PREVALENCE AND FACTORS ASSOCIATED WITH PSORIATIC ARTHRITIS AMONG PSORIASIS PATIENTS ON FOLLOWUP AT THE DERMATOLOGY AND RHEUMATOLOGY UNITS KENYATTA NATIONAL HOSPITAL KENYA

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Prevalence and Factors Associated with Psoriatic Arthritis among Psoriasis Patients on Followup at the Dermatology and Rheumatology Units Kenyatta National Hospital, Kenya

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University

Signature…….……Date…….

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This thesis has been submitted for examination with our approval as University Supervisors

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DEDICATION

I dedicate this work to my late grandparents, Muteule Patrick Ayub Muchelle and Mama Lorna Hoka. For inculcating the spirit of academia in my upbringing. May your legacy live through your generation.

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I return all the glory and honour to the Almighty God for granting me the gift of life, strength, and knowledge to do this work. For opening up financial resources that made this study possible.

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ACRONYMS AND ABBREVIATIONS

PsA	Psoriatic Arthritis
PsO	Psoriasis
Derm	Dermatology
MRI	Magnetic Resonance Imaging
X-ray	Radiography
DIP	Distal Interphalangeal
BMI	Body Mass Index
SJC	Swollen Joint Count
TJC	Tender Joint Count
HAQ	Health Assessment Questionnaire
VAS	Visual Analog Scale

DEFINITION OF OPERATIONAL TERMS

Psoriatic Arthritis (PsA) Psoriatic arthritis is a chronic seronegative inflammatory arthritis that affects some individuals with psoriasis. It is destructive to joints if left untreated.

Psoriasis Psoriasis is a chronic systemic condition characterized by red, scaly patches on the skin with associated metabolic syndrome. It can occur in various forms and severity levels.

Prevalence Prevalence refers to the proportion of individuals in a population who have a specific condition (in this case, PsA) at a given point in time or within a specified period.

Dactylitis Dactylitis is the medical term for the swelling of an entire finger or toe, often seen in PsA patients.

Nail Dystrophy Nail dystrophy refers to abnormal changes in the nails, such as pitting, onycholysis (nail plate separation from the nail bed), or other nail abnormalities, which can occur in both psoriasis and PsA.

ABSTRACT

Psoriatic arthritis (PsA) is a serious and potentially debilitating condition that frequently occurs in approximately 30% of individuals with psoriasis. The burden of PsA ranges between 6 – 42 percent globally and occurs in approximately 30% of patients with psoriasis. However, the burden of PsA has not been fully investigated within the local context. The main study purpose was to determine the prevalence and clinical factors associated with psoriatic arthritis among psoriasis patients on follow-up at the Dermatology and Rheumatology units, Kenyatta National Hospital, Kenya. This was a cross-sectional study conducted at Kenyatta National Hospital over a period of five months. A consecutive sampling technique was used to sample 80 patients diagnosed with psoriasis. A structured questionnaire was used to collect data. The CASPAR criteria were used to screen for PsA. The prevalence of PsA was obtained as a proportion of patients with PsA over the total sample size and expressed as a percentage. Bivariate and multivariable analyses were done to investigate factors associated with PsA using binary logistic regression. A STATA version 16 was used to analyze the data. The findings indicated that the majority of the patients were male (65%), 47.5% were aged between 31 and 49 years, with the youngest being four years and the oldest being 75 years. Further, 52.5% had psoriasis for more than 48 months, and 33.8% had a family history of psoriasis with a first degree relative. The average PASI score was 11.5 (SD=8.9). The common type of psoriasis was plaque (70%), and the common site of psoriasis included the extremities (78.8%). The prevalence of psoriatic arthritis was 23(28.8%) with a 95%CI: 19.4% to 40.2%. The common psoriatic arthritis subtypes included polyarticular arthritis (39.1%), spondylarthritis (26.1%), and oligoarticular arthritis (21.7%). The multivariable analysis revealed that significant factors associated with Psoriatic Arthritis include gender (females, aOR = 10.11, 95% CI: 1.12, 91.61, p = 0.040), history of smoking (aOR = 21.37, 95% CI: 2.45, 186.71, p = 0.006), nail involvement (aOR = 5.44, 95% CI: 2.69, 42.1, p = 0.006), onycholysis morphology (aOR = 11.39, 95% CI: 1.42, 91.50, p = 0.022), oil drops (aOR = 12.11, 95% CI: 1.44, 34.12, p = 0.034), and the PASI score (aOR = 2.11, 95% CI: 1.34, 6.11, p < 0.001). The study concluded that Psoriatic arthritis (PsA) burden is high, with polyarticular arthritis being the most common subtype. Female gender, smoking history, nail involvement, onycholysis morphology, oil drops, and a higher PASI score are key contributors to the likelihood of developing PsA. Early monitoring for these factors is recommended.

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Psoriasis is defined as a chronic, multifactorial, immune mediated systemic inflammatory condition that is characterized by a higher rate of skin and joint manifestations. The psoriatic arthritis condition affects about 30% of the psoriasis patients (Wilson et al., 2009). However, the progression from psoriasis to psoriatic arthritis is variable . Thus, identifying the underlying risk factors is integral to effective management of this condition.

Among patients with psoriasis, an approximate prevalence of psoriatic arthritis ranging from 20% to 40% and incidence of 2.7 patients per 100 patients per year is reported globally (Alinaghi et al., 2019). PsA was once assumed to be a harmless ailment, but it is now widely recognized as a systemic inflammatory disease that can cause severe joint damage and disability. It is most common in patients with psoriasis; however, arthritis appears before psoriasis in 10%-15% of patients, and psoriasis and arthritis often emerge at the same time in about 10% of patients. Data on the epidemiology of PsA among the general population and patients with psoriasis are conflicting because of disparities in the geographical location, target population, techniques, and definition of PsA utilized in the studies (Rech et al., 2020).

Some studies have linked an increased severity of psoriasis with increased incidence of psoriatic arthritis. There is a paucity of data on similar associated clinical factors in the Kenyan set up. Routine screening among patients at high risk would increase chances of early diagnosis and initiation of therapy or referral to a rheumatologist before the destructive joint disease progresses.

Furthermore, treatment of psoriasis can be both systemic and topical (Ogdie & Weiss, 2015). Current systemic therapies include Disease-Modifying Anti-Rheumatic Drugs (DMARDs) like methotrexate and cyclosporine, small molecules like tofacitinib, and apremilast, retinoids like acitretin and biologics like tumor necrosis factor inhibitors,

interleukin-17A inhibitors, interleukin-23 inhibitors, and an interleukin-12/23 inhibitor. Some systemic therapies, like methotrexate and the biologics, are beneficial for both the joint disease and the skin disease. They can therefore be initiated early among the patients at a higher risk of joint disease. This would lead to improved patient outcomes for both the skin and joint disease (Rech et al., 2020; Truong et al., 2015; Wilson et al., 2009). Newer treatment options lie biologics and small molecules have had good outcomes for both the cutaneous and the joint disease (Vergara-Dangond et al., 2025)

This study provides local incidence and prevalence statistics for psoriatic arthritis for future research work in this topic. It will also equips the dermatologists and Rheumatologists with the evidence on patients that require routine screening for psoriatic arthritis for the purpose of early diagnosis and the choice of treatment beneficial to both systems.

1.2 Statement of the Problem

PsA is an increasing problem among patients with psoriasis, occurring in approximately 7 to 41% (Ogdie & Weiss, 2015). Even though there have been advancements in treatment with novel immune modulating medicines, such as tumor necrosis factor α (TNFα) inhibitors, patients who have Psoriatic arthritis (PsA) continue to face severe morbidity. This includes the gradual degradation of joints, dysfunctional impairment, and increasing expenditures associated with medical care (Wilson et al., 2009).

Therefore, it is suggested that PsA be diagnosed and treated as soon as possible in order to prevent disability associated with the disease and a loss of productivity in the workplace. Although a number of studies have produced evidence of risk factors for the development and progression of psoriatic arthritis (PsA), relatively little is known about the clinical characteristics of psoriasis that are connected with the onset of PsA. Generally speaking, those who suffer from severe psoriasis indicated by a higher PASI score of more than ten may be at a greater risk of developing inflammatory arthritis compared to patients who have mild psoriasis (Wilson et al., 2009). Furthermore, oral corticosteroid intake within two years before the diagnosis of PsA is associated with

an increased chance of developing PsA; Both acute life stressors and physical trauma in individuals with psoriasis, which is referred to as the deep Koebner phenomenon, have been discovered to be related to the onset of psoriatic arthritis (PsA) in recent research. However, within the local context, there has been a paucity of data on the burden of PsA among patients with psoriasis and associated factors.

1.3 Research Question

What is the prevalence and factors associated with psoriatic arthritis among psoriasis patients on follow-up at the Dermatology and Rheumatology units Kenyatta National Hospital Kenya?

1.4 Objectives of the Study

1.4.1 Broad Objective

To determine the prevalence and factors associated with psoriatic arthritis among psoriasis patients on follow-up at the Dermatology and Rheumatology units, Kenyatta National Hospital, Kenya.

1.4.2 Specific Objectives

1) To determine the prevalence of psoriatic arthritis among psoriasis patients on follow-up at the Dermatology and Rheumatology units, Kenyatta National Hospital, Kenya.
2) To establish the psoriatic arthritis subtypes among psoriasis patients on follow-up at the Dermatology and Rheumatology units, Kenyatta National Hospital, Kenya.
3) To investigate clinical factors associated with psoriatic arthritis among psoriasis patients on follow-up at the Dermatology and Rheumatology units, Kenyatta National Hospital, Kenya.

1.5 Justification of the Study

Psoriatic arthritis (PsA) is a chronic and potentially debilitating autoinflammatory disorder that affects individuals with psoriasis, a common skin condition. While the prevalence and factors associated with PsA have been studied extensively in various global populations, there is a lack of comprehensive data specific to Kenya. This study aims to address this gap by investigating the prevalence and identifying factors associated with PsA among psoriasis patients undergoing follow-up care in Kenya. Understanding the specific characteristics and risk factors associated with PsA in the Kenyan population allows healthcare professionals to provide more targeted and personalized care. This can lead to better pain management, enhanced quality of life, and improved functional outcomes for PsA patients.

CHAPTER TWO

LITERATURE REVIEW

2.1 Pathophysiology of Psoriatic Arthritis among Psoriasis Patients

The pathophysiology of psoriatic arthritis (PsA) among psoriasis patients is a complex and fascinating topic, offering numerous insights into the disease process. The pathophysiology of PsA is distinguished by the complexity of an activated immune system with several cellular pathways implicated, which are dynamic in the disease's various stages or presentations, as well as in the distinct tissues affected. The use of single-cell methods allows researchers to identify many cell subtypes, primarily synovial fibroblasts and T lymphocytes, that may play a pathogenic or protective function in PsA (Truong et al., 2015).

Genetic factors play a significant role in the development of PsA. Certain genetic markers, such as the HLA-B27 gene, have been strongly associated with an increased risk of PsA. However, PsA is a polygenic disease, meaning that multiple genetic factors likely contribute to its development. PsA is characterized by chronic inflammation of the joints and entheses (the sites where tendons and ligaments attach to bone). It is believed that the immune system becomes dysregulated in individuals with PsA. Dysregulation is believed to be triggered by environmental factors in genetically predisposed individuals. Specifically, there is an abnormal immune response that leads to the production of inflammatory cytokines, such as tumor necrosis factor-alpha (TNF-alpha), interleukin-17 (IL-17), and interleukin-23 (IL-23). These cytokines play a central role in the inflammatory process in PsA (Lindberg et al., 2020).

In PsA, synovitis occurs, leading to swelling, pain, and damage to the synovial tissue. The synovial inflammation is driven by the release of pro-inflammatory cytokines and immune cell infiltration into the synovium. Enthesitis is inflammation at the sites where tendons, ligaments, and joint capsules attach to bone. Enthesitis is a hallmark feature of PsA and can lead to pain and stiffness in affected areas. The exact mechanisms driving enthesitis are not fully understood but are thought to involve

immune cell activation. Dactylitis is the swelling of an entire finger or toe, giving it a "sausage-like" appearance. It is a common manifestation of PsA and is believed to result from a combination of tenosynovitis (inflammation of the tendon sheath) and synovitis in the affected digits (Loo et al., 2023)

PsA is associated with several comorbidities, including metabolic syndrome, and uveitis (eye inflammation). The exact mechanisms linking these comorbidities to PsA are still under investigation, but are likely related to systemic inflammation. There are also several triggers that are majorly environment-based, such as infections, trauma, and stress, which can trigger the onset or exacerbation of PsA in genetically susceptible individuals. These triggers may set off the immune system's abnormal response, leading to the development of PsA (Ogdie & Weiss, 2015).

Psoriatic arthritis is a complex disease with a multifactorial pathophysiology involving genetic predisposition, dysregulated immune responses, inflammation of the joints, entheses, and tendons, as well as the potential for joint and bone damage. Understanding these mechanisms is critical for the development of targeted treatments and improved management of PsA. Current treatment approaches often focus on suppressing the abnormal immune response and reducing inflammation to alleviate symptoms and prevent joint damage (Walsh et al., 2023).

The pathophysiology of PsA and psoriasis is interlinked through a chronic immune-mediated inflammatory response involving the IL-23/IL-17 axis, which drives uncontrolled inflammation, activating T-cells and cytokines like TNF-alpha leading to skin proliferation in psoriasis and joint/tendon destruction in PsA.

2.2 The Prevalence of Psoriatic Arthritis and Subtypes

The prevalence of psoriatic arthritis (PsA) and its subtypes can vary depending on the population studied, geographic location, and diagnostic criteria used. Psoriatic arthritis is estimated to affect approximately 10% to 30% of individuals with psoriasis. This means that among people diagnosed with psoriasis, a significant proportion may develop PsA at some point in their lives. A single-centred, cross-sectional study in Malaysia investigating the burden of psoriatic arthritis revealed that the prevalence of

PsA was 29.7%. Psoriasis preceded arthritis in 81.3% of cases, averaging 10.5 years. Polyarthropathy occurred in 46.8% of patients, followed by oligoarthropathy (22.4%), axial joint disease (5.6%), major distal interphalangeal joint disease (2.8%), and mixed subtype (22.4%). In arthritic patients, 12.1% had enthesitis, 20.6% had dactylitis, and 37.4% had deformity (Loo et al., 2023).

A cross-sectional study conducted in a tertiary hospital in Turkey investigating the prevalence of psoriatic arthritis revealed that the prevalence of PsA was 25.4% (Çinar et al., 2015). Similar findings were obtained from a study in the United States, which revealed that the prevalence of PsA was 29.8% (Truong et al., 2015). A prevalence rate of nearly 30% for PsA in the United States is substantially higher than some previously reported estimates. It underscores the significance of PsA as a common comorbidity among individuals with psoriasis. The high prevalence highlights the importance of early detection and diagnosis of PsA in individuals with psoriasis. Healthcare providers should therefore be vigilant in recognizing the signs and symptoms of PsA, and psoriasis patients should be aware of the potential risk and seek medical attention if they experience joint-related issues.

A large cross-sectional observational study in China investigating the burden of PsA found that the prevalence of PsA was 5.8% of which 92% of them were newly diagnosed (Yang et al., 2011). A prevalence rate of 5.8% for PsA in China indicates that a substantial proportion of individuals with psoriasis in the study population also had arthritis. This highlights the need for increased awareness, early detection, and appropriate management of PsA in people with psoriasis. The finding that 92% of the PsA cases were newly diagnosed suggests that PsA may often go undetected or undiagnosed in clinical practice. This could be due to various factors, including limited awareness of PsA among healthcare providers, atypical or mild symptoms that may not prompt evaluation, or lack of routine screening for joint involvement in psoriasis patients (Yang et al., 2011). This was however a population based study and is likely to not compare fully with our study.

A prospective study in Canada investigating the burden of PsA revealed that the prevalence of PsA was 11%. The annual incidence rate was 2.7 (95% confidence

interval (CI) 2.1, 3.6) PsA cases per 100 psoriasis patients (Eder et al., 2016). The prevalence rate of 11% in Canada is notably lower than the previously mentioned rates of 29.8% in the United States and 5.8% in China. This variation in prevalence rates highlights that PsA can exhibit regional differences, possibly influenced by genetic, environmental, and healthcare factors.

A multi-centre non-interventional study in Japan investigating PsA revealed that there were 431 patients out of 3021 who were diagnosed with psoriasis who were found to have PsA, with a mean prevalence of 14.3% (range, 8.8-20.4%). There were no significant discrepancies found between these findings and earlier reports from Western countries in terms of the distribution of arthritis, the categories of skin diseases, or the treatment choices that were made (Ohara et al., 2015).

Psoriatic arthritis is infrequently reported in sub-Saharan Africa. Population based studies are not available. A prevalence of 0.05 to 0.9% in West Africa and 2.8 to 3.5% in South Africa is reported in hospital based studies done in Dermatology departments (Ouédraogo & Meyer, 2012)

2.3 Characteristics of PsA Patients at Diagnosis

Patients with psoriatic arthritis (PsA) exhibit a range of characteristics and clinical features that can help healthcare providers identify and classify the disease. These characteristics may vary among individuals. The findings from a study in Canada revealed that the average age at the time of diagnosis was 49.9 years, with a standard deviation of 12.8. At the time of diagnosis, the majority of patients who had peripheral involvement had oligo arthritic type, which is defined as four or fewer joints that are actively inflamed. Imaging (radiographs or MRI) revealed that 41.4% of the patients showed symptoms that were consistent with sacroiliitis or spondylitis. 25 percent of patients were found to have radiographic sacroiliitis, which can be classified as either bilateral grade 2 or unilateral grade 3 sacroiliitis. On the other hand, the diagnosis was confirmed by magnetic resonance imaging (MRI) of the spine in four of the nine patients who presented with inflammatory back pain without peripheral arthritis. This was a non-radiographic axial Spine case. In total, 39 patients had radiographs taken of their hands and feet. It was discovered that 23 percent of these individuals had at least

one periarticular joint degradation, and 10 percent of them had periarticular new bone development present (Eder et al., 2016).

An observational cross-sectional study in China revealed that among patients with PsA, the most common pattern of manifestation was oligoarthritis (48 percent), spondylitis (27 percent and polyarthritis (20 percent) (Yang et al., 2011).

Another study investigating characteristics of PsA patients revealed that more than half of the patients reported experiencing joint pain (55.2% of them) or joint stiffness (57%) in their bodies. Within this group of patients, the hands were the most frequently affected by joint pain (89 percent), followed by the spine, shoulders, and knees (85 percent for each of the last three). Joint pain had been present for an average of 7.7 years among patients who had been diagnosed with PsA. When it comes to people who have been diagnosed with PsA, the majority of them (91.1%) were diagnosed during the initial consultation with rheumatology, while 18.3% were diagnosed solely based on their medical history, without any physical symptoms being present (Truong et al., 2015).

The findings from a cross-sectional study investigating PsA in Turkey revealed that arthritis started before psoriatic lesions in three (9.4%) of 32 patients, simultaneously with psoriasis in one patient (3.1%), and after psoriatic skin lesions in 28 patients (87.5%). The most common types were the asymmetrical oligoarticular type (53.1%) and spondylitis type (43.8%). In the group that had PsA, the duration of Pso was actually substantially longer. The asymmetrical oligoarticular variety was the most prevalent, accounting for 53.1% of all cases. Our research found that the rate of isolated spondyloarthropathy was significantly higher than that of prior studies, coming in at 21.9%. The group that had PsA had significantly greater levels of nail involvement, the Psoriasis Area and Severity Index score, the mean erythrocyte sedimentation rate, and C-reactive protein readings (Çinar et al., 2015).

2.4 Clinical Factors Associated with Psoriatic Arthritis

A cross-sectional study in Malaysia revealed that psoriatic arthritis was significantly associated with being an ever-smoker, genital psoriasis, and increased erythrocyte

sedimentation rate (ESR) and C-reactive protein. In the context of PsA, this suggests that there was a significant association between a history of smoking and the development or severity of PsA (Loo et al., 2023). Smoking has been identified as a potential risk factor for PsA and can contribute to the overall burden of the disease. The association between genital psoriasis and PsA suggests that individuals with psoriasis affecting their genital area may have a higher likelihood of developing PsA. Psoriatic skin involvement, including genital lesions, is one of the risk factors associated with the development of PsA.

A retrospective study in Germany investigating factors associated with PsA found that the mean amount of time it took to diagnose psoriasis was 1.5 years, and the cumulative percentage of patients who already had psoriasis and developed concomitant psoriatic arthritis over a period of four years was 3.44 percent. Patients with psoriasis who were diagnosed with acute rheumatism or pain in joints that were not specific also exhibited an increased risk for the development of psoriatic arthritis in the future. It is interesting to note that a rheumatologist was consulted by a smaller percentage of individuals who had both Pso and concurrent PsA (Rech et al., 2020).

A systematic review of literature and a meta-analysis investigating factors associated with psoriatic arthritis revealed that the severity of PsO and nail pitting were the best predictors of the development of PsA among the skin and nail phenotypes found. In addition, patients with PsO who also had arthralgia and/or imaging-MSK inflammation were at a significant risk of developing PsA. There were also other factors, such as having a family history of PsA and having a higher BMI category (Zabotti et al., 2021).

A population-based cohort study done in Sweden investigating the incidence of psoriatic arthritis showed that time to diagnosis was evaluated with the help of cumulative incidence and Cox proportional hazards models in order to determine the elements that contributed to the risk. 1.69 per 100 patient-years was the overall incidence of psoriatic arthritis in patients with psoriasis, with a 95% confidence interval ranging from 1.65 to 1.72. The incidence of psoriatic arthritis was 1.48 per 100 patient-years, 3.00 per 100 patient-years, and 5.49 per 100 patient-years in patients

with mild, moderate, and severe psoriasis, respectively. It was found that people with severe psoriasis had a 3.2 times increased risk of developing psoriatic arthritis compared to patients with mild illness (Lindberg et al., 2020). The detection of psoriatic arthritis could be improved by dermatologists conducting regular risk factor assessments in clinical practice.

A prospective cohort study in Canada established that factors associated with PsA included severe psoriasis, low level of education (college/university vs. high school incomplete, high school education vs. high school incomplete), use of retinoid medications; time-dependent variables included psoriatic nail pitting and uveitis (Eder et al., 2016).

Another case-control study in the United Kingdom revealed that in individuals who had psoriasis, the following were the exposures that showed a positive correlation before the beginning of inflammatory arthritic syndrome: immunization against rubella, injuries that were severe enough to demand a medical consultation, recurring mouth ulcers, and moving residence. Additionally, there was a higher probability that the cases had undergone a bone fracture that required hospitals to admit them (Pattison et al., 2008).

2.5 Prevalence of Nail Changes among Psoriasis Patients on Follow-Up

It is estimated that fifty percent of people who have psoriasis also have nail psoriasis, and when joint involvement is present, the percentage can approach eighty percent. Not only are the nails believed to be a modified specialization of the epidermis, but they are also regularly affected by the disease, which can manifest itself in as many as 80 percent of patients. The clinical manifestations of nail involvement in psoriasis are heterogeneous and are connected to the effects of the inflammatory disease process in the nail bed, the nail matrix, or the periungual tissue, which leads to unique injury patterns. When it comes to psoriasis, nail involvement is associated with significant psychological stress, pain, and a reduction in functionality. In addition to being a potential indicator of joint inflammation, it may be indicative of more severe types of cutaneous psoriasis (Schons et al., 2015). A cross-sectional study conducted in Brazil investigating the prevalence and clinical features established that the prevalence of nail

psoriasis (NP) was 46.1 percent 1. A median NAPSI of 1 (0-15) was found among these patients, which falls within the interquartile range (IQR). Out of the total number of patients, 63.3% claimed that their nails caused them to experience either aesthetic pain or functional impairment. 80% of patients had onycholysis as their most common symptom. When compared with patients who did not have nail involvement, patients who had NP had a lower mean age at the onset of psoriasis; a longer duration of disease; a higher PASI, a higher frequency of psoriatic arthritis, and a more frequently reported family history of psoriasis (50% versus 7.4%) (Schons et al., 2015).

A prospective study of three groups of nail psoriasis patients being treated with only topical medication, methotrexate, or biologics in Thailand, investigating the prevalence of onychomycosis in nail psoriasis, it was found that the prevalence was 35.3 percent. Between the treatment groups, the methotrexate group had a significantly greater prevalence of onychomycosis than the topical therapy and biologic treatment groups. This was the case when comparing the three treatment groups. The most common organism responsible for the infection was Candida species, followed by Trichophyton rubrum. In the majority of cases, the thumb was affected (59.3%). By far the most common abnormality of the nail matrix and the nail bed was pitted nail, which accounted for 71.3% of cases, and onycholysis, which accounted for 91.3% of cases. Through the use of multivariate analysis, it was discovered that diabetes, exposure to moist work, and treatment with methotrexate are all predictors of onychomycosis (Chularojanamontri et al., 2021).

Similarly, the findings from another study in Pakistan investigating nail changes in psoriatic patients, it was found that seventy-one percent of the patients also had alterations in their nails. Among the one hundred patients suffering from psoriatic arthritis. Pitting was the most prevalent nail irregularity that was detected on both fingernails and toenails, followed by onycholysis as the second most common aberration. Patients with psoriatic nail changes were substantially older than patients with psoriatic arthritis who did not have nail changes. In patients who had psoriatic nail alterations, the duration of psoriasis was substantially longer than in other patients. Nine percent of patients showing changes in their nails tested positive for fungal infection. The conclusion is that persons who suffer from psoriasis typically have

dystrophic nails. The frequency of nail involvement in this group of patients is likely somewhat comparable to that of their counterparts in Europe and the United States. Pitting and onycholysis are the most common findings among the many different types of nail alterations. Fungal colonization of psoriatic nails is a clinical condition that occurs rather frequently and should be taken into consideration by dermatologists who are consulting with patients who suffer from psoriatic arthritis (Alinaghi et al., 2019).

The findings from another prospective case-control study conducted in Spain investigating nail psoriasis in individuals with psoriasis vulgaris, the prevalence of nail psoriasis was estimated to be 7.4%, with men having a 13.5% higher incidence than women. The group of patients who had nail disease had a more severe form of psoriasis (12.82 versus 8.22 points on the psoriasis area and severity index) and a longer duration of disease (20.30 versus 13.94 years). Additionally, this group included a greater proportion of patients who had psoriatic arthritis (29.7% versus 11.5%), a positive family history of the disease (53.7% versus 42.8%), and a body mass index that was greater than 30 (31.6% versus 23.9%). The percentage of patients with nail disease who had early-onset psoriatic arthritis was higher (74.1% compared to 65.5%), while a smaller number of patients were carriers of the human lymphocyte antigen Cw*0602 allele (33% compared to 50.3% overall) (Armesto et al., 2011).

A cross-sectional study in Iran evaluating the nail involvement in patients with psoriatic arthritis in Northern Iran established that patients with psoriatic arthritis exhibited nail involvement in 69.5% of cases (137 out of 197). In terms of nail abnormalities, onycholysis was the most common, followed by pitting and oil droplet alterations. Patients who were diagnosed with psoriatic arthritis had a significantly higher incidence of nail involvement (82.1% versus 57.8%) (Zargari et al., 2018). Psoriatic arthritis is frequently linked with nail involvement. Patients who had only cutaneous abnormalities were considerably less likely to get onycholysis, splinter haemorrhage, and oil drop than those who were in the PsA group. Psoriatic individuals who also suffered from arthritis typically had a more severe form of the condition.

A cross-sectional study in India established that out of the 38 patients with nail psoriasis, 9 had concomitant psoriatic arthritis. The average psoriasis area severity

index was 14.4 with a standard deviation of 9.6 (with a range of 0.4 to 34). Pitting (97.4%), onycholysis (94.7%), and subungual hyperkeratosis (89.5%) were the psoriatic nail alterations that were recorded the most frequently. The mean score for the nail psoriasis severity index was 83.2 ± 40.1, with a range of 5 to 156. Additionally, the mean score for the nail psoriasis quality of life 10 was 1.1 ± 0.4. Rheumatoid factor was positive in 5 out of 38 patients (13.2% of the total), and anti-cyclic citrullinated peptide antibody was elevated in 4 out of 38 patients (10.5% of the total). Erythrocyte sedimentation rate was elevated in 22 out of 38 patients (57.9%), and C-reactive protein was elevated in 15 out of 38 patients (39.5% of the total) (Daulatabad et al., 2017).

2.6 Conceptual Framework

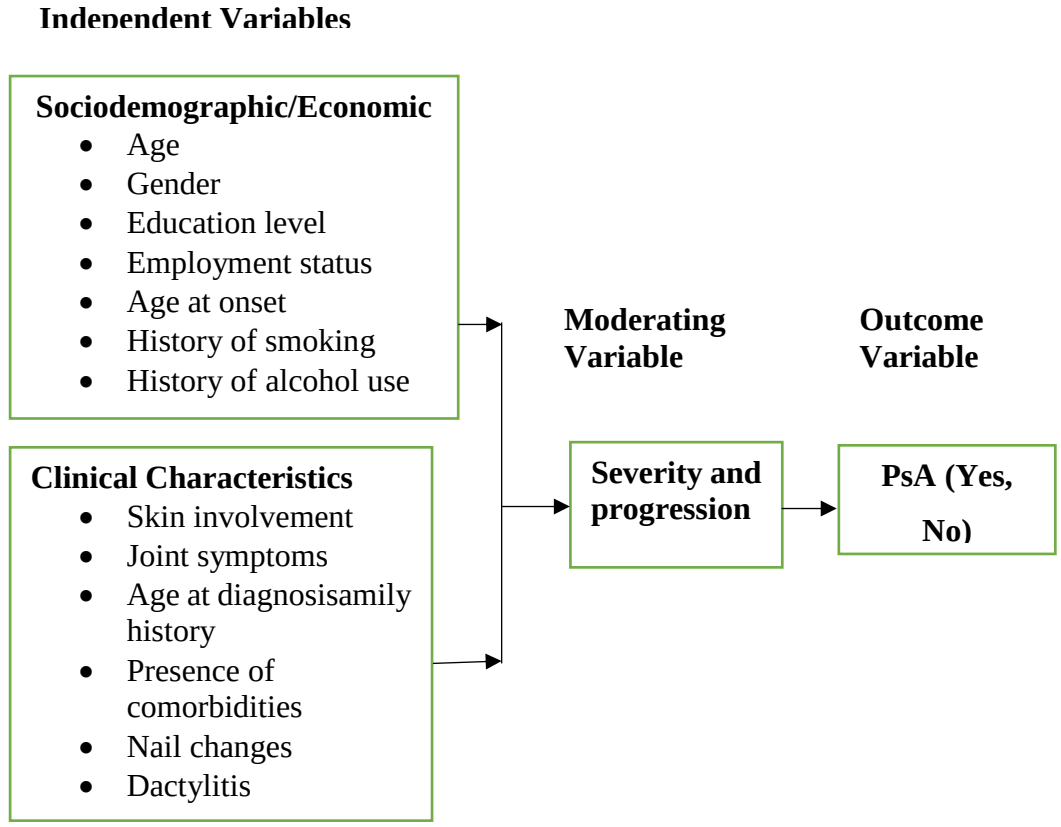

Figure 2.1: Conceptual Framework

CHAPTER THREE

MATERIALS AND METHODS

This chapter provided an explanation of the procedures that were utilized in order to carry out this study. This chapter provided a description of the study's population and setting, as well as the study's design, participants, and eligibility requirements, as well as the ethical review, strategies for data collection, and methods for data analysis that were utilized for the research.

3.1 Study Design

This was a cross-sectional study.

3.2 Study Site

Kenyatta National Hospital in Nairobi, Kenya. Participants will be recruited from the Dermatology and Rheumatology outpatient clinics and inpatient wards. With a capacity of 2,400 beds and over 6,000 staff members, Kenyatta National Hospital is the largest referral hospital in the country of Kenya. Nairobi County, located in the upper hill region of Kenya. KNH is a national referral institution that accepts patients who have complex medical conditions and require specialist treatments. It is common practice for patients to be referred to KNH from other healthcare institutions located throughout the country. In addition to providing a wide variety of medical services, Kenyatta National Hospital is a comprehensive medical facility that offers specialized care in a variety of departments, including but not limited to Surgery, Internal Medicine, Pediatrics, Obstetrics and Gynecology, Orthopedics, and Dermatology, amongst others. There are approximately three patients with Psoriasis who attend the adult dermatology clinic at KNH during each session. The clinic is runs on Fridays from 8:00 am to 2:00 pm. The pediatric clinic runs on Wednesdays at the same time with an approximate two patients with psoriasis per visit. The numbers are according to data from the KNH hospital information management system.

The Rheumatology joint clinic runs on Thursdays from 2 PM to 4 PM.

3.3 Study Population

The study population included both pediatric and adult patients diagnosed with psoriasis in the Dermatology and Rheumatology wards and clinics at Kenyatta National Hospital.

3.3.1 Inclusion Criteria

i. Adults and pediatric patients attending the Dermatology and Rheumatology outpatient clinic at Kenyatta National Hospital or admitted in the Dermatology and Rheumatology wards and diagnosed to have psoriasis by a KNH consultant and confirmed through histology of a skin biopsy.

3.3.2 Exclusion Criteria

i. Patients without a confirmatory skin biopsy
ii. Patients with cognitive dysfunction since they might struggle to understand the study process making informed consent challenging

3.4 Sample Size Determination

The sample size was determined using Fischer's formula.

This was based on a previous study conducted in Malaysia by Loo et al., which established that the prevalence of PsA was 29.7% (Loo et al., 2023).

Therefore;

$$n = \frac{Z^2 P\,(1-P)}{e^2}$$

n= minimum sample size required for the study
z= 1.96 (normal deviate for 95% confidence interval)
e= 10% (Margin of error)
P= 29.7 prevalence of psoriatic arthritis from a previous hospital based study

$$n = \frac{1.96^2 * 0.297\ (1-0.297)}{0.1*0.1} = 80$$

Thus, the sample size was 80 patients with a psoriasis diagnosis at Kenyatta National Hospital.

3.5 Sampling Procedure

A consecutive sampling method was used to recruit participants between January 2025- May 2025

The researcher, with the help of two research assistants, approached patients who met the inclusion criteria and recruited them into the study. Recruitment was done consecutively until the sample size was attained. The consecutive sampling technique provided an equal opportunity for all individuals who met the inclusion criteria to be recruited within the study duration period.

3.6 Data Collection Procedure

Recruitment of the study participants was done by the principal investigator with the help of research assistants. The research assistants were trained beforehand on filling out the data collection tool and obtaining informed consent. The researcher approached patients at each respective study area, explained the purpose of the study, and administered consent. Those who met the inclusion criteria were recruited into the study. Recruitment took place as patients waited in line before seeing a doctor, both in the clinic and in the wards. A structured questionnaire was administered, and the questionnaire was interviewer-administered to ensure that patients effectively understood the components included in the questionnaire.

3.6.1 Caspar Screening Tool

The CASPAR (Classification Criteria for Psoriatic Arthritis) screening tool is a widely used set of criteria for the classification of psoriatic arthritis (PsA) in clinical and research settings. It was developed to help identify individuals who may have PsA based on a standardized set of features. CASPAR criteria are often used for the

classification of PsA in research studies and clinical trials to ensure that the study participants have PsA.

The CASPAR criteria include five key features, and individuals with established inflammatory articular disease are classified as having PsA with at least 3 points from the following features:

i. **Evidence of Current Psoriasis, a Personal History of Psoriasis, or a Family History of Psoriasis**: This criterion can be met if the individual has current psoriasis (skin or scalp involvement (assigned a score of 2). A history of psoriasis (even if it is not active at the time of assessment) (in the absence of current psoriasis; assigned a score of 1). A family history of psoriasis in a first-degree relative (score of 1)

ii. **Presence of Psoriatic Nail Dystrophy**: Psoriatic nail dystrophy includes nail pitting, onycholysis (nail detachment from the nail bed), or a nail that is completely destroyed due to psoriasis (assigned a score of 1).

iii. **Negative Test Results for Rheumatoid Factor (RF) and/or Anti-Cyclic Citrullinated Peptide (anti-CCP) Antibodies**: This criterion is met if tests for RF and anti-CCP antibodies are negative. These tests are typically used to distinguish PsA from rheumatoid arthritis (assigned a score of 1).

iv. **Dactylitis**: Dactylitis refers to swelling of an entire finger or toe, giving it a "sausage-like" appearance. The presence of dactylitis is considered a positive criterion and is assigned a score of 1.

v. **Radiographic Evidence of Juxta-Articular New Bone Formation**: Radiographic imaging may reveal characteristic findings such as new bone formation near joints (periarticular bone), which is associated with PsA (assigned a score of 1)

Meeting a score of three or more of these criteria is considered sufficient for the classification of PsA, helping to distinguish it from other forms of arthritis. The CASPAR criteria aim to provide a standardized and consistent method for identifying PsA patients in research and clinical settings, which is important for ensuring that studies and clinical trials are conducted with a well-defined patient population.

The tool was used in the study to diagnosed psoriatic arhthritis. The study funded the laboratory tests and radiographs and the participants did not pay for any tests.

3.7 Validity and Reliability

A pre-test was conducted at the Kenyatta National Hospital Dermatology and Rheumatology clinics. The pre-test emphasized ensuring that the selected research instrument contained all the necessary questions to help attain better outcomes and improve research validity. To enhance reliability, an expert dermatologist reviewed the study data collection instrument in relation to the study objectives. Additionally, an expert statistician was contacted to review the data collection tool.

3.8 Quality Assurance

Pretesting of the data collection tool was done by scrutinizing 5% of the desired sample size. This helped estimate the total time it would take to complete one form and assess the efficacy of the tool in capturing adequate data. All required data was filled in the form during the pretest. Research assistants were trained for one day by the principal investigator (PI) on the study method and what was required of them. They were trained on how to fill out the data collection form in a standardized and uniform manner.

3.9 Data Management and Analysis

3.9.1 Data Cleaning, Entry and Storage

Data was collected using a structured questionnaire and stored in a lockable drawer accessible to the researcher. Data entry was done daily using Epi-data version 3.1 to ensure a high level of completeness and to exclude any questionnaires with incomplete information. The database was then uploaded to Google Drive to prevent any unintentional data loss. This database was updated as data entry was completed throughout the data collection process. The hard copy questionnaires were stored for a period of five years, after which they were discarded.

3.9.2 Data Analysis

Data was analyzed using both descriptive and inferential analysis. Categorical data were grouped and analyzed in terms of frequencies and percentages, while continuous variables were assessed using mean and standard deviation. The prevalence of PsA was obtained as a proportion of patients with PsA over the total sample size and expressed as a percentage. Bivariate and multivariable analyses were done to investigate factors associated with PsA using binary logistic regression. Significant findings from the bivariate analysis were subjected to multivariable analysis. A STATA version 16 was used to analyze the data.

3.10 Ethical Consideration

The study sought approval from the KNH-UoN Ethics Committee, which reviewed the ethical aspects of the study and approved under (**KNH-ERC/A/368).** Permission was also obtained from the KNH administration to access patient health information in the files.

The Kenya National Commision for Science Technology and Innovation (NACOSTI) also approved the study

In addition, only those who agreed to consent to the study were recruited. The consent obtained also allowed access to patient medical files and registers, ensuring that only the health information of those who provided consent was accessed.

Confidentiality, anonymity, and privacy were fully guaranteed throughout the study. The data obtained was used solely for the purpose of the research and was not shared with any other platform. Strict confidentiality and anonymity were observed during the collection, storage, processing of data, and handling of results.

Given the nature of the study, participants were likely to experience psychological distress. Thus, these patients were identified and offered access to counseling services during or after their involvement in the study. Participating in the study helped participants reflect on their condition and share their level of knowledge and quality of life, which is fundamental to their overall well-being.

No costs were incurred by any participant in this study.

This study was fully voluntary, and participants were free to withdraw at any time without facing any penalty.

CHAPTER FOUR

RESULTS

The study sought to determine the prevalence and factors associated with psoriatic arthritis among psoriasis patients on follow-up at the Dermatology and Rheumatology units of Kenyatta National Hospital, Kenya. A total of 80 psoriasis patients were included in the study.

4.1 Characteristics of Psoriasis Patients on Follow-Up at the Dermatology and Rheumatology Units, Kenyatta National Hospital, Kenya

The findings showed that 38(47.5%) were aged between 31 and 49 years, 52(65%) of the patients were male. In terms of education level, 26(32.5%) had tertiary level education while 25(31.3%) had primary level of education. More than half of the patients, 42(52.5%) had the psoriasis disease for more than 48 months. The average PASI score was 11.5±8.9 as shown in Table 4.1.

Table 4.1: Characteristics of Psoriasis Patients on Follow-Up at the Dermatology and Rheumatology Units, Kenyatta National Hospital, Kenya

	Frequency	Percent
Age		
Less than 30 years	15	18.8
31 - 49 years	38	47.5
50 years and above	27	33.8
Gender		
Male	52	65.0
Female	28	35.0
Highest level of education		
No formal education	7	8.8
Primary level education	25	31.3
Secondary	22	27.5
Tertiary	26	32.5
Marital status		
Single	27	33.8
Divorced/Separated	15	18.8
Married	38	47.5
Religion		
Christian	69	86.3
Muslim	11	13.8
Duration of psoriasis		
≤24 months	21	26.3
25 - 48 months	17	21.3
>48 months	42	52.5
History of psoriasis in the family		
No	53	66.3
Yes	27	33.8
History of smoking		
No	61	76.3
Yes	19	23.8
History of alcohol use		
No	39	48.8
Yes	41	51.3
Presence of pre-existing condition		
No	39	48.8
Yes	41	51.3
PASI score (Mean, SD)	11.5±8.9	

4.1.1 Types of Psoriasis

Plaque psoriasis is the most common type, affecting 56 patients (70.0%), followed by inverse, present in 16 patients (20%). Pustular psoriasis occurs in 5 patients (6%),

while guttate psoriasis is the least common, seen in 3 patients (4%), as shown in Figure 4.1.

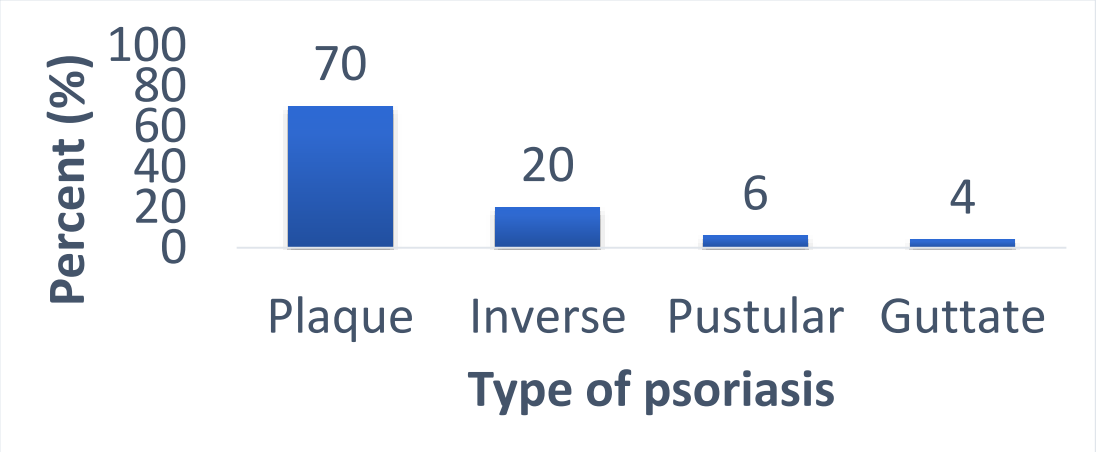

Figure 4.1: Types of Psoriasis

4.1.2 Site of Psoriasis

The most common sites of psoriasis in the study were the extremities, which were affected in 63 patients (78.8%), followed by the trunk in 60 patients (75.0%) and the scalp in 51 patients (63.8%). Nail involvement was present in 48 patients (60.0%), while palms and/or soles were affected in 37 patients (46.3%). Intergluteal/perianal regions were involved in 26 patients (32.5%), and axilla/groin areas in 22 patients (27.5%). Facial involvement occurred in 21 patients (26.3%), with a subset showing face involvement specifically in 13 patients (16.3%), as shown in Table 4.2.

Table 4.2: Site of Psoriasis

	Frequency	Percent
Site of psoriasis		
Extremities	63	78.8
Trunk	60	75.0
Scalp	51	63.8
Nail involvement	48	60.0
Palms and/or soles	37	46.3
Intergluteal/perianal	26	32.5
Axilla/groin	22	27.5
Face	21	26.3
Genital involvement	7	8.8

4.1.3 Morphology of Nail Patterns

Pitting was the most frequently observed nail morphology, present in 37 patients (46.3%). Onycholysis affected 26 patients (32.5%), while hemorrhages and leukonychia were seen in 25 patients (31.3%). Subungual hyperkeratosis was observed in 17 patients (21.3%), and oil drops in 13 patients (16.3%). Splinter hemorrhages occurred in 10 patients (12.5%), with ridging nails being the least common morphology, seen in 7 patients (8.8%) (Figure 4.2).

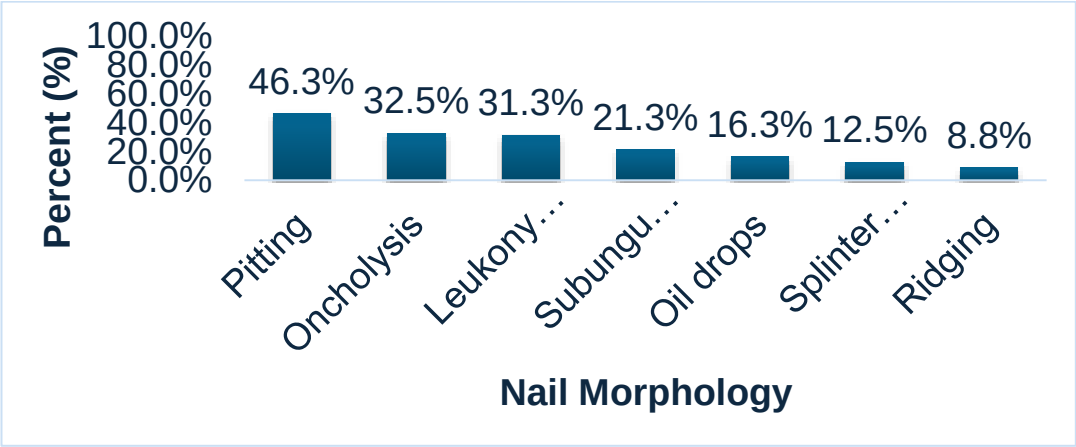

Figure 4.2: Morphology of Nail patterns

4.2 The Prevalence of Psoriatic Arthritis among Psoriasis Patients on Follow-Up at the Dermatology and Rheumatology Units, Kenyatta National Hospital, Kenya

The prevalence of psoriasis arthritis was 23(28.8%) with a 95%CI: 19.4% to 40.2% as shown in Figure 4.3.

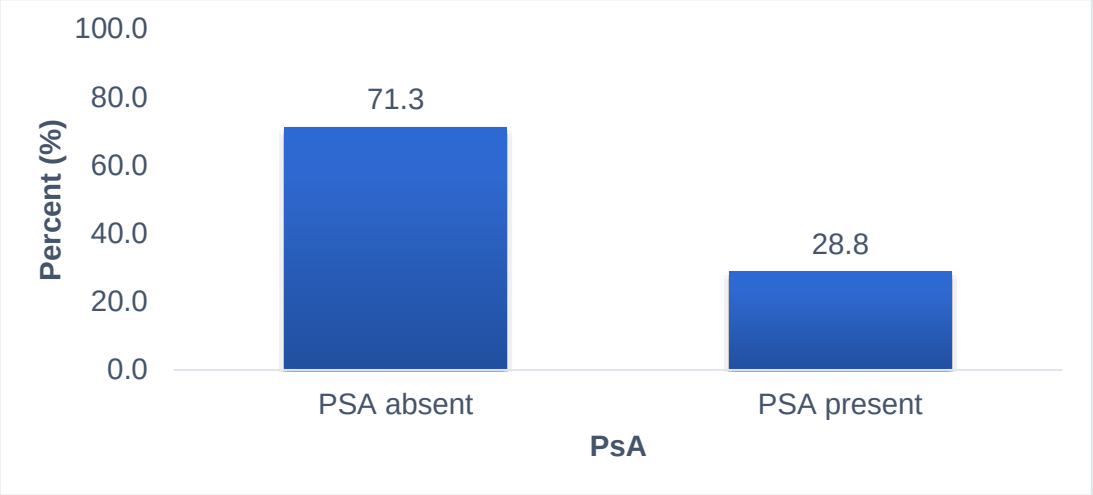

Figure 4.3: The Prevalence of Psoriasis Arthritis

4.2.1 The Psoriatic Arthritis Subtypes among Psoriasis Patients on Follow-Up at the Dermatology and Rheumatology units, Kenyatta National Hospital, Kenya

Among the PSA cases, polyarticular arthritis was the most common subtype, affecting 9 patients (39.1%). Spondyloarthritis was present in 6 patients (26.1%), followed by oligoarticular arthritis in 5 patients (21.7%). Asymmetric oligoarticular arthritis was seen in 2 patients (8.7%), while oligoarthritic arthritis was the least common subtype, affecting 1 patient (4.3%).

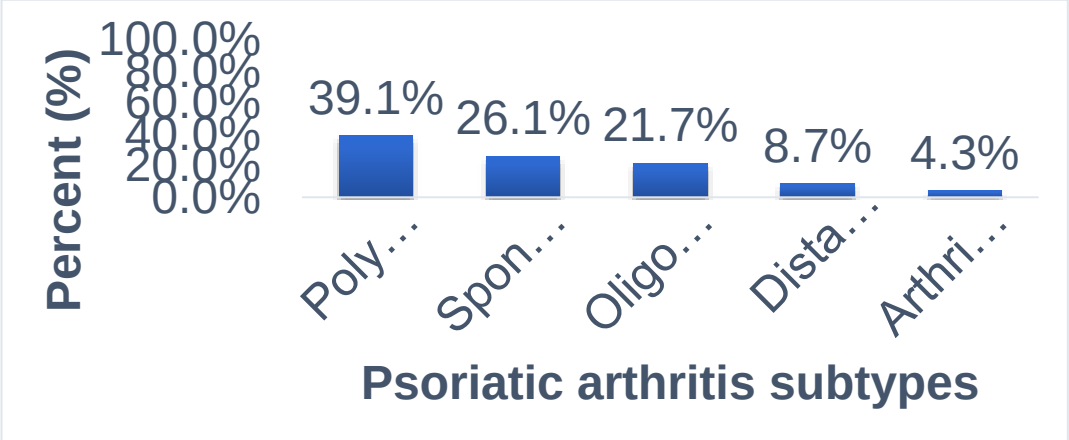

Figure 4.4: The Psoriatic Arthritis Subtypes

4.3 Factors Associated With Psoriatic Arthritis among Psoriasis Patients on Follow-Up at the Dermatology and Rheumatology Units, Kenyatta National Hospital, Kenya

4.3.1 Demographic and Clinical Characteristics of Psoriatic Arthritis among Psoriasis Patients on Follow-Up at the Dermatology and Rheumatology Units

Females have an OR of 2.80 (95% CI: 1.03 to 7.61) and a p-value of 0.038, meaning females are about 2.8 times more likely than males to have PSA, and this association is statistically significant. Similarly, a positive family history of psoriasis increases the odds of PSA nearly fourfold (OR = 3.99, 95% CI: 1.4 to 11.09, p = 0.009). History of smoking also significantly raises the odds of PSA by more than five times (OR = 5.62, 95% CI: 1.85 to 17.01, p = 0.003). Conversely, the presence of pustular psoriasis is associated with significantly reduced odds of PSA (OR = 0.13, 95% CI: 0.02 to 1.03, p = 0.031), suggesting it might be protective or less commonly associated with PSA, as shown in Table 4.3.

Table 4.3: Demographic and Clinical Characteristics of Psoriatic Arthritis among Psoriasis Patients on Follow-Up at the Dermatology and Rheumatology Units

	Total	PSA		OR (95%CI)	p value
		PSA absent n (%)	PSA present n (%)		
Age					
Less than 30 years	15	12(80.0)	3(20.0)	Ref	
31 - 49 years	38	26(68.4)	12(31.6)	1.85(0.44, 7.78)	0.403
50 years and above	27	19(70.4)	8(29.6)	1.68(0.37, 7.63)	0.499
Gender					
Male	52	41(78.8)	11(21.2)	Ref	
Female	28	16(57.1)	12(42.9)	2.80(1.03 7.61)	0.038
Highest level of education					
No formal education	7	5(71.4)	2(28.6)	Ref	
Primary level education	25	16(64.0)	9(36.0)	1.41(0.23, 8.78)	0.715
Secondary	22	17(77.3)	5(22.7)	0.74(0.11, 5.01)	0.754
Tertiary	26	19(73.1)	7(26.9)	0.92(0.14, 5.89)	0.931
Marital status					
Single	27	20(74.1)	7(25.9)	Ref	
Divorced/Separated	15	9(60.0)	6(40.0)	1.90(0.50, 7.31)	0.348
Married	38	28(73.7)	10(26.3)	1.02(0.33, 3.14)	0.972
Religion					
Christian	69	46(66.7)	23(33.3)		
Muslim	11	11(100)	0		
Duration of disease					
≤24 months	21	14(66.7)	7(33.3)		
25 - 48 months	17	17(100)	0		
>48 months	42	26(61.9)	16(38.1)		
History of psoriasis in the family					
No	53	43(81.1)	10(18.9)	Ref	
Yes	27	14(51.9)	13(48.1)	3.99(1.4, 11.09)	0.009
History of smoking					
No	61	49(80.3)	12(19.7)	Ref	
Yes	19	8(42.1)	11(57.9)	5.62(1.85, 17.01)	0.003
History of alcohol use					
No	39	27(69.2)	12(30.8)	Ref	
Yes	41	30(73.2)	11(26.8)	0.83(0.31, 2.18)	0.806
Pre-existing medical condition					
No	39	28(71.8)	11(28.2)	Ref	
Yes	41	29(70.7)	12(29.3)	1.05(0.40, 2.78)	0.557
Plaque					
No	24	15(62.5)	9(37.5)	Ref	
Yes	56	42(75.0)	14(25.0)	0.56(0.20, 1.55)	0.289
Guttate					
No	76	53(69.7)	23(30.3)		
Yes	4	4(100)	0		
Seborrheic psoriasis					
No	38	26(68.4)	12(31.6)	Ref	
Yes	42	31(73.8)	11(26.2)	0.77(0.29, 2.03)	0.629
Pustular					
No	64	42(65.6)	22(34.4)	Ref	
Yes	16	15(93.8)	1(6.3)	0.13(0.02, 1.03)	0.031

4.3.2 Association between Site of Psoriasis and Psoriatic Arthritis among Psoriasis Patients on Follow-Up at the Dermatology and Rheumatology Units

The findings revealed that extremities involvement is associated with significantly reduced odds of PSA (OR = 0.25, 95% CI: 0.08–0.78, p = 0.031). Patients with psoriasis on the extremities are 75% less likely to have PSA compared to those without extremity involvement. Face involvement showed a significant protective association against PSA (OR = 0.19, 95% CI: 0.04–0.90, p = 0.024), indicating a much lower likelihood of PSA in patients with facial psoriasis. Nail involvement has a strong positive association with PSA (OR = 6.91, 95% CI: 1.85–25.85, p = 0.002), meaning patients with nail psoriasis are almost seven times more likely to have psoriatic arthritis compared to those without nail involvement.

Table 4.4: Association between Site of Psoriasis and Psoriatic Arthritis among Psoriasis Patients on Follow-Up at the Dermatology and Rheumatology Units

	Total	PSA		OR (95%CI)	p value
		PSA absent n (%)	PSA present n (%)		
Site of psoriasis					
Scalp					
No	29	20(69.0)	9(31.0)	Ref	
Yes	51	37(72.5)	14(27.5)	0.84(0.31, 2.28)	0.8
Extremities					
No	17	8(47.1)	9(52.9)	Ref	
Yes	63	49(77.8)	14(22.2)	0.25(0.08, 0.78)	0.031
Trunk					
No	20	11(55.0)	9(45.0)	Ref	
Yes	60	46(76.7)	14(23.3)	0.37(0.13, 1.08)	0.087
Intergluteal/perianal					
No	54	35(64.8)	19(35.2)	Ref	
Yes	26	22(84.6)	4(15.4)	0.34(0.10, 1.12)	0.112
Face					
No	59	38(64.4)	21(35.6)	Ref	
Yes	21	19(90.5)	2(9.5)	0.19(0.04, 0.90)	0.024
Palms and/or soles					
No	43	30(69.8)	13(30.2)	Ref	
Yes	37	27(73.0)	10(27.0)	0.86(0.32, 2.27)	0.808
Axilla/groin					
No	58	40(69.0)	18(31.0)	Ref	
Yes	22	17(77.3)	5(22.7)	0.65(0.21, 2.05)	0.585
Nail involvement					
No	32	29(90.6)	3(9.4)	Ref	
Yes	48	28(58.3)	20(41.7)	6.91(1.85, 25.85)	0.002
Genital involvement					
No	73	50(68.5)	23(31.5)		
Yes	7	7(100)	0		

4.3.3 Association between Nail Morphology and Psoriatic Arthritis among Psoriasis Patients on Follow-Up at the Dermatology and Rheumatology Units

The findings showed that onycholysis (separation of the nail from the nail bed) showed a strong association with PSA. Patients with onycholysis have 4.4 times higher odds of having PSA compared to those without (OR = 4.40, 95% CI: 1.57–12.33, p = 0.007), indicating a statistically significant relationship. Further, hyperkeratosis Oil drops (yellowish spots under the nails) were the strongest predictor among the nail morphologies studied. Its presence increases the odds of PSA nearly 14-fold (OR = 13.85, 95% CI: 3.33–57.58, p < 0.001), which is highly statistically significant and highlights its importance as a clinical marker for PSA (Table 4.5).

Table 4.5: Association between Nail Morphology and Psoriatic Arthritis among Psoriasis Patients on Follow-Up at the Dermatology and Rheumatology Units

	Total	PSA		OR (95%CI)	p value
		PSA absent n (%)	PSA present n (%)		
Morphology					
Onycholysis					
No	54	44(81.5)	10(18.5)	Ref	
Yes	26	13(50.0)	13(50.0)	.40(1.57, 12.33)	0.007
Subungual hyperkeratosis					
No	63	48(76.2)	15(23.8)	Ref	
Yes	17	9(52.9)	8(47.1)	2.84(0.93, 8.67)	0.075
Oil drops					
No	67	54(80.6)	13(19.4)	Ref	
Yes	13	3(23.1)	10(76.9)	.85(3.33, 57.58)	<0.001
Pitting					
No	43	31(72.1)	12(27.9)	Ref	
Yes	37	26(70.3)	11(29.7)	1.09(0.41, 2.88)	0.526
Splinter hemorrhages					
No	70	51(72.9)	19(27.1)	Ref	
Yes	10	6(60.0)	4(40.0)	1.79(0.46, 7.05)	0.462
Leukonychia					
No	55	40(72.7)	15(27.3)	Ref	
Yes	25	17(68.0)	8(32.0)	1.26(0.45, 3.51)	0.791
Ridging					
No	73	52(71.2)	21(28.8)	Ref	
Yes	7	5(71.4)	2(28.6)	0.99(0.18, 5.51)	0.679

4.4 Multivariable Analysis of Factors Associated with Psoriatic Arthritis

The multivariable analysis of factors associated with Psoriatic Arthritis revealed that gender was a significant factor, with females having an odds ratio (aOR) of 10.11 (95% CI: 1.12, 91.61, p = 0.040), indicating a higher likelihood of Psoriatic Arthritis compared to males. The history of smoking was strongly associated with Psoriatic Arthritis, with an aOR of 21.37 (95% CI: 2.45, 186.71, p = 0.006). Nail involvement was another significant predictor, with an aOR of 5.44 (95% CI: 2.69, 42.1, p = 0.006), showing a higher risk of Psoriatic Arthritis in individuals with nail involvement. Onycholysis morphology was also significant, with an aOR of 11.39 (95% CI: 1.42, 91.50, p = 0.022), indicating a strong association with the condition.Oil drops nail morphology were found to be significant with an aOR of 12.11 (95% CI: 1.44, 34.12, p = 0.034), suggesting an increased risk. Finally, the PASI score was highly significant, with an aOR of 2.11 (95% CI: 1.34, 6.11, p < 0.001), indicating that higher PASI scores are strongly associated with Psoriatic Arthritis.

Table 4.6: Multivariable Analysis of Factors Associated with Psoriatic Arthritis

	aOR(95%CI)	**P value**
Gender		
Male		
Female	10.11(1.12, 91.61)	0.04
Family history of psoriasis	1.66(0.16, 16.76)	0.669
History of smoking	21.37(2.45, 186.71)	0.006
Pustar psoriasis	0.10(0.01, 10.10)	0.333
Trunk psoriasis	1.17(0.10, 13.03)	0.899
Face	0.32(0.11, 0.89)	0.031
Nail involvement	5.44(2.69, 42.1)	0.006
Onycholysis morphology	11.39(1.42, 91.50)	0.022
Oil drops	12.11(1.44, 34.12)	0.034
PASI score	2.11(1.34, 6.11)	<0.001

CHAPTER FIVE

DISCUSSION

5.1 The Prevalence of Psoriatic Arthritis among Psoriasis Patients on Follow-Up at the Dermatology and Rheumatology Units, Kenyatta National Hospital, Kenya

The prevalence of psoriatic arthritis (PsA) in this study was 28.8% (95% CI: 19.4% to 40.2%), which is comparable to findings from other studies. This finding is comparable to a cross-sectional study conducted in a tertiary hospital in Turkey, where the prevalence of PsA was found to be 25.4% (Çınar, 2015). The similarity between our findings and the Turkish study's prevalence rate supports the notion that PsA is prevalent in diverse populations, with comparable rates observed in different geographic regions. The slight difference in the prevalence rates could be attributed to variations in the patient population, such as differences in ethnicity, lifestyle, or healthcare access, which may influence the prevalence of PsA. However, the similarity suggests that PsA could be a common condition in various settings, particularly among patients with psoriasis, as both studies focused on populations with this condition.

In addition, our results are also similar to those of a study in the United States, which reported a prevalence of 29.8% for PsA (Truong et al., 2015). This finding further reinforces the comparability of PsA prevalence rates across different countries, despite potential cultural, environmental, and healthcare system differences. The United States study, like ours, investigated the relationship between psoriasis and PsA in a cohort of patients, and the findings corroborate the international relevance of our results. The slight difference in prevalence between our study (28.8%) and the U.S. study (29.8%) could reflect variations in the specific cohort of patients, the methods of diagnosis, or even temporal factors related to healthcare changes or awareness. Both of these studies utilized a cross-sectional design, similar to our own, which involved assessing the prevalence of PsA in a defined patient population at a single point in time. The diagnostic criteria and patient recruitment strategies employed in these studies were also comparable to those used in our research.

5.2 The Psoriatic Arthritis Subtypes among Psoriasis Patients on Follow-Up at the Dermatology and Rheumatology Units, Kenyatta National Hospital, Kenya

In our study, polyarticular arthritis was found to be the most common subtype of psoriatic arthritis (PsA), affecting 39.1% of patients. This was followed by spondyloarthritis at 26.1%, and oligoarticular arthritis at 21.7%. Other subtypes included distal interphalangeal predominant arthritis at 8.7%, and arthritis mutilans at 4.3%. These findings reflect a distribution of PsA subtypes in our study population, with polyarticular arthritis being the most prevalent form, which is consistent with the general understanding that PsA can be heterogenous affecting different joints and areas of the body.

In contrast, a cross-sectional study conducted in Turkey investigating PsA revealed that the most common types were asymmetrical oligoarticular arthritis (53.1%) and spondyloarthritis (43.8%) (Çınar, 2015). Similarly, an observational cross-sectional study in China found that among patients with PsA, the most common manifestations were oligoarthritis (48%), followed by spondyloarthritis (27%) and polyarthritis (20%) (Yang et al., 2011). These findings suggest a notable difference in the distribution of PsA subtypes compared to our study, with oligoarticular arthritis being more prevalent in the Turkish and Chinese populations, while polyarticular arthritis was the most common in our study.

The difference in findings could be attributed to genetic and ethnic variations across populations, which may influence the clinical expression of PsA, leading to differences in the predominant arthritis patterns. Genetic factors have been shown to affect disease susceptibility and the type of arthritis that manifests in PsA patients, which may explain why oligoarticular arthritis is more common in some populations, while polyarticular arthritis is more prevalent in others. Additionally, environmental factors such as climate, lifestyle, and access to healthcare might also contribute to variations in disease manifestation and diagnosis. For instance, differences in physical activity, diet, and healthcare resources across regions may influence how PsA presents clinically and how it is diagnosed and treated. Thus, while our study shows a higher prevalence of polyarticular arthritis, the variations observed in the international studies

suggest that both genetic and environmental factors play a significant role in shaping the clinical features of PsA across different populations.

5.3 Factors Associated with Psoriatic Arthritis among Psoriasis Patients on Follow-Up at the Dermatology and Rheumatology Units, Kenyatta National Hospital, Kenya

In our study, we found several key factors that significantly influenced the likelihood of developing psoriatic arthritis (PsA). Female gender and a history of smoking were both associated with an increased risk of PsA, supporting the well-documented influence of gender and lifestyle factors in the disease's development. Additionally, we found that nail changes, which are common in PsA patients, were strongly associated with the disease, suggesting that dermatological manifestations such as nail involvement might be early indicators of PsA. On the other hand, facial psoriasis was found to be associated with a reduced risk of PsA, highlighting potential differences in the clinical manifestations of psoriasis that could influence the likelihood of developing PsA. Furthermore, higher psoriasis severity (as measured by the PASI score) correlated with an increased likelihood of PsA. This supports the understanding that more severe forms of psoriasis might predispose patients to PsA, given the higher systemic inflammation seen in these cases.

These findings align with those from a study in Malaysia which reported that psoriatic arthritis was significantly associated with being an ever-smoker and having nail involvement. Smoking is known to exacerbate various inflammatory conditions, and its association with PsA has been noted in other studies as well. Similarly, nail involvement is often a hallmark feature of PsA and is strongly correlated with the development of the disease, as seen in our study (Loo et al., 2023b). This study used an observational design, similar to ours, which focused on clinical factors, and therefore, these findings support the notion that smoking and nail changes are significant risk factors for PsA.

Further, a study in Sweden found that individuals with severe psoriasis had a 3.2 times higher risk of developing psoriatic arthritis compared to those with mild psoriasis. This finding aligns with our observation that higher psoriasis severity (as indicated by the

PASI score) was associated with a greater likelihood of developing PsA. The 3.2-fold increased risk emphasizes the strong connection between the severity of psoriasis and the development of PsA, likely due to the increased systemic inflammation and immune dysregulation seen in patients with more severe disease. (Lindberg et al., 2020). This study's findings further validate our results and underline the importance of assessing psoriasis severity when considering the risk of developing PsA.

The study in Italy highlighted that females have a higher burden of disease when it comes to PsA. This is consistent with our finding that female gender is a significant risk factor for PsA. Gender differences in PsA prevalence and severity are well-established, with some studies showing that women tend to have a more severe form of the disease, potentially due to hormonal or genetic factors (Lubrano et al., 2023). The Italian study's focus on the burden of disease among females provides further support for our observation that female gender is a significant risk factor for PsA. All these studies employed observational designs focusing on clinical risk factors, similar to the design of our study. These shared methodologies allow for valid comparisons of the findings across different populations and geographical locations.

5.4 Study Strengths and Weaknesses

The study employed CASPAR criteria, ensuring a standardized and consistent identification of PsA cases, enhancing the reliability and comparability of the findings with other studies globally. A major limitation of this study was that there was a likelihood that we may have missed early or atypical cases of psoriatic arthritis that do not yet meet the full classification thresholds.

The small study sample size may also have limited conclusive clinical significance witnessed by very wide confidence intervals in some of the findings.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

- The present study established that psoriatic arthritis affected nearly one-third (28.8%) of psoriasis patients, with polyarticular arthritis as the predominant subtype.
- Female gender, smoking history, and nail changes were significant risk factors, while facial psoriasis was linked to a lower PsA risk.
- Greater psoriasis severity, measured by PASI score, was strongly associated with increased likelihood of developing PsA.
- Nail psoriasis is a significant indicator of an increased risk of psoriatic arthritis with pitting being the most common nail morphology.

6.2 Recommendations

- Psoriatic arthritis has a significant prevalence within our local context, therefore routine screening protocols for PsA among psoriasis patients, focusing on those with identified associated factors such as female gender and nail involvement is highly recommended.
- Integrate smoking cessation support into Dermatological and Rheumatologically care to reduce PsA risk and improve overall patient outcomes.
- Enhance training for healthcare providers on recognizing clinical signs of PsA, including nail changes and disease severity indicators, to enable early diagnosis and timely treatment.
- Future research can assess treatment and DAPSA score to assess psoriatic disease activity and severity and response to different modes of treatment.

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APPENDICES

Appendix I: Informed Consent

Title of the study: **PREVALENCE AND FACTORS ASSOCIATED WITH PSORIATIC ARTHRITIS AMONG PSORIASIS PATIENTS ON FOLLOWUP AT THE DERMATOLOGY AND RHEUMATOLOGY UNITS KENYATTA NATIONAL HOSPITAL KENYA**

Principal Researcher: Dr Jane Achungo

Introduction:

Purpose of the Study

To determine the prevalence and factors associated with psoriatic arthritis among psoriasis patients on follow-up at the Dermatology and Rheumatology units Kenyatta National Hospital Kenya

Introduction

I Dr. Jane Achungo, I am currently pursuing my Masters in Medicine at the Jomo Kenyatta University of Agriculture and Technology. As per the degree requirement, I have to undertake the research as part of my studies. The purpose of this consent form is to provide you with adequate information to help you make decision for voluntary participation in the study. You are free to ask about the research, its purpose, your implication in the study, risks and benefits, volunteers rights, and any others information not included in this form that needs clarification. After your questions are answered, you can decide whether to take part in the study or not. If you agree, I will be request you to sign on the form.

Study procedure

If you choose to participate in the study, you will be required to read and sign the informed consent and respond to the questionnaire as presented by the principal investigator or my research assistant who I have fully trained. This should take not more than 10 minutes of your time.

Risks, stress and discomfort

There are no major risks, stress or discomfort of participating in the study apart from your time. This study is observational and will only seek to understand information relating to your medical condition.

Benefits of the study

The study will provide more insights in understanding Psoriatic Arthritis which will help inform policy and help streamline the quality of care.

Compensation

No financial benefits are associated with taking part in the study.

Confidentiality

Your information will be handled with utmost confidence. All details will be stored under lock and key only accessible to the principal investigator and research assistants for upto five years after which the data will be destroyed.

Right of Withdrawal

Kindly note that you have the right to withdraw from the study at whatever point; feel free to seek any clarifications from the principal investigator and make any inquiries from the KNH- UoN ERC at any time.

Whom to Contact

If you have any questions, you may ask them now or later, even after the study has started.

If you wish to ask questions later, you may contact the Principal investigator: Dr Achungo on +254 725 346896 or the chairperson of the KNH-UON ethics and research committee, Tel: (254-020) 2726300 Ext 44355, email: uonknh_erc@uonbi.ac.ke, website: www.erc.uonbi.ac.ke

Participants Consent

I confirm that the researcher has explained fully the nature of the study and the extent of activities which I will be asked to undertake. I confirm that I have had adequate opportunity to evaluate and ask questions about this study. I understand that my participation is voluntary and that I may withdraw at any time during the study, without having to give a reason. I, therefore, consent to participate in the study after reading and understanding the purpose of the study.

Sign ……. Date ……

Researcher's statement

I, the undersigned, have fully explained the relevant details of this research study to the participant named above and believe that the participant has understood and has willingly and freely given his/her consent.

Researcher 's Name: **Jane Achungo** Date: _____

Signature _____

Appendix II: Kuidhinishwa kwa Taarifa

Kichwa cha utafiti: KIWANGO NA SABABU ZINASOHUSIANA NA PSORIATIC ARTHRITIS MIONGONI MWA WAGONJWA WA PSORIASIS JUU YA UFUATILIAJI KATIKA KLINIKI YA NGOZI KATIKA HOSPITALI KUU YA KENYATTA

Mtafiti Mkuu: Dkt Jane Achungo

Utangulizi:

Madhumuni ya Utafiti

Kubaini maambukizi na sababu zinazohusiana na ugonjwa wa arthritis ya psoriatic kati ya wagonjwa wa psoriasis juu ya ufuatiliaji katika vitengo vya Damatologia katika Hospitali ya Taifa ya Kenyatta Kenya

Utangulizi

Mimi Dkt. Jane Achungo, kwa sasa ninafanya utafiti kama sehemu ninayotakiwa kumaliza ili kufaulu katika masomo yangu na kupewa shahada ya uzamifu katika Chuo Kikuu cha Kilimo na Teknolojia cha Jomo Kenyatta. Kulingana na mahitaji ya shahada, lazima nifanye utafiti kama sehemu ya masomo yangu. Madhumuni ya fomu hii ya idhini ni kukupa habari ya kutosha kukusaidia kufanya uamuzi wa ushiriki wa hiari katika utafiti. Wewe ni huru kuuliza kuhusu utafiti, madhumuni yake, maana yako katika utafiti, hatari na faida, haki za kujitolea, na habari nyingine yoyote ambayo haijajumuishwa katika fomu hii ambayo inahitaji ufafanuzi. Baada ya maswali yako kujibiwa, unaweza kuamua kama kushiriki katika utafiti au la. Ikiwa unakubali, nitakuomba usaini kwenye fomu.

Utaratibu

Ikiwa unachagua kushiriki katika utafiti, utahitajika kusaini idhini ya habari na kujibu dodoso kama ilivyowasilishwa na mchunguzi mkuu au msaidizi wangu wa utafiti

ambaye nimefundisha kikamilifu. Hii haipaswi kuchukua zaidi ya dakika 10 za wakati wako.

Hatari, mafadhaiko na usumbufu

Hakuna hatari kubwa, mafadhaiko au usumbufu wa kushiriki katika utafiti mbali na wakati wako. Utafiti huu ni msingi wa uchunguzi na utatafuta tu kuelewa habari zinazohusiana na hali yako ya matibabu.

Faida za utafiti

Utafiti huo utatoa ufahamu zaidi katika kuelewa Arthritis ya Psoriatic ambayo itasaidia kuwajulisha sera na kusaidia kuboresha ubora wa huduma.

Fidia

Hakuna faida za kifedha zinazohusishwa na kushiriki katika utafiti.

Usiri

Taarifa yako itashughulikiwa kwa kujiamini sana. Maelezo yote yatahifadhiwa chini ya kufuli na ufunguo tu kupatikana kwa mchunguzi mkuu na wasaidizi wa utafiti.

Haki ya Kuondolewa

Tafadhali kumbuka kuwa una haki ya kujiondoa kutoka kwa utafiti wakati wowote; jisikie huru kutafuta ufafanuzi wowote kutoka kwa mchunguzi mkuu na ufanye maswali yoyote kutoka kwa KNH- UoN ERC wakati wowote.

Nani wa kuwasiliana

Ikiwa una maswali yoyote, unaweza kuwauliza sasa au baadaye, hata baada ya utafiti kuanza. Ikiwa unataka kuuliza maswali baadaye, unaweza kuwasiliana na mchunguzi mkuu: Dr Achungo kwenye +254 725 346896 au KNH-UON kamati ya maadili na utafiti, Tel: (254-020) 2726300 Ext 44355, barua pepe: uonknh_erc@uonbi.ac.ke, tovuti: www.erc.uonbi.ac.ke

Washiriki

Ninathibitisha kuwa mtafiti amefafanua kikamilifu asili ya utafiti na kiwango cha shughuli ambazo nitaulizwa kufanya. Ninathibitisha kuwa nimepata fursa ya kutosha ya kutathmini na kuuliza maswali kuhusu utafiti huu. Ninaelewa kuwa ushiriki wangu ni wa hiari na kwamba ninaweza kujiondoa wakati wowote wakati wa utafiti, bila kutoa sababu. Kwa hiyo, ninakubali kushiriki katika utafiti baada ya kusoma na kuelewa madhumuni ya utafiti.

Ishara..... Tarehe.....

Kauli ya mtafiti

Mimi, aliyesainiwa, nimeelezea kikamilifu maelezo muhimu ya utafiti huu kwa mshiriki aliyetajwa hapo juu na kuamini kwamba mshiriki ameelewa na ametoa idhini yake kwa hiari na kwa uhuru.

Jina: **Jane Achungo** Tarehe: _____

Sahihi _____

Appendix III: Questionnaire

Section 1: Demographic Information

Participant ID: _____ (To be filled by the researcher)

1. What is your age?.....
2. What is your gender?

Male [ ]

Female [ ]

Other: _____

3. What is your ethnicity: _____
4. What is your highest level of education?

No formal education [ ]

Primary education [ ]

Secondary education [ ]

College graduate [ ]

Postgraduate [ ]

5. Where do you reside?.....
6. What is your marital status?

Single [ ]

Married [ ]

Separated/Divorced [ ]

7. What is your religion?

Christian [ ] Hindu ( )

Muslim [ ] Others---------

Section 2: Clinical characteristics

8. What is the duration since diagnosis? (in months) ……
9. History of psoriasis in the family?

   Yes [ ] No [ ]
10. History of smoking?

    Yes [ ] No [ ]
11. History of alcohol use?

    Yes [ ] No [ ]
12. Is there a pre-existing condition?

    Yes [ ] No [ ]
13. If yes, specify

    Diabetes Yes [ ] No [ ]

    Hypertension Yes [ ] No [ ]

    Others specify …….

14. Is the psoriasis present?

    Yes [ ] No [ ]

15. If yes, which type

    Plaque Yes [ ] No [ ]

    Guttate Yes [ ] No [ ]

    Sebopsoriasis Yes [ ] No [ ]

    Pustular Yes [ ] No [ ]

16. What is the site of psoriasis

    Scalp Yes [ ] No [ ]

    Extremities Yes [ ] No [ ]

    Trunk Yes [ ] No [ ]

    Intergluteal/perianal Yes [ ] No [ ]

    Face Yes [ ] No [ ]

Palms and/or soles Yes [ ] No [ ]

Axilla/groin Yes [ ] No [ ]

Nail involvement Yes [ ] No [ ]

Genital involvement Yes [ ] No [ ]

17. Morphology of nail patterns

Onycholysis Yes [ ] No [ ]

Subungual hyperkeratosis Yes [ ] No [ ]

Oil drops Yes [ ] No [ ]

Pitting Yes [ ] No [ ]

Splinter Haemorrhages Yes [ ] No [ ]

Leukonychia Yes [ ] No [ ]

Ridging Yes [ ] No [ ]

Red spots Yes [ ] No [ ]

Section 3: Psoriasis Area and Severity Index

PASI Scoring Sheet[3]

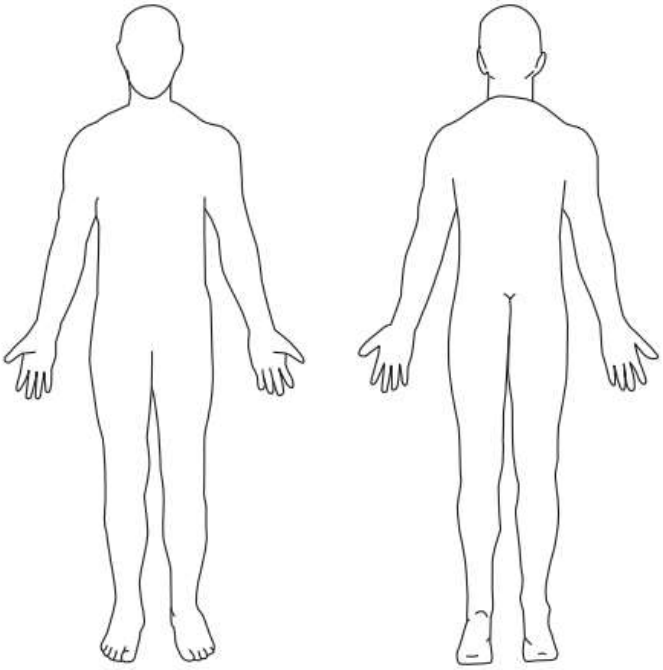
Patient Name and Surname: ..... Date: .....

Medical Aid: ..... Number: .....

A Psoriasis Area and Severity Index (PASI) is a quantitative rating scale for measuring the severity of psoriatic lesions based on area coverage and plaque appearance. Please complete **all** sections of the table and shade in the affected areas on the body diagrams below.

Plaque characteristic	Rating score	Body region (and weighting factor)			
		Head 10%	Upper Limbs 20%	Trunk 30%	Lower Limbs 40%
Erythema	0 = None 1 = Slight 2 = Moderate 3 = Severe 4 = Very severe				
Thickness					
Scaling					
Add together each of the 3 scores for each of the body regions to give 4 separate sub totals.					
Sub Totals		A1=	A2=	A3=	A4=
Multiply each sub total by amount of body surface area represented by that region i.e. A1 x 0.1 for head, A2 x 0.2 for upper limbs, A3 x 0.3 for trunk, A4 x 0.4 for lower limbs to give a value B1, B2, B3 and B4 for each body region respectively					
		A1 x 0.1 = B1	A2 x 0.2 = B2	A3 x 0.3 = B3	A4 x 0.4 = B4
		B1=	B2=	B3=	B4=
Degree of involvement as % for each body region affected (score each region with score between 0-6)	0 = None 1 = 1-9% 2 = 10-29% 3 = 30-49% 4 = 50-69% 5 = 70-89% 6 = 90-100%				
For each body region multiply sub total, B1, B2, B3 and B4 by the score (0-6) of the % of body region involved to give 4 subtotals C1, C2, C3 and C4					
		B1 x score = C1	B2 x score = C2	B3 x score = C3	B4 x score = C4
Sub Totals		C1=	C2=	C3=	C4=
The patient's PASI score is the sum of C1+C2+C3+C4				PASI Score =	

Adapted from ref 3: http://www.medicareaustralia.gov.au/provider/pbs/drugs1/files/ma_4178_PASI_calculation_and_whole_body_diagram.pdf



Please shade in the affected areas

Section 4: Caspar Criteria

1. **Inflammatory Articular Disease (Joint, Spine, or Entheseal)**

   This is a prerequisite for applying the CASPAR criteria. The patient must have current, past, or a history suggestive of inflammatory articular disease.

2. **Plus at least three points from the following features:**

   Skin Psoriasis (current: 2 points, history: 1 point, family history: 1 point)

   Current: Active psoriasis, diagnosed by a rheumatologist or dermatologist.
   History: Personal history of psoriasis, but not currently active.
   Family history: Psoriasis in a first or second-degree relative.

Psoriatic Nail Dystrophy (1 point)

Observed onycholysis, pitting, or hyperkeratosis of the nails.

A Negative Test for Rheumatoid Factor (1 point)

Demonstrates the absence of rheumatoid factor by any method except latex, which must be negative.

Dactylitis (1 point)

Current or a history of dactylitis, recorded by a rheumatologist.

Radiographic Evidence (1 point)

Juxta-articular new bone formation on plain radiographs of the hand or foot.

Appendix IV: Assent Form

Informed assent

Study Title: *Prevalence and Factors Associated with Psoriatic Arthritis among Psoriasis Patients on Follow-up at the Dermatology and Rheumatology Units, Kenyatta National Hospital, Kenya*

Investigator: Maureen Achungo**Institution:** JKUAT

Part I: Information Sheet

Introduction

We are doing a study to learn more about psoriasis and psoriatic arthritis. Psoriasis is a skin condition, and sometimes children and young people with psoriasis can also develop joint problems called psoriatic arthritis.

Your parents/guardians already know about this study. Now we are asking you if you also agree to join. You can say **yes** or **no**. Even if your parents say yes, you can still say no.

You can talk about this with your parents, friends, or anyone you trust before deciding.

Why are we doing this study?

We want to know how many children and young people with psoriasis also develop psoriatic arthritis, and what factors (like family history, lifestyle, or other health issues) may increase the risk. This information will help doctors improve care for children with psoriasis.

Why you?

We are asking children and adolescents with psoriasis who are being followed up at the Dermatology and Rheumatology Units. Your experience will help us learn more.

Do I have to join?

No. Joining is your choice. If you say no, nothing changes and you will still get the same care. If you say yes now, you can change your mind later.

What will happen if I join?

- We will ask you questions about your health, family history, and lifestyle.
- We will look at your medical file to understand your psoriasis treatment and follow-up.
- We may do a physical examination to check your joints and skin.
- Sometimes, blood tests or imaging (like X-rays) may be used to help understand your condition.

Will it hurt?

Most of the study involves questions and examinations that do not hurt. If blood tests or imaging are needed, they may cause mild discomfort, but no harmful procedures will be done.

Are there risks?

You may feel uncomfortable answering some personal questions. You don't have to answer anything you don't want to.

Are there benefits?

There is no direct benefit for you. But what we learn may help improve treatment for children with psoriasis in the future.

Do I get anything?

Your parents may be reimbursed for part of the transport costs for hospital visits.

Will people know I joined?

No. Your information will be kept private. We will use a number instead of your name. Only the research team will know.

Will you tell me the results?

Yes. At the end, we will share what we learned with you and your parents.

Can I change my mind?

Yes. You can say no at any time. Your care will not change.

Who can I ask questions?

You can ask the researcher or the Ethics Committee. You can also ask your doctor, parents, friends, or teachers.

Part II: Certificate of Assent

- I have read or someone has read this form to me.
- I understand what the study is about.
- I know I can ask questions now or later.
- I know I can say yes or no, and I can change my mind.

I agree to join the study.
OR
I do not want to join the study.
If child assents:

- Print name of child _____
- Signature of child _____
- Date: day/month/year

If illiterate:

A literate witness must sign (not a parent, not part of the research team). The child gives a thumb print.

- Print name of witness _____
- Thumb print of participant

- Signature of witness _____
- Date: day/month/year

Researcher's Confirmation

I have accurately read or witnessed the reading of the assent form. The child had the chance to ask questions. Assent was given freely.

- Print name of researcher _____
- Signature of researcher _____
- Date: day/month/year

Statement by Researcher

I confirm that:

- The child understood the study information.
- The child asked questions and got answers.
- The child was not forced to join.
- A copy of this form was given to the child.
- Print name of researcher _____
- Signature _____
- Date: day/month/year

Copy provided to participant _____ (initialed)
Parent/Guardian has signed informed consent: ___Yes ___No _____ (initialed)

Fomu ya Ridhaa

Kichwa cha Utafiti: *Ueneaji na Sababu Zinazohusiana na Ugonjwa wa Psoriatic Arthritis miongoni mwa Wagonjwa wa Psoriasis Wanaofuatiliwa katika Vitengo vya Dermatology na Rheumatology, Hospitali ya Kitaifa ya Kenyatta, Kenya*

Mtafiti: [Weka Jina la Mtafiti]
Taasis: Hospitali ya Kitaifa ya Kenyatta
Sehemu ya I: Karatasi ya Maelezo

Utangulizi

Tunafanya utafiti ili kujua zaidi kuhusu psoriasis na psoriatic arthritis. Psoriasis ni ugonjwa wa ngozi, na wakati mwingine watoto na vijana wenye psoriasis hupata matatizo ya viungo yanayoitwa psoriatic arthritis.

Wazazi/walezi wako tayari wanajua kuhusu utafiti huu. Sasa tunakuuliza wewe pia kama unakubali kushiriki. Unaweza kusema **ndiyo** au **hapana**. Hata kama wazazi wako wamesema ndiyo, bado unaweza kusema hapana.

Unaweza kuzungumza na wazazi, marafiki, au mtu yeyote unayemwamini kabla ya kuamua.

Kwa nini tunafanya huu utafiti?

Tunataka kujua ni watoto na vijana wangapi wenye psoriasis pia hupata psoriatic arthritis, na ni mambo gani (kama historia ya familia, mtindo wa maisha, au matatizo mengine ya kiafya) yanaongeza hatari. Taarifa hii itasaidia madaktari kuboresha huduma kwa watoto wenye psoriasis.

Kwa nini wewe?

Tunawauliza watoto na vijana wenye psoriasis wanaofuatiliwa katika vitengo vya Dermatology na Rheumatology. Uzoefu wako utatusaidia sana.

Lazima nishiriki?

Hapana. Kushiriki ni uamuzi wako. Ukisema hapana, hakuna kitakachobadilika—utapata matibabu sawa. Ukisema ndiyo sasa, unaweza kubadilisha mawazo yako baadaye.

Nini kitatokea nikishiriki?

- Tutakuuliza maswali kuhusu afya yako, historia ya familia, na mtindo wa maisha.
- Tutaangalia faili yako ya hospitali ili kuelewa matibabu yako ya psoriasis.

- Tunaweza kukufanyia uchunguzi wa mwili ili kuangalia ngozi na viungo.
- Wakati mwingine vipimo vya damu au picha (mfano X-ray) vinaweza kufanywa ili kuelewa hali yako.

Je, itauma?

Maswali na uchunguzi havitauma. Vipimo vya damu au picha vinaweza kukuletea usumbufu mdogo, lakini hakuna taratibu za hatari.

Kuna hatari yoyote?

Unaweza kuhisi aibu au kutotaka kujibu baadhi ya maswali. Huna haja ya kujibu maswali yoyote yanayokufanya usijisikie vizuri.

Kuna faida yoyote?

Hakuna faida ya moja kwa moja kwako. Lakini kile tutakachojifunza kinaweza kusaidia kuboresha matibabu ya watoto wengine wenye psoriasis baadaye.

Nitapata kitu chochote?

Wazazi wako wanaweza kulipwa sehemu ya gharama za usafiri kwa ziara zako hospitalini.

Watu wengine watajua nimeshiriki?

Hapana. Taarifa zako zitabaki siri. Tutatumia namba badala ya jina lako. Ni timu ya utafiti pekee itakayojua.

Mtaniambia matokeo?
Ndiyo. Mwisho wa utafiti, tutakueleza wewe na wazazi wako tulichojifunza.

Naweza kubadilisha mawazo?
Ndiyo. Unaweza kusema hapana wakati wowote. Huduma yako haitabadilika.
Naweza kuuliza nani maswali?

Unaweza kumuuliza mtafiti au Kamati ya Maadili. Pia unaweza kuuliza daktari wako, wazazi, marafiki, au walimu.

Sehemu ya II: Cheti cha Ridhaa

- Nimesoma au nimeelezewa fomu hii.
- Ninaelewa utafiti huu unahusu nini.
- Najua naweza kuuliza maswali sasa au baadaye.
- Najua naweza kusema ndiyo au hapana, na kubadilisha mawazo yangu.

Nakubali kushiriki katika utafiti.

AU

Sitaki kushiriki katika utafiti.

Ikiwa mtoto anakubali:

- Jina la mtoto _____
- Sahihi ya mtoto _____
- Tarehe: siku/mwezi/mwaka

Ikiwa mtoto hajui kusoma/kuandika:

Shahidi anayejua kusoma na kuandika lazima asaini (si mzazi, si mtu wa timu ya utafiti). Mtoto ataweka alama ya kidole gumba.

- Jina la shahidi _____
- Alama ya kidole gumba ya mtoto
- Sahihi ya shahidi _____
- Tarehe: siku/mwezi/mwaka

Uhakikisho wa Mtafiti

Nimesoma au nimeeleza fomu hii kwa mtoto. Mtoto alipata nafasi ya kuuliza maswali. Ridhaa imetolewa kwa hiari.

- Jina la mtafiti _____
- Sahihi ya mtafiti _____

- Tarehe: siku/mwezi/mwaka

Taarifa ya Mtafiti

Ninathibitisha kwamba:

- Mtoto amepewa maelezo na ameelewa.
- Mtoto aliuliza maswali na akapata majibu.
- Mtoto hakulazimishwa kushiriki.
- Nakala ya fomu hii imetolewa kwa mtoto.
- Jina la mtafiti _____
- Sahihi _____
- Tarehe: siku/mwezi/mwaka

Nakala imetolewa kwa mtoto_____ (imewekwa sahihi na mtafiti)

Mzazi/Mlezi amesaini ridhaa ya mzazi: ___Ndiyo ___Hapana _____ (imewekwa sahihi na mtafiti)