of the community served by Helen Joseph Hospital. There were too few patients to adequately assess the impact of the ethnicity in our group. Previous studies have shown psoriasis to be more common in the Indian population.[11]

There were 131 females (53%) in our cohort, this was marginally higher than the 115 (45%) male patients. This minor difference in prevalence between the genders reflects data from Norwegian and American population-based registries where females outnumbered males.[15,16] As demonstrated in several studies as well as published texts, there is a bimodal peak in the age at which patients present with psoriasis. A recent systematic review found peak prevalences between ages 30-39 and at 60-69 years of age.[17] Our results reveal a similar bimodal peak in age of presentation, but our peaks were noted at ages 20-39 and 50-59 years. The review by Iskander et al noted that the second psoriasis peak occurs earlier in females (50-59 years).[17]

The chronic inflammation that occurs in psoriasis is linked with cardiometabolic diseases and accelerated atherosclerosis.[7,18] A Mexican study recorded dyslipidemia in 33% of the psoriasis cohort and cardiovascular disease in 7.2% of their psoriasis cohort.[19] Goolam Mahyoodeen at al recorded dyslipidemia in 26.2% of psoriasis patients in their study across three academic hospitals in Johannesburg in 2019.[7] In comparison to both studies, very few patients in our cohort were documented to have dyslipidemia (9%) and ischemic heart disease (3.1%) with

only one patient documented with a myocardial infarction. Our figures are unlikely to be a true reflection of the extent of cardiometabolic disease and is most likely due to a combination of poor record-keeping and patients lost to follow-up after a myocardial infarction. Helen Joseph Hospital does not have the facilities to manage these patients acutely and thus refers them to other institutions. These patients are likely to continue their dermatology follow-up at those facilities (for convenience) instead of returning to the HJH dermatology OPD.

Human Immunodeficiency Virus infection has been reported as an independent risk factor for developing psoriasis.[20] The national prevalence of HIV in 2022 amongst those aged 15-49 was 17% whilst in our cohort this age group had a prevalence of 21%. The total prevalence of HIV in our cohort was 17% (18 patients) whilst the national prevalence in 2022 was 12.7%.[21] Ten (56%) of patients in this sub-group had plaque psoriasis. This is consistent with the findings in a Spanish cohort of HIV-infected patients where plaque psoriasis was most common.[22]

Diagnosis of psoriasis is usually clinical; less common subtypes of psoriasis, such as inverse or erythrodermic psoriasis are more likely to require histological confirmation.[1,18] Nail psoriasis is also diagnosed clinically due to the risk of complication by infection or the formation of scar tissue.[23] Those patients in our cohort who underwent skin punch biopsy presented with atypical clinical features or required histological confirmation before initiating immunosuppressive therapy.

As expected, corticosteroids were the most frequently used topical agents in our cohort; this was no different to global trends.[24] A combination of a topical vitamin D analogue and potent topical corticosteroid was prescribed to 34% of our cohort. This is in keeping with international practice despite the resource limitations faced in South Africa.[24]

Five out of 18 HIV positive patients were on systemic agents to manage their psoriasis: three were on acitretin, one was on MTX and one was initially on acitretin with no improvement and was changed over to MTX. Acitretin is preferred in patients with HIV as it is not immunosuppressive; MTX is associated with a higher risk of infections in HIV positive patients.[25] A recent study showed that TNF alpha inhibitors and ustekinumab have been used with success in HIV positive patients; there is no data regarding the use of IL-17 and IL-23 inhibitors in this population.[25]

One hundred and twenty-five patients were given six monthly follow-up appointments. The possible reasons for wide intervals between visits include 1) patients are well controlled on their prescribed medications 2) patients have financial constraints that do not allow for frequent visits 3) institutional limitations, specifically limitation of number of patients booked for OPD clinic days.

There were several limitations in this study. The study was conducted at a specialist dermatology clinic and is not representative of psoriasis in the general population. The covid-19 pandemic resulted in the study period ending in 2019. Newer targeted immunological biologic agents available for the treatment of psoriasis have since become more readily available. Poor record keeping did not allow for calculation of PASI scores or for truly establishing the presence or absence of associated diseases and the severity thereof.

CONCLUSION

It is evident that psoriasis in our cohort reflects published data about gender representation and prevalence in the dermatology OPD setting. Cardiometabolic diseases were unexpectedly low in the cohort, possibly a consequence of the lack of acute coronary care facilities at the HJH. Unfortunately, our sample size was too small to comment meaningfully on the impact of ethnicity. The relatively higher prevalence of HIV infection is reflective of the national prevalence. The management of psoriasis at our clinic is consistent with recommended practice. Despite the limitations of our study, we believe that it adds to the understanding of the disease in our setting.

Recommendations

Psoriasis in 2025 is acknowledged as an immune-mediated disease which can be treated with targeted immunological treatments. Co-morbidities can be prevented, and the quality of life and economic work strength of the patient can be sustained. We should implement the following despite the limitations and flaws in our system:

- A dedicated psoriasis clinic day

- Clerking sheets for uniformity of records; noting specific details such as disease triggers, lifestyle and associated conditions and calculation of PASI scores for each patient to monitor treatment outcome
- Recording of all vital data, including weight and height, to screen for associated diseases and establish causality between these and psoriasis
- Screening for PsA
- Monitoring for complications of both topical and systemic treatments
- Digitalisation of records

We trust and hope that this epidemiologic study will add value and implement changes to the administrative and clinical management of our patients with psoriasis who are dependent on the public health care system in South Africa.

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APPENDIX A: APPROVED RESEARCH PROTOCOL

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

Master of Medicine

Division of Dermatology

Research proposal:

A retrospective study of psoriasis over five years at a tertiary hospital

Candidate:

Dr Vidya D Bhojwani

MBBCh (Wits), Dip HIV Man (SA)

Student number 0414383V

Supervisor:

Dr Kapila Hari

MBBCh MMed (Wits) PhD (Wits)

Co-supervisor:

Dr Lushen Pillay

MBCHb (UP) MMed Derm (Wits) FC Derm (Wits)

ABSTRACT

Psoriasis is a disease with skin, nail and joint manifestations. It is an immune-mediated, inflammatory polygenic disease. Its incidence is higher in Caucasians; the global prevalence ranges from 0.27% to 11.4%. The subtypes of psoriasis can be differentiated based on the pattern of skin involvement and appearance of skin lesions. In those with severe disease, psoriasis is an independent risk factor for myocardial infarction. Much of the data available on psoriasis is from research in north America and Europe. As there is limited published data from the African region, it would be valuable to evaluate and assess various parameters of those affected with psoriasis in our population.

INTRODUCTION

Psoriasis is an inflammatory immune-mediated polygenic disease manifesting in the skin and/or joints. Owing to the potentially disfiguring nature of the cutaneous manifestations as well as the associated co-morbidities, psoriasis carries a significant psychological and physical burden of disease. [26]

Parisi et al recently published a systematic review of studies from around the world that reported on the incidence and prevalence of psoriasis in the general population.

Taiwan has an incidence of 30.3 per 100000 person-years, while the incidence in Italy is 321 per 100000 person years. It describes the global prevalence of psoriasis in adults as a range from 0.27% to 11.4%. This variation is attributed to several factors such as age, sex, geographical location and race. Increased prevalence is noted in white people and in countries with a high income, higher latitude, and an older population. The wide range in the prevalence is also due to a paucity of epidemiological data from approximately 81% of the world's countries. Africa is not represented in the studies from which data was extracted; most data came from Europe and North America. [27]

There are very few studies which have evaluated psoriasis in the African region. A review in 1997 studied various surveys and extrapolated a psoriasis incidence of 3.4-3.6% at CHBAH. A lower incidence of 1.8% was noted in a similar population at a dermatology department at hospital in Pretoria. In comparison the incidence was found to be 4-5% in Caucasian and Indian populations in the province. [28] In 2019,

Mahyoodeen et al studied at a cohort of 103 patients with psoriasis at three academic hospitals in Johannesburg; of these patients, 42.1% were Indian, 11.7% Caucasian, 14.6% black and the rest were of mixed ancestry. [29]

Psoriasis can manifest at any age but generally has two peaks – one before the age of 39 and the next between 50-59. There is no predilection for gender however female patients present at an earlier age. [30]

Although psoriasis can present with various cutaneous manifestations, the characteristic lesion is a well demarcated thick erythematous plaque with silvery scales. The common characteristic findings are erythema, thickening and scaliness. These features and body area involved are used to calculate the Psoriasis Area and Severity Index (PASI) score to determine disease severity. [31]

Plaque type psoriasis, or psoriasis vulgaris, accounts for 90% of cases. Plaques can be extensive or few; preferred sites include extensor surfaces of the limbs, scalp and lower back. Papules and small plaques that are numerous and widely distributed over the body surface are referred to as guttate psoriasis. Erythematous plaques are found on intertriginous folds and in flexures in inverse psoriasis while erythrodermic psoriasis involves almost the entire body surface. The presence of pustules is described as pustular psoriasis or palmoplantar pustulosis according to the distribution of lesions. [26,31]

Nail psoriasis affects 50% of those with plaque psoriasis and is associated with a longer disease duration and double the risk of developing psoriatic arthritis. Patients may present with onycholysis (separation of the nail plate from the nail bed), nail dystrophy (a crumbling nail plate), oil spots (orange-yellow discolouration resulting from leukocyte exocytosis underneath the nail plate) or nail pits. [32] Nail disease tends to affect the fingernails more than the toenails. [31]

Genetically predisposed patients are triggered by environmental factors. This leads to activation of the innate immune system and consequently the adaptive immune system creates a self-perpetuating cycle of persistent chronic inflammation. Psoriasis is associated with particular major histocompatibility complex (MHC) alleles; early onset psoriasis in particular is associated with expression of Human Leukocyte Antigen (HLA) -C*06:02. Late onset psoriasis, psoriatic arthritis and pustular psoriasis are not associated with this allele.[32]

The innate immune system response is mediated through epidermal cells such as keratinocytes, natural killer T cells, dendritic cells and neutrophils. The inflammatory cytokines secreted by these cells include interleukin-17 (IL-17), interferon gamma (IFN-y) and tumour necrosis factor alpha (TNF-a). This leads to keratinocyte proliferation, further cytokine secretion in an autocrine or paracrine fashion and antimicrobial peptide expression. This then leads to angiogenesis, neutrophil accumulation, and increased numbers of T lymphocytes of the T helper 1 (Th1) and Th17 subsets. Release of IL-17 further stimulates keratinocyte proliferation and inflammation. IFN-y promotes a Th1 response, creating an auto-amplifying loop. [26,31,32]

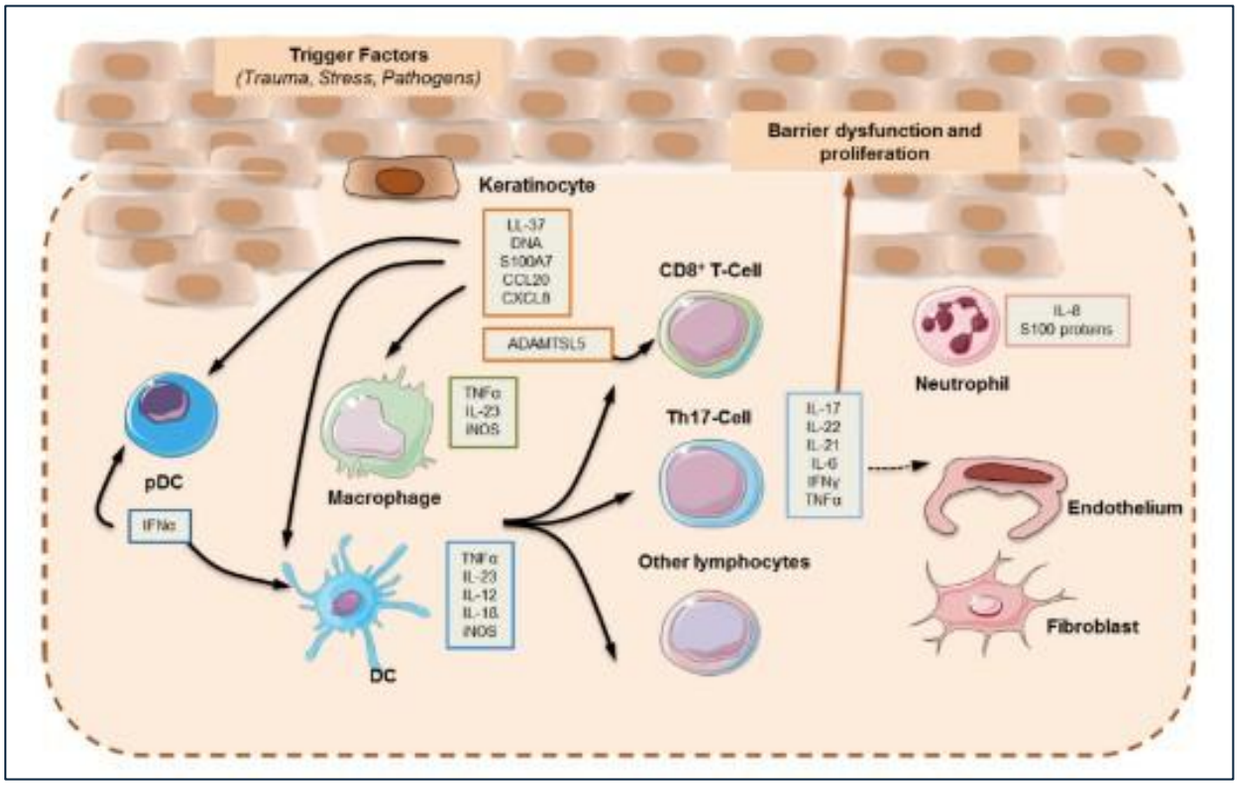

Figure 1 Pathogenesis of psoriasis [33]

Triggers that may lead to development of psoriasis include stress, infection, alcohol, smoking and exposure to specific drugs. Psychogenic stress has been shown to be a precipitant for both disease initiation and for acute flares. Similarly, infections can both induce and aggravate psoriasis, especially streptococcal infections in the form of pharyngitis, dental abscesses or impetigo. Medications such as lithium, beta-blockers, anti-malarial agents and non-steroidal anti-inflammatory agents have all been shown to be inciting factors for the development of psoriasis. Cutaneous injury from trauma, sunburn or other dermatoses may also precipitate disease. [31]

Several co-morbid conditions are associated with psoriasis. A study done in a cohort of psoriasis patients across three academic hospitals in Johannesburg showed that the prevalence of metabolic syndrome amongst psoriasis patients was significantly high at 52.4%. Hypertension was especially prevalent in those with severe psoriasis. In keeping with the high inflammatory state of psoriasis, these patients were found to have a median high sensitivity-CRP value twice that of the value in non-psoriasis patients. Significantly, severe psoriasis is noted to be an independent risk factor for developing myocardial infarction. This is believed to be due to the high inflammatory milieu present in the disease. [29]

Psoriatic arthritis (PsA) is a seronegative erosive inflammatory arthritis occurring in up to 30% of patients with psoriasis. It can manifest as an oligoarthritis or a polyarthritis that mimics rheumatoid arthritis. It may also present as axial arthritis, dactylitis or enthesitis. PsA, like psoriasis, has a genetic component. 25% of patients with PsA are HLA-B*27 positive and as previously mentioned, HLA-C*0602 is more common in PsA and is associated with an earlier age of disease onset. Irreversible joint damage adds to the emotional burden of disease in psoriasis. [34]

HIV is particularly prevalent in our region; in 2008 it was found that 67% of global HIV cases are from sub-Saharan Africa. The altered immune function can lead to a multitude of cutaneous disorders. Psoriasis in HIV can be a clinical conundrum as it may manifest similarly to several other cutaneous disorders associated with HIV infection. Presentation with erythroderma or reactive arthritis suggest underlying immunodeficiency. A distinctive feature of HIV-associated psoriasis is the co-existence

of several different phenotypes in the same patient. Highly active antiretroviral therapy is an integral part of management of patients with HIV-associated psoriasis, along with standard psoriasis treatment regimens. [35]

When treating psoriasis, we consider disease severity, associated co-morbidities and the psychological burden of disease. It is also necessary to identify triggering factors such as stress and medications. [31] Due to the chronic nature of the disease long-term therapy is usually required. [33]

Treatment can be divided into topical, systemic and phototherapy. Topical treatment is ideal for those with mild-moderate disease. These include vitamin D3 analogues, corticosteroids and phototherapy. Systemic therapy is warranted for those with moderate to severe disease as well as those with psoriatic arthritis. [26] The World Health Organization Model List of Essential Medicines include methotrexate and cyclosporin A as systemic options for the treatment of psoriasis. More novel therapies include biologics which are molecules targeting specific inflammatory pathways. Of these, TNF-a inhibitors have been available for several years and are effective in the treatment of psoriatic arthritis and psoriasis vulgaris. The range of drugs available to our state sector patients is limited due to resource constraints. [33]

There is a paucity of data on the incidence of psoriasis both internationally and locally. Our aim is to establish the incidence at a tertiary hospital. This may not reflect the incidence for the country as it does not account for primary care facilities. We would

also like to describe any demographic variation and the associated co-morbidities in our cohort. Furthermore, we aim to assess differences in clinical presentation, if any in the HIV infected and HIV-uninfected populations.

STUDY OBJECTIVES

The objectives of this retrospective observational study are to:

- Establish the incidence of psoriasis at a dermatology outpatient clinic at an academic tertiary hospital in Johannesburg, South Africa
- Describe the demography and associated co-morbidities in our cohort
- Assess the difference in clinical manifestations (if any) between HIV-infected and non-infected patients

METHODS

Study Design

This is a descriptive retrospective case cohort study.

Study setting

This is a single center study based at Helen Joseph Hospital (HJH), Johannesburg, South Africa. HJH is a tertiary care hospital with a dedicated dermatology outpatient clinic, catering to referrals from outlying primary and secondary care facilities as well as referrals from other departments within the hospital itself.

Study population

Patients with psoriasis attending the HJH dermatology outpatient clinic from 01/01/2015 to 31/12/2019 will be included in the study. We have chosen not to include the last two years due to the SARS-CoV-2 pandemic which would have affected patient compliance and frequency of visits.

Inclusion criteria

- Patients over the age of 18
- Diagnosis of psoriasis may be clinical (based on clinical or histological features)

Exclusion criteria

Patients under the age of 18

Data collection

Data will be extracted from patient records and captured using a data collection sheet (Appendix A). This will be done by the investigator. Each patient will be allocated an unique study number to preserve anonymity.

For those patients with psoriatic arthritis who attend Dermatology and Rheumatology Outpatient clinics, data will be extracted from records at both facilities.

Parameters to be recorded:

- Date of birth
- Gender

- Race
- Method of diagnosis (clinical or histological)
- Clinical manifestations and severity on index presentation
- HIV status, CD4 count and viral load, treatment
- Co-morbidities (including other dermatological conditions)
    - on presentation
    - diagnosed during the course of disease
    - treatment thereof
- Treatment prescribed
- Frequency of visits
- Treatment response (disease activity after treatment, indications to start systemic treatment)

DATA ANALYSIS

Data will be entered onto a Microsoft Excel spreadsheet and will be analyzed using statistical software. Descriptive analyses will then be performed on all parameters. A statistician will be consulted if necessary. Continuous data will be expressed as means (± standard deviation {SD}) or medians (interquartile range {IQRI}), the latter being used when the SD is greater than the mean. Categorical data will be expressed as percentages. Comparisons between groups will be made using the Chi-squared test or Fisher's exact test for qualitative data, and the two-tailed unpaired Student's t-test for quantitative data. The Spearman rank correlation test will be used to determine the relationship between variables, along will linear regression tests.

ETHICS

Ethics approval will be sought from the Human Research Ethical Committee of the University of the Witwatersrand. As the study is retrospective in nature and does not include patient's names, consent from individual patients will be not be required. Consent to use the files from the HJH Dermatology Clinic and HJH Rheumatology Clinic will be obtained from the head of Dermatology, head of Rheumatology, the superintendent of HJH and the medical advisory committee. All captured data will be password protected and will be used only by the research team.

FUNDING

Any associated costs will be borne by the investigator.

POTENTIAL LIMITATIONS

This is a retrospective study and thus relies on records; some information may be incomplete or absent. As the study is being conducted at a single center, outcomes cannot be generalized for the overall population. Patients lost to follow up will impact on results of various parameters being recorded.

TIMING

	2022							2023				
	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May
Literature review												
Protocol preparation												
Protocol assessment												
Ethics application												
Data collection												
Data analysis												
Write-up thesis												

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APPENDIX

Age: Race: Black/Indian/Coloured/White/Asian Biopsy done: Y / N Method of dx: Biopsy/Clinical Gender: M / F Date of diagnosis: Date of index visit: HIV: Y / N CD4: VL:			
Co-morbidities at diagnosis		Clinical features at diagnosis	
Co-morbidities over course of disease		Clinical features at index visit	
Treatment for co-morbid conditions		Treatment prescribed	
Frequency of visits		Treatment response	

APPENDIX B: ETHICS CLEARANCE CERTIFICATE

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG	HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research and Innovation)

TO:	Dr V Bhojwani School of Clinical Medicine Department of Medicine Division of Internal Medicine - Dermatology Medical School University E-mail: vidya_bhojwani@yahoo.com
CC:	Supervisor: Drs K Hari and L Pillay <Kapila.Hari@wits.ac.za> and <HREC-Medical Research Office@wits.ac.za>
FROM:	Mr Iain Burns Human Research Ethics Committee (Medical) Tel: 011 717 1252 E-mail: Iain.Burns@wits.ac.za
DATE:	2023/06/27
REF:	R14/49
PROTOCOL NO:	**M230345** (This is your ethics application reference number. Please quote it in all enquiries, oral or written, relating to this study.)
PROJECT TITLE:	*A retrospective study of psoriasis over five years at a tertiary hospital*

Please find attached the Clearance Certificate for the above project. I hope it goes well and that an article in a recognized publication comes out of it. This will reflect well on your professional standing and contribute to Government funding of the University.

MSWorks2000/Iain0007/Clearscan.wps

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R49 Dr V Bhojwani

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M230345

NAME: (Principal Investigator)	Dr V Bhojwani
DEPARTMENT:	School of Clinical Medicine Department of Medicine Division of Internal Medicine - Dermatology Medical School University
PROJECT TITLE:	*A retrospective study of psoriasis over five years at a tertiary hospital*
DATE CONSIDERED:	2023/03/31
DECISION:	Approved unconditionally
CONDITIONS:	
NOTE:	If contact information regarding student study participants is required, please contact the Registrar's office - <Nicoleen.Potgieter@wits.ac.za>
SUPERVISOR:	Drs K Hari and L Pillay
APPROVED BY:	CB Penny Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	2023/06/27 **EXPIRY DATE:** 2028/06/26

This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office secretariat on the 3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report**. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in **March** and therefore reports and re-certification will be due in the month of **March** each year. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

VBB
Signature of Principal Investigator

28/06/23
Date

APPENDIX C: TURNITIN REPORT

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by Vidya Bhojwani

Submission date: 29-May-2025 02:34PM (UTC+0200)
Submission ID: 2687557662
File name: turnitin_doc.docx (506.92K)
Word count: 3144
Character count: 17758

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APPENDIX D: JOURNAL SUBMISSION GUIDELINES

INTERNATIONAL JOURNAL OF DERMATOLOGY

Author Guidelines

IJD SUBMISSION FORMS

1. ABOUT *IJD*

The *International Journal of Dermatology* (*IJD*) publishes monthly and is specifically designed to provide dermatologists around the world with a regular, up-to-date source of information on all aspects of diagnosing and managing skin diseases.

IJD's longstanding interest in global dermatology and tropical skin diseases began with the release of its first issue in the early 1960s. Today, with a well-established global presence, IJD presents a comprehensive exploration of all aspects of dermatology, including basic sciences, venereology, public health, and the teaching of dermatology in developing countries.

IJD is guided by a distinguished, international editorial board and emphasizes a global approach to continuing medical education for physicians and other healthcare providers with a specific interest in skin problems.

2. MANUSCRIPT CATEGORIES

IJD invites the following types of submissions:

Review Article

IJD welcomes the submission of both **Narrative Reviews** and **Systematic Reviews and Meta-Analysis**. Topics may include updates in clinically relevant basic science and cutaneous biology.

A *Narrative Review* summarizes existing knowledge in a particular field without appearing as an exhaustive review of the literature.

A *Systematic Review and Meta-Analysis* functions as synthesized summaries and critical appraisals that account for explicit questions through detailed and comprehensive literature searches in medicine.

The length of the body text should not exceed 5000 words (excluding the abstract, reference list, and figures), with a maximum of 5 figures and tables allowed. These submissions must include an unstructured abstract of a maximum of 250 words. Graphical abstracts, visually summarizing the key message and main results of the submission, are highly encouraged, though optional.

A list of multiple-choice and/or true-or-false questions may be included at the end of the article to provide additional educational challenges to the reader. Keywords are a requirement, please see below for further details.

A maximum of 5 supplementary figures/ tables restriction applies to this article type. These will be published under the Supporting Information tab once the article goes live. Tables must be 35 lines or less in portrait layout, with 2.5cm/1-inch margins and 12-point font, to fit on one journal page.

The IJD currently does not consider non-medical and bibliometric topics for publication under this manuscript type.

Original Article

As the primary means of communication, submitted Original Articles should present new data resulting from scientific research employing a broad variety of empirical methods and study protocols.

These major didactic research papers should comprise the following structure: *Abstract, Introduction, Materials and Methods, Results, Discussion, and References*.

The length should not exceed 3000 words (excluding the abstract, reference list, figure, and table legends), with a maximum of 5 figures and tables and preferably no more than 50 references.

A structured abstract of approximately 250 words must be included and should consist of 4 paragraphs labeled: Background, Methods, Results, and Conclusions. Graphical abstracts, visually summarizing the key message and main results of the submission, are encouraged, though optional.

The authors can also include a Plain-language Summary (maximum 100 words) along with their submission. This supplemental excerpt is not mandatory, but it can enhance the article's visibility and citation while also reaching and benefitting a wider audience of readers. Keywords are a requirement, please see below for further details.

A maximum of 5 supplementary figures/ tables restriction applies to this article type. These will be published under the Supporting Information tab once the article goes live. Tables must be 35 lines or less in portrait layout, with 2.5cm/1-inch margins and 12-point font, to fit on one journal page.

The IJD currently does not consider non-medical and bibliometric topics for publication under this manuscript type.

Clinicopathological Challenge

A photographic essay that includes both a clinical and a pathological photograph in color. This contribution should not exceed 800 words in length, with a maximum of 2-3 figures or tables and 5 references. The submission should include a short unstructured abstract. The article must be formatted according to History, What's the diagnosis? (providing four possibilities), Diagnosis, Discussion, and References. Keywords are mandatory.

Short Communication

Brief research letter presenting new or preliminary research findings, early reports of therapeutic trials, and/or surveys. This manuscript type should not be subdivided into subheadings in the body of the text, rather, all the required parts (Introduction, Materials & Methods, Results, and Discussion), except for the References, must be given in a single section. The article should not exceed 600 words in length with a maximum of 5 references and 2 figures/tables. Only references cited within the main text are permitted in the tables. Abstracts and supplemental materials are not allowed, however, authors may share additional data via Mendeley.

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Case Reports can be submitted under the Clinical Correspondence manuscript type. Correspondence Articles should not exceed 600 words in length (excluding title, acknowledgment, and references), with a maximum of 5 references and 2 figures or tables. No abstracts and no supplemental materials are permitted. Only references cited within the main text are permitted in the tables. Abstracts and supplemental materials are not allowed, however, authors may share additional data via Mendeley.

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1. de Berker DAR, Baran R, Dawber RPR. The Nail in Dermatological Diseases. In:*Baran and Dawber's Diseases of the Nails and their Management*(Baran R, Dawber RPR, de Berker DAR, Haneke E, Tosti, A, eds), 3rd edn. Oxford: Blackwell Science Ltd., 2001: 172–92.
   2. Murray ML, Cohen JB. Mycophenolate mofetil therapy for moderate to severe atopic dermatitis. *Clin Exp Dermatol* 2007; **32**: 23–7.
   3. Graham-Brown R, Burns T. *Lecture Notes: Dermatology*. Oxford: Wiley-Blackwell, 2006.
   4. Smith A. (1999) Select committee report into social care in the community [WWW document]. URL http://www.dhss.gov.uk/reports/report015285.html [accessed on 7 November 2003].

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