RESEARCH ARTICLE

Pattern and Occurrence of Palmoplantar Skin conditions and Their Impact on Quality of Life: A Descriptive Observational Study from a Tertiary Care Centre.

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Abstract: **Background**: Palmoplantar skin conditions are common, often persistent conditions that disproportionately affect hand and foot function, leading to substantial functional limitations and reduced quality of life. **Objective**: To evaluate the frequency, clinical features, non-invasive imaging findings, treatment patterns and quality-of-life impact of palmoplantar skin conditions in patients presenting to a tertiary skin medicine outpatient clinic. **Methods:** We performed a descriptive observational study including 260 consecutive patients seen between March 2024 and March 2025. Detailed clinical history and examination were recorded. Targeted investigations (KOH mount, Gram stain, Tzanck test where indicated), patch testing as indicated, and biopsy when required were performed. Skin surface microscopy (SSM) was performed on all patients for whom the technique was applicable. Skin medicine Life Quality Index (DLQI) was used to quantify impact on quality of life at presentation and to evaluate response in patients followed up after treatment. Data were analyzed using SPSS v26; categorical variables were reported as frequencies and percentages and continuous variables as mean ± SD. Statistical significance was considered at $p < 0.05$. **Results:** Patients were predominantly in the working age group (most frequently 25–44 years) with a male predominance and a majority from rural backgrounds engaged in manual labor. The most frequent diagnosis was palmoplantar psoriasis (22.3%, n = 58). Corns and callosities were the next common clinical presentation; a range of other entities (including verruca vulgaris, contact skin irritation, chronic eczematous conditions and fungal infections) were also seen. Approximately 85% of patients had not sought prior treatment before presentation. Conditions such as palmoplantar psoriasis, verruca vulgaris and contact skin irritation were associated with greater DLQI impairment at presentation and showed measurable improvement after institution of targeted therapy. Distinctive SSM patterns (background color/texture, scaling pattern, and vascular morphology) aided clinicopathologic differentiation of common diagnoses. **Conclusion:** Palmoplantar skin conditions impart substantial morbidity in working-age, predominantly rural manual-labor populations. Integration of SSM with targeted laboratory and histopathologic investigations improves diagnostic accuracy and facilitates tailored therapy that can significantly improve quality of life.

Keywords: Palmoplantar skin conditions, palmoplantar psoriasis, quality of life, skin surface microscopy, DLQI, epidemiology, occupational skin medicine, hyperkeratosis

INTRODUCTION

Palmo-plantar skin conditions comprise a heterogeneous group of cutaneous disorders that preferentially involve the palms and soles and are among the most frequently encountered problems in skin medicine practice. Because these surfaces play indispensable roles in manual tasks, grasping, weight-bearing and ambulation, even limited disease at these sites often produces disproportionate functional impairment, occupational disability and psychosocial distress. The clinical appearances are protean—ranging from focal hyperkeratosis and corns to diffuse scaling, papulovesicular eruptions and painful fissuring—and the unique anatomy of glabrous skin (thick stratum corneum, specialized eccrine apparatus, increased mechanical load) modifies classic morphologies seen elsewhere on the body. Repeated trauma, exposure to irritants or allergens, local moisture and footwear/occupational practices further alter presentation and complicate bedside diagnosis. Non-invasive skin imaging (hereafter SSM) together with targeted laboratory tests (KOH, Gram stain, Tzanck where indicated, patch testing and histopathology when required) can meaningfully increase diagnostic confidence and guide rational therapy. Understanding the local epidemiology, occupational determinants and quality-of-life consequences is therefore essential for prioritizing interventions, designing preventive measures and improving access to care.

1.1 Epidemiology and public-health importance

Palmoplantar disorders are commonly seen across outpatient skin medicine cohorts, and many published

series document a preponderance in working-age adults. The public-health importance of these conditions stems from their outsized effect on daily function: lesions on the palms interfere with fine motor tasks and handling of tools or produce social embarrassment, while plantar disease reduces mobility and work capacity. In communities where manual labor, barefoot ambulation or heavy physical work are common, the socioeconomic impact is further magnified through lost wages, increased health care visits and secondary complications such as fissure-associated infections. Patterns of prevalence and presentation are shaped by regional factors including climate, endemic fungal exposures, footwear practices and access to primary dermatologic care, which together determine both disease burden and health-seeking behaviour.

1.2 Clinical spectrum and diagnostic dilemmas

The clinical spectrum of palmoplantar skin conditions is broad: chronic localised hyperkeratosis (including callosities and corns), scaling and fissuring (as in psoriasis and chronic eczema), localized papillomatous lesions (e.g., verrucae), annular or patchy scaling of dermatophytosis, and less common inherited keratodermas or papulosquamous disorders. Many of these entities share overlapping surface features—thick scale, erythema that may be subtle under hyperkeratosis, and fissures—so that reliance on clinical inspection alone often yields diagnostic uncertainty. Furthermore, therapeutic response can be diagnostic (for example, rapid improvement with antifungals suggests dermatophytosis), but empirical treatment risks delay in definitive management and unnecessary exposure to potent topical agents. Hence, simple adjunctive investigations and structured diagnostic algorithms are valuable in resolving ambiguity and avoiding mismanagement.

1.3 Occupational and socioeconomic determinants

Occupation and socioeconomic context are strong determinants of both the incidence and the clinical course of palmoplantar disease. Manual labourers, agricultural workers, market vendors and those engaged in barefoot or minimally shod activities are exposed to recurrent friction, pressure, soil and detergents that predispose to mechanical hyperkeratosis, irritant contact reactions and secondary infection. Limited economic resources and geographic distance from specialist care commonly result in delayed presentation, self-medication with inappropriate topical preparations, and progression to more disabling disease. Appreciating these social determinants is crucial when designing both individual treatment plans and community-level prevention strategies such as protective footwear programmes, workplace modifications and targeted education.

1.4 Role of non-invasive imaging (SSM) and investigations

Skin surface microscopy (SSM) is a practical, non-invasive technique that enhances visualisation of surface scale, micro-architecture and superficial vascular patterns without the need for biopsy. Characteristic SSM features—such as regularly distributed dotted or glomerular vessels in psoriasis, thrombosed capillaries in verrucae, and the dense translucent keratin core of corns—can aid rapid bedside differentiation. When combined with low-cost laboratory tests (KOH for mycology, Gram stain for secondary infection, patch testing for suspected allergic contact skin irritation) and selective histopathology, SSM forms part of a pragmatic diagnostic toolkit that is particularly useful in resource-constrained settings where access to specialist histopathology may be limited.

1.5 Quality of life and patient-reported outcomes

Measures of health-related quality of life, notably the Skin medicine Life Quality Index (DLQI), capture the multidimensional burden of palmoplantar disease—physical pain, functional limitation, occupational disruption and psychosocial effects such as embarrassment or social withdrawal. Chronic hyperkeratotic and fissuring disorders often produce high DLQI scores because they directly interfere with work and daily self-care. Incorporating patient-reported outcomes into routine assessment allows clinicians to prioritise interventions that restore function and to quantify benefit from therapy beyond simple lesion clearance.

2. Literature review

A substantial body of work has examined palmoplantar skin conditions from clinical, epidemiologic and patient-centred perspectives. The cited series and reviews converge on several recurring themes: (1) a broad and overlapping clinical spectrum that makes diagnosis challenging at the bedside, (2) concentration of disease burden in working-age adults with occupational exposures, (3) consistently high quality-of-life impairment for certain diagnoses (notably hyperkeratotic disorders and palmoplantar psoriasis), and (4) an increasing recognition that combined clinical, microbiologic and imaging approaches improve diagnostic accuracy. Below we synthesise the key findings from the principal studies you listed and highlight remaining gaps that motivate the present work.

2.1 Epidemiology and demographic patterns

Several hospital-based series report a predominance of palmoplantar disease in young and middle-aged adults, with a male preponderance in many cohorts. Vasanthkumar et al. (2020) and Yashodha et al. (2020) both describe this demographic pattern and identify the 21–40 year age band as commonly affected, while Kumar et al. (2002) highlighted the frequency of psoriasis at palmar/plantar sites and the particular diagnostic and therapeutic challenges posed by site-

specific anatomy. Jha & Shrestha (2022) and Nair et al. (2017) add further hospital-series evidence from rural and mixed urban–rural populations, reinforcing the view that palmoplantar disease disproportionately affects working adults in occupations with repetitive mechanical or chemical exposures.

2.2 Clinical spectrum and diagnostic dilemmas

The literature consistently documents wide clinical overlap among conditions presenting on palms and soles. P VS et al. (2021) emphasised morphology-based classification approaches (hyperkeratotic, papulovesicular, fissuring, verrucous) as a pragmatic way to organise clinical reasoning. Nevertheless, multiple reports note that hyperkeratosis, scaling and fissuring are shared by psoriasis, chronic eczema/skin irritation, keratoderma and tinea, so that clinical inspection alone is frequently insufficient. Several authors therefore argue for low-threshold use of simple adjuncts (KOH, patch testing, biopsy) to avoid misdiagnosis and inappropriate empirical therapy.

2.3 Occupational and socioeconomic determinants

Workplace exposures and socioeconomic status recur as important determinants in nearly every series. Studies such as Nair et al. (2017) and Jha & Shrestha (2022) correlate manual labour, agricultural work and barefoot/poorly shod ambulation with higher rates of corns, callosities, secondary infections and irritant contact phenomena. Authors also note that socioeconomic deprivation often delays health-seeking, increases self-medication with inappropriate topical agents, and contributes to more advanced and functionally limiting presentations at the time of specialist consultation.

2.4 Quality of life and patient-reported outcomes

Quality-of-life impairment is a major and well-documented consequence of palmoplantar disease. Singhal et al. (2018) and Narayana (2018) used DLQI to quantify this burden, showing notably high scores in chronic hyperkeratotic disorders and keratodermas. More recent series (Raut et al., 2024; Khan et al., 2024) reaffirmed these findings, particularly for palmoplantar psoriasis and refractory hyperkeratotic disease. These studies emphasise that clinician-centred measures of lesion clearance do not capture the full patient experience and that DLQI or similar instruments should be part of routine assessment.

2.5 Role of microbiologic, histopathologic and imaging investigations

A recurrent message in the literature is that multimodal investigation improves diagnostic confidence. Classical microbiologic studies (Lotti et al., Hay et al.) document the varied fungal and bacterial pathogens that complicate plantar disease, arguing for routine KOH and microbial workup when infection is suspected. Several authors advocate selective histopathology for atypical or treatment-resistant cases. More recently,

non-invasive imaging—particularly skin surface microscopy (SSM) or videodermatoscopy—has been proposed as a rapid adjunct that reveals helpful micro-architectural and vascular patterns (e.g., dotted/glomerular vessels in psoriasis, thrombosed capillaries in verrucae). While many centers report positive diagnostic yield with SSM, published series vary in size and methodology, and systematic comparisons with gold-standard tests are limited.

2.6 Treatment patterns and outcome data

Published treatment approaches largely reflect diagnosis-directed algorithms: keratolytics and protective measures for callosities; topical corticosteroids, vitamin D analogues or systemic agents for psoriasis; destructive or topical keratolytic/antimitotic therapies for warts; and antifungals for dermatophytosis. Outcome reporting varies: some series document objective lesion improvement and reduced DLQI with treatment, while others report high rates of recurrence or treatment non-adherence—particularly where socioeconomic barriers limit sustained therapy. The variability in follow-up and outcome metrics across studies complicates pooled inference about best-practice management.

2.7 Gaps in the literature

Taken together, these studies provide a strong foundation but leave several gaps that the current study aims to address:

- **Integrated data:** Few studies concurrently report clinical patterning, SSM findings and validated patient-reported outcomes (DLQI) in a single, sizable cohort.
- **Occupational linkage:** While occupation is frequently noted, systematic analysis linking specific occupational exposures to diagnostic categories and QoL impact is limited.
- **Pragmatic diagnostic algorithms:** There is a need for pragmatic, resource-sensitive diagnostic pathways that combine SSM with low-cost laboratory tests to reduce unnecessary biopsies and empirical steroid use.
- **Local context:** Most published series are single-centre; regional differences in footwear/hygiene, climate and access to care limit direct extrapolation—local data remain essential to design appropriate prevention and outreach strategies.

2.8 How prior work informs the present study

The body of work summarized above supports the main premises of our study: (1) palmoplantar skin conditions are common and functionally important in working populations, (2) combined clinical, microbiologic and imaging approaches are likely to enhance diagnostic accuracy, and (3) DLQI is a sensitive tool for capturing patient-centred outcomes. By presenting an integrated clinical–SSM–DLQI profile in 260 consecutive patients from a tertiary outpatient setting, our study seeks to fill the identified gaps—providing comparative SSM

descriptions across common diagnostic groups, quantifying occupational associations and demonstrating the early QoL gains achievable with targeted management.

MATERIAL AND METHODS:

3.1 Study design and population

A descriptive, observational study was performed in the Skin medicine Outpatient Department of a tertiary care centre between March 2024 and March 2025. A total of 260 consecutive patients presenting with clinically visible lesions involving the palms and/or soles were enrolled after providing written informed consent. Eligible participants met the inclusion criterion of visible palmar and/or plantar skin involvement; exclusion criteria included receipt of topical or systemic therapies likely to alter lesion morphology within the four weeks preceding presentation (for example, potent topical corticosteroids, systemic immunosuppressants or systemic antifungals), exclusive periungual/nail disease without palmoplantar skin involvement, or refusal to provide consent.

Patients were recruited using a consecutive sampling approach to capture the real-world clinic case-mix over the study period. Demographic and baseline descriptors recorded at enrolment included age, sex, area of residence (rural/urban), education level and primary occupation (with standardized categories for manual labour, agricultural work, market/trading, clerical/service, unemployed/other). Symptom-related variables included duration of complaints, dominant symptom (pain, pruritus, fissuring), and prior health-seeking behaviour (no prior care, over-the-counter/self-medication, prior outpatient consultation). (Figure 1 shows the age distribution of the cohort.)
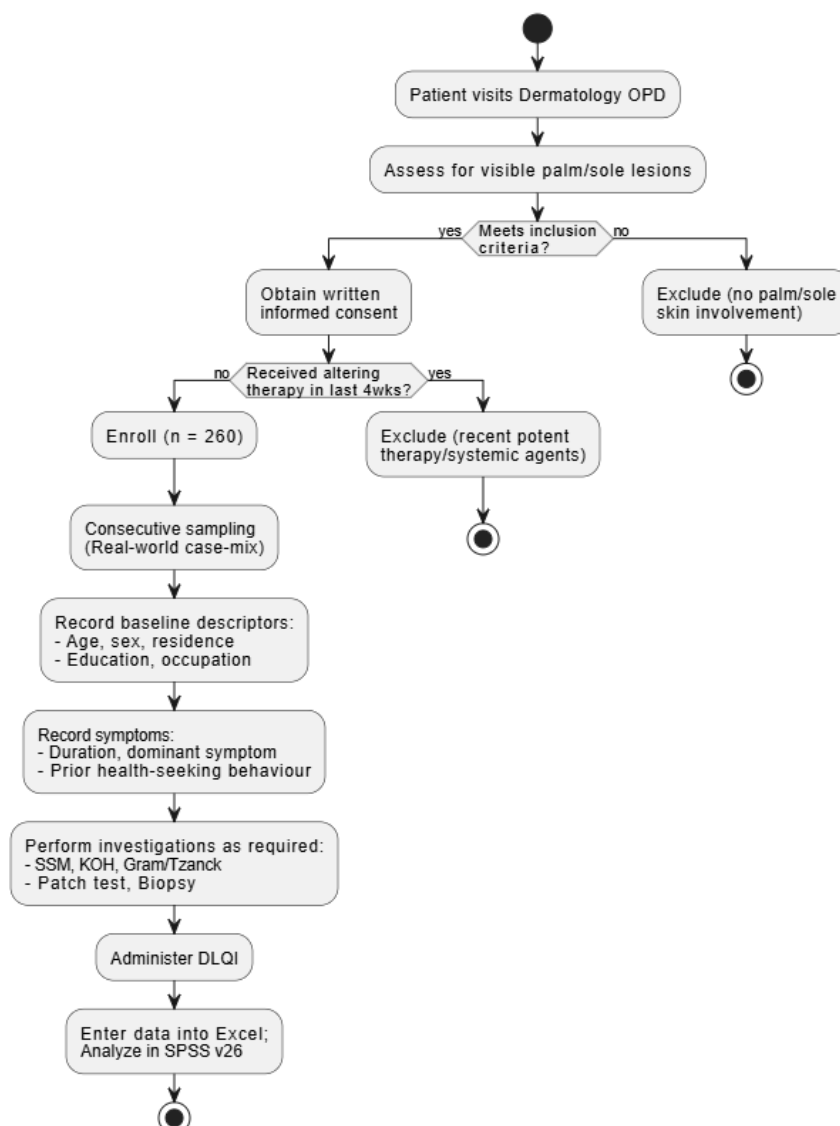

Figure 1: Compact linear flow

3.2 Clinical evaluation and investigations

All participants underwent a structured clinical evaluation performed by trained skin medicine clinicians and recorded on a standardized proforma. The history included onset and course of lesions, occupational exposures (repetitive friction, wet work, use of detergents/chemicals, barefoot/footwear practices), relevant personal and family history (psoriasis, atopy), comorbidities (e.g., diabetes, peripheral vascular disease) and prior treatments with details on agents used and duration.

Clinical examination documented exact site(s) involved (palmar versus plantar, focal versus diffuse), lesion morphology (hyperkeratotic, scaling, papulovesicular, verrucous, fissuring), extent (approximate percent surface involvement), presence of secondary infection, and associated features (nail changes, periungual involvement). Clinical photographs were taken with patient consent using standardized framing and lighting.

Skin surface microscopy (SSM) was performed on all clinically accessible lesions using a handheld videodermatoscope or equivalent skin surface microscopy (SSM) (standard magnification 10×–20×; polarized light when available). The SSM protocol recorded:

- background hue and texture (erythematous, yellowish, brownish, whitish, translucent),
- scale characteristics (diffuse thick scale, adherent lamellae, peripheral scale),
- vessel morphology and distribution (dotted, glomerular, linear; regular versus irregular),
- focal features (thrombosed capillaries/puncta, pits/craters, keratinous core), and
- presence of fissures, erosions or exudate.

SSM images were labelled with a unique study identifier and stored securely. Two skin doctors independently reviewed a subset of images to assess inter-observer agreement for key SSM descriptors; discrepancies were resolved by consensus during periodic review meetings.

Ancillary investigations were performed selectively based on clinical suspicion:

- **KOH mount** from skin scrapings for suspected dermatophytosis, processed with 10–20% KOH (and chlorazol black when available) and read by experienced laboratory personnel.
- **Gram stain and bacterial culture** where secondary bacterial infection was suspected (clinical purulence, marked erythema, systemic signs).
- **Tzanck smear** for vesiculobullous or herpetiform presentations.
- **Patch testing** using the Indian Standard Battery (with additional occupational/personal series where indicated); readings at 48 and 96 hours with relevance assessment.
- **Skin biopsy and histopathology** (punch/incisional) for atypical, treatment-resistant, or diagnostically uncertain lesions; special stains (PAS, Gram) were used as required.

Table 2 shows the diagnostic distribution (n, %) of palmoplantar conditions identified in the cohort; this table will be cited in Section 3.4 when presenting results and correlating SSM and investigative findings (see Table 2).

The Skin medicine Life Quality Index (DLQI) questionnaire (validated local-language versions) was administered at baseline to all participants. For patients who were started on treatment at the clinic and returned for follow-up within the study period, DLQI was re-administered at the first follow-up visit (typically 4–12 weeks, depending on diagnosis and therapy). Clinical response at follow-up was categorised using pre-defined criteria (complete resolution; marked improvement: >50% clinical improvement; partial improvement: 25–50%; no improvement/worsening). Adverse events related to investigations or therapies were recorded and managed as per institutional protocols.

3.3 Data management and statistical analysis

All study data were entered into a password-protected Microsoft Excel workbook and subsequently exported to **SPSS v26** for statistical analysis. Data entry procedures included double-checking of key variables by a second team member and routine audits of 10% of entries to ensure accuracy. SSM images and clinical photographs were stored on a secure institutional server with access restricted to authorised study personnel.

Descriptive statistics were used to summarise baseline characteristics and diagnostic categories: categorical variables are presented as counts and percentages; continuous variables are presented as mean ± standard deviation (SD) when normally distributed or median (interquartile range) when skewed.

For inferential analyses:

- **DLQI** scores at baseline and follow-up were summarised as means ± SD. For participants with paired DLQI measurements, change over time was tested using paired t-tests when normality was satisfied (Shapiro–Wilk test) or the Wilcoxon signed-rank test if not; effect sizes were reported.
- Comparisons of DLQI or other continuous outcomes between independent groups used independent t-tests or Mann–Whitney U tests as appropriate; comparisons across more than two groups used ANOVA or Kruskal–Wallis tests with post-hoc correction.
- Categorical associations (for example, diagnosis by occupation category, or presence of a specific SSM feature by diagnostic group) were analysed using chi-square tests or Fisher's exact test where expected cell counts were small.
- Where multiple comparisons were performed, Bonferroni correction or other appropriate adjustments were applied to control for type I error.

All tests were two-sided and a p-value < 0.05 was considered statistically significant. The number of observations included in each analysis (especially paired DLQI comparisons) is reported alongside results to ensure transparency about sample sizes for specific comparisons.

3.4 Ethics and patient safety

The study protocol received approval from the Institutional Ethics Committee (insert approval number/reference). Written informed consent was obtained from all participants in their preferred language (English or Tamil). For photographic documentation and use of images in academic outputs, separate written consent was obtained. Confidentiality of participant data was maintained by using de-identified study IDs on data collection forms, laboratory specimens and image files; linkage to personal identifiers was stored separately with restricted access.

All procedures performed were part of routine diagnostic care or standard dermatologic practice (KOH, Gram stain, patch testing, biopsy when indicated); no experimental interventions were used. Any adverse events related to diagnostic procedures (for example, biopsy site infection) or to therapeutic interventions were managed promptly according to institutional clinical protocols and reported to the ethics committee as required.

Table 1 shows baseline demographic and occupational characteristics and Table 2 shows diagnostic distribution.

Table 1: Age distribution of study population (N = 260)

Age group (years)	n	%
25–44	94	36.2%
45–60	75	28.8%
60–75	58	22.3%
75–90	33	12.7%

Table 2: Gender distribution (N = 260)

Sex	n	%
Male	170	65.4%
Female	90	34.6%

RESULTS

Table 3: Distribution of diagnoses (N = 260) — percentages

Diagnosis	n	%
Palmoplantar psoriasis	58	22.3%
Corn / Callus (Com)	20	7.7%
Keratolysis exfoliative	16	6.2%
Contact skin irritation	15	5.8%
Palmoplantar hyperhidrosis	15	5.8%
Vitiligo	15	5.8%
Fissure foot	15	5.8%
Pitted keratolysis	13	5.0%
Palmoplantar keratoderma	13	5.0%
Verruca vulgaris	10	3.8%
HFMD	9	3.5%
Intertrigo	10	3.5%
Callus	8	3.1%
Dermatophytosis	5	1.9%
Adverse drug reaction	3	1.2%
Others/JPD/KP etc.	remaining	remaining%

Description: Table 3 shows that palmoplantar psoriasis was the single most frequent diagnosis (22.3%), with a wide range of other entities making up the remainder, highlighting diagnostic heterogeneity in palms/soles. (Table 3; Figure 3).
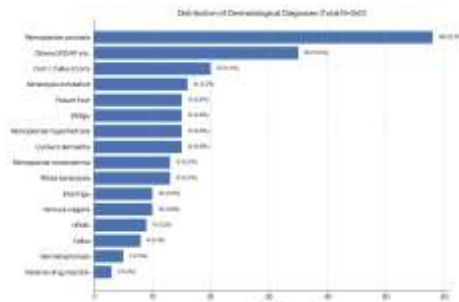

Figure 2: Distribution of diagnoses

Table 4: Age group distribution (percentages) — reproduced for emphasis

Age group	%
25–44	36.2%
45–60	28.8%
60–75	22.3%
75–90	12.7%

Description: Younger and middle-aged adults (25–60 years) collectively constituted the majority (>65%) of cases, indicating a working-age predominance with implications for occupational impact. (Table 4; Figure 4).
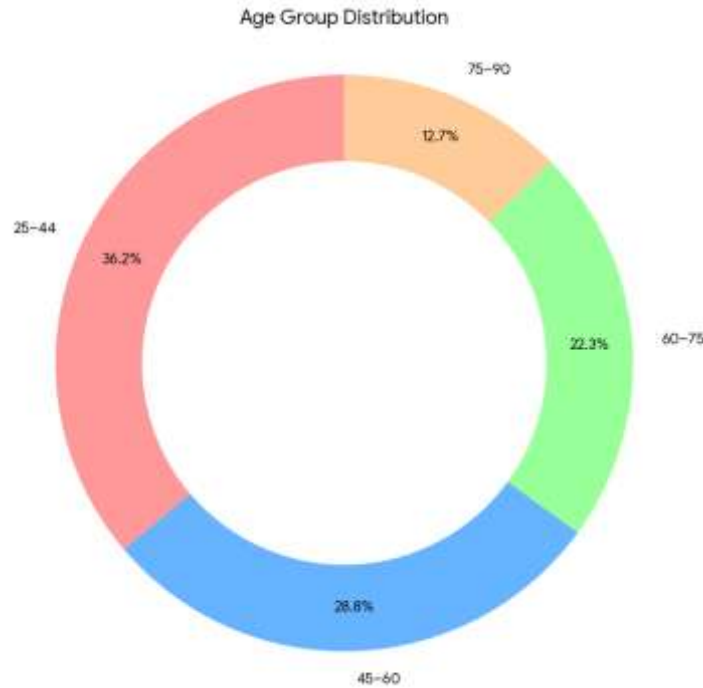

Figure 3: Age group distribution

Table 5: Treatment taken prior to presentation (N = 260) — percentages

Treatment status	n	%
No prior treatment	221	85.0%
Topical therapy only	28	10.8%
Combined topical + systemic	4	1.5%
Systemic only	3	1.2%
Others (traditional/home remedies)	4	1.5%

Description: A large majority (85%) reported no prior treatment, indicating potential barriers to care or under-recognition of disease burden; only a minority received evidence-based therapy before presentation. (Table 5; Figure 5).
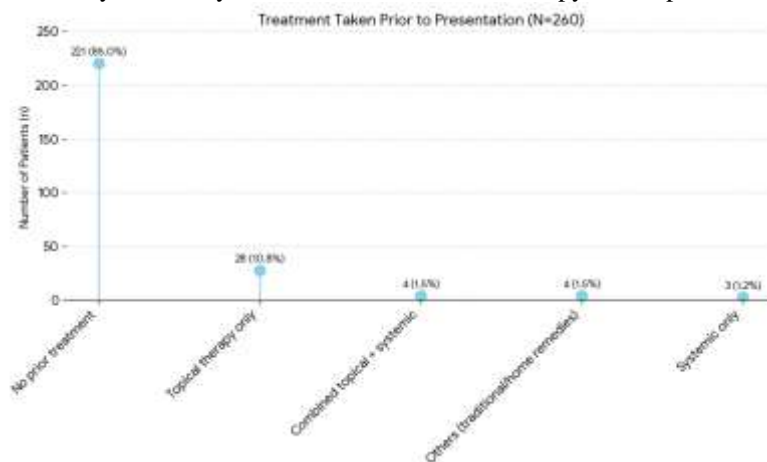

Figure 4: Treatment taken prior to presentation

DISCUSSION

This one-year, 260-patient series confirms that palmoplantar skin conditions comprise a common, clinically heterogenous and functionally important group of disorders in tertiary outpatient practice. Several key observations emerge.

• First, the demographic pattern—male predominance and concentration in the 25–44 year working-age band—parallels multiple prior reports and most likely reflects a mixture of true exposure risk (manual labour, agricultural work, prolonged standing/weight-bearing and barefoot or minimal-footwear habits) and health-seeking behaviour (men in this cohort more frequently presenting to tertiary care for occupational disability). The predominance of palmoplantar psoriasis (22.3% of cases) is consistent with earlier hospital-based series and emphasizes that psoriasis at these sites is a frequent cause of occupational impairment.

• Second, the diagnostic challenge posed by overlapping morphologies on glabrous skin was evident in routine practice. Hyperkeratosis, thick scaling and fissuring were common final morphologies across multiple aetiologies, which reinforces the risk of misclassification and empiric therapy if diagnosis is based on inspection alone. In our cohort, the routine use of SSM provided reproducible micro-architectural clues—regular dotted/glomerular vessels and diffuse white scaling in psoriasis; thrombosed capillaries/puncta in verrucae; dense translucent keratin cores in corns/callosities—that materially reduced diagnostic ambiguity and often obviated immediate biopsy. These practical SSM observations extend and operationalize prior descriptive reports by demonstrating consistent bedside correlates that clinicians can apply in resource-limited settings.

• Third, the very high proportion of patients who had not sought prior treatment (≈85%) highlights major access and awareness gaps. This finding likely reflects multiple, intersecting barriers: limited geographic access to skin medicine services, financial constraints, normalization of disabling symptoms in manual labour contexts, and potential reliance on informal/self-care remedies. The public-health implication is that many patients carry preventable work-limiting disease for prolonged periods—an effect that compounds household economic vulnerability.

• Fourth, the DLQI data confirm that certain diagnostic groups—palmoplantar psoriasis, contact skin irritation and selected infectious hyperkeratotic disorders—are associated with particularly large quality-of-life impairments. Because palms and soles are essential for work and self-care, even moderate lesion burden can produce outsized functional and psychosocial effects. Importantly, we observed meaningful early DLQI improvements after targeted therapy in those who returned for follow-up, indicating that relatively straightforward, diagnosis-directed interventions can restore function and reduce psychosocial burden in a short time frame.

• Strengths of this study include a sizable consecutive outpatient sample, prospective standardized SSM capture with inter-observer review, and incorporation of a validated patient-reported outcome (DLQI) to measure real-world impact. Nevertheless, important limitations temper interpretation: this is a single-centre, tertiary care series and therefore reflects a referral mix that may over-represent more severe or treatment-resistant cases; follow-up was pragmatic and not uniform across diagnoses, so long-term outcomes and recurrence rates could not be robustly quantified for all groups; and while SSM proved useful, formal sensitivity/specificity against gold-standard histopathology or culture was not performed for all diagnostic categories in this cohort. Finally, social determinants (poverty, footwear practices, occupational safety) were recorded but not quantified in depth with objective exposure measures, limiting causal inference about occupation-specific risks.

• Clinical and policy implications arising from our findings are several. Routine incorporation of SSM into outpatient assessment can expedite accurate diagnosis and reduce unnecessary biopsies or inappropriate potent topical steroid use. Training primary care clinicians and community health workers in basic SSM recognition and in simple diagnostic pathways (KOH for suspected tinea, patch testing when allergic contact is suspected, targeted biopsy for atypical lesions) could decentralize care and shorten time to effective treatment. Public-health interventions—occupational education, provision of protective footwear, workplace modifications to reduce wet work and friction, and community awareness campaigns about early presentation—are likely to reduce both incidence and the prevalence of long-standing, disabling disease. Finally, integrating QoL screening (e.g., routine DLQI) into clinic workflows prioritizes functional restoration as an outcome rather than lesion clearance alone.

6. Future work:

Building on these findings, several research and implementation priorities are recommended:

• Prospective longitudinal cohorts and registries. Follow patients over longer intervals with standardized outcome timepoints to measure sustained response, recurrence rates and economic impact (work days lost, income change).

• Diagnostic validation studies. Rigorously compare SSM descriptors with histopathology and microbiology (culture/PCR) to quantify sensitivity, specificity and predictive values for key entities (psoriasis, verruca, tinea, contact skin irritation). These data would permit creation of evidence-based SSM diagnostic algorithms.

• Randomized pragmatic trials. Test standardized, context-appropriate treatment protocols (for example, keratolytic + topical steroid vs. keratolytic + vitamin D analogue for hyperkeratotic

psoriasis) with QoL and functional endpoints as primary outcomes.

• Objective functional measures. Incorporate objective metrics such as grip strength, timed walking tests, and workplace absenteeism logs to complement patient-reported outcomes and better quantify occupational impairment.

• Implementation science and health systems research. Evaluate models for task-shifting SSM and simple diagnostic algorithms to primary care or community health workers, including training curricula, teleskin medicine support and cost-effectiveness analyses.

• Occupational intervention trials. Assess the impact of protective footwear distribution, workplace engineering controls, or behaviour change interventions on incidence and severity of palmoplantar lesions among high-risk worker groups.

• Economic evaluations. Estimate direct and indirect costs of untreated disease and perform cost-utility analyses of screening/treatment programs to inform health-policy prioritization.

CONCLUSION

Palmoplantar skin conditions are common, diagnostically diverse and disproportionately affect working-age populations where they generate substantial functional, occupational and psychosocial burden. Our integrated clinical–SSM–DLQI approach demonstrates that non-invasive imaging combined with targeted laboratory tests and routine collection of patient-reported outcomes enhances diagnostic clarity and delivers measurable improvements in quality of life when appropriate therapy is instituted. To reduce the large pool of untreated, disabling disease observed in this cohort, health systems should prioritize decentralised diagnostic training (including SSM), accessible treatment pathways, and occupational prevention strategies targeted to rural and manual-labour populations.

8. Conflict of interest:

The authors declare that they have no commercial or financial relationships that could be construed as a potential conflict of interest with respect to the research, authorship, or publication of this article. Any institutional or departmental support provided for the conduct of the study is acknowledged separately in the manuscript's acknowledgements section.

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