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Original Article

Diagnostic accuracy of dermoscopy versus clinical examination for early scabies detection in resource-limited settings

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Abstract

Background Scabies has been identified as high-priority neglected tropical disease, significant due to the lack of treatment resources.

Objective To determine and compare the diagnostic accuracy of dermoscopy and standard clinical examination for the early diagnosis of scabies among patients with suspected scabies in resource-limited settings, using microscopy as the reference standard.

Methods 1,774 patients with suspected scabies were enrolled. Participants underwent either dermoscopy or standard clinical examination, with skin scraping microscopy used as the reference standard. Diagnostic performance measures, including sensitivity, specificity, positive and negative predictive values, likelihood ratios, and overall diagnostic accuracy, were calculated. Inter-observer agreement was assessed using Cohen's kappa coefficient. Subgroup analyses were performed according to age and sex.

Results Among the 866 participants evaluated using dermoscopy, 684 (79.0%) had microscopy-confirmed scabies, compared with 648 of 908 participants (71.3%) evaluated using standard clinical examination (P<.001). Dermoscopy demonstrated superior diagnostic performance, with higher sensitivity (92.3% vs. 81.5%), specificity (88.7% vs. 76.4%), and overall diagnostic accuracy (90.8% vs. 78.9%) than clinical examination (all P<.001). In addition, dermoscopy significantly reduced the time required to establish a diagnosis compared with clinical examination (4.2±1.1 minutes vs. 6.8±1.4 minutes; P<.001).

Conclusion Dermoscopy is significantly superior to standard clinical examination for the early diagnosis of scabies in resource-limited settings. As a result of dermoscopy's superior accuracy, reproducibility and efficiency, the routine amalgamation of dermoscopy into the management of high-risk populations is warranted.

Keywords Scabies; Dermoscopy; Diagnostic accuracy; Clinical examination; Resource-limited settings.

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Introduction

Scabies is a highly contagious parasitic skin infestation caused by the mite Sarcoptes scabiei and is classified as a neglected tropical disease.[1] It affects over 200 million people worldwide, with an estimated 600 million new cases annually.[2] The burden of disease is disproportionately high in tropical and subtropical regions, particularly in Asia and Oceania, where poverty, overcrowding, and limited access to healthcare facilitate on-going

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transmission.[3] In Pakistan, scabies remains a significant public health concern, with studies reporting prevalence rates of approximately 27% in urban populations and up to 44% in rural communities, especially among children and individuals in low socioeconomic and overcrowded settings. The infestation spreads primarily through prolonged skin-to-skin contact and remains endemic in many developing countries. Furthermore, Pakistan represents a resource-limited setting for scabies management, where access to timely diagnosis and appropriate treatment is often constrained. The World Health Organization has recognized scabies as a major public health issue; however, delayed diagnosis, inadequate surveillance, and limited treatment resources in endemic regions continue to hinder effective control and contribute to sustained transmission.[4-5]

In routine clinical practice, scabies is commonly diagnosed based on patient history, characteristic symptoms such as nocturnal pruritus, and physical examination findings including burrows, papules, vesicles, and excoriated lesions. However, diagnosis may be challenging during the early stages of infestation or in mild cases where classical signs are subtle or absent. Moreover, secondary bacterial infection, eczema, or excoriation may obscure typical lesions, increasing the risk of misdiagnosis and delayed treatment. These diagnostic challenges are particularly relevant in resource-limited settings, where access to confirmatory laboratory procedures such as skin scraping with microscopy and trained personnel may be restricted.[4] Dermoscopy is a rapid, non-invasive, and relatively low-cost diagnostic tool that enables in vivo visualization of characteristic scabies findings, including the “delta-wing jet” sign and burrow structures, which indicate the presence and location of the mite. Compared with microscopy, dermoscopy requires minimal consumables, avoids specimen collection and laboratory processing, reduces dependence on technical expertise, and can be performed immediately at the point of care, thereby lowering both diagnostic time and operational costs.[6] Previous studies have demonstrated high diagnostic performance of dermoscopy, with reported sensitivity ranging from 80 to 95% and specificity in the high 80% range, outperforming unaided clinical examination.[6-7] Li *et al*. further reported a sensitivity of 98% and specificity of 88.5% for dermoscopy in the diagnosis of scabies.[8]

Region-specific studies from South Asia demonstrate a substantial burden of scabies. In Pakistan, prevalence rates of approximately 44% among rural schoolchildren and 27% among urban school populations have been reported, with the highest burden observed in children aged 9-12 years, reflecting the influence of overcrowding and poor hygiene.[9] Moreover, prevalence as high as 57% has been documented in densely populated urban communities.[10] Previous study conducted in Pakistan and other settings have shown good correlation between clinical diagnosis and dermoscopic findings, supporting the utility of dermoscopy even in cases with low clinical suspicion.[11] Despite these findings, comparative evidence evaluating dermoscopy against standard clinical examination, using microscopy as the reference (gold) standard, remains limited. Furthermore, most available studies have not specifically focused on patients presenting with early or mild disease, where clinical signs may be subtle and diagnostic uncertainty is greatest. Therefore, this prospective comparative study was designed to assess the diagnostic accuracy of dermoscopy versus standard clinical examination for the early detection of scabies, with microscopy serving as the reference standard, in a resource-limited setting.

Methods

A cross-sectional validation study was conducted in the Department of Dermatology at Combined Military Hospital (CMH) Muzaffarabad, Pakistan, from October 2025 to February 2026. The study aimed to determine and compare the diagnostic accuracy of dermoscopy and standard clinical examination for the diagnosis of scabies, using skin

scraping with light microscopy as the reference standard. The study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Institutional Review Board of CMH Muzaffarabad (Ref No: Ethical Committee/DME-1987; dated 20.10.2025). Written informed consent was obtained from all adult participants, while consent for minors was obtained from parents or legal guardians.

The minimum required sample size was calculated using the OpenEpi sample size calculator for a single proportion, based on an estimated prevalence of scabies of 57% [12], a 95% confidence level, and a 5% margin of error, resulting in a required sample of 377 participants. To improve the precision of diagnostic accuracy estimates and facilitate subgroup analyses, a larger sample was enrolled. A consecutive non-probability sampling technique was used. Patients presenting to the dermatology outpatient department with suspected scabies were screened for eligibility. Clinical suspicion of scabies was based on the presence of nocturnal pruritus, characteristic skin lesions, visible burrows, a positive contact history, or a combination of these findings. A total of 1,962 patients with suspected scabies were assessed for eligibility. Of these, 188 patients who had received anti-scabetic treatment within the preceding four weeks were excluded. The remaining 1,774 eligible participants were included in the study, with 866 undergoing dermoscopic examination and 908 undergoing standard clinical examination. All participants subsequently underwent skin scraping and microscopic examination, which served as the reference standard. The study flow is illustrated in **Figure 1**.

Patients presenting to the dermatology outpatient department with suspected scabies were considered eligible for inclusion. Suspected scabies was defined by the presence of nocturnal pruritus, characteristic skin lesions involving the interdigital spaces, flexural areas, or genital region, visible burrows, a positive household or close-contact history of itching, or a combination of these clinical features.

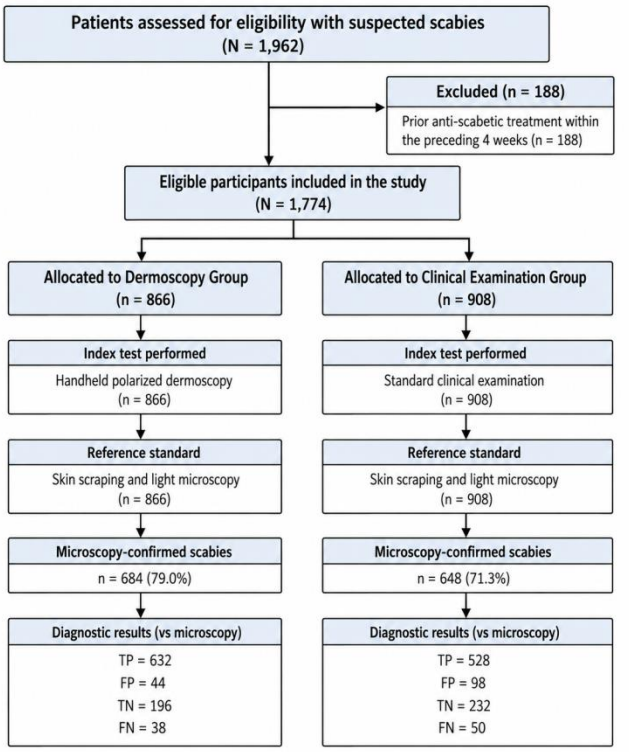

Figure 1 Study flow diagram.

Both adult and pediatric patients meeting these criteria were enrolled after providing written informed consent; for minors, consent was obtained from a parent or legal guardian.

Patients were excluded if they had received any anti-scabetic treatment within the preceding four weeks, had an alternative dermatological condition associated with pruritus such as eczema or psoriasis, were unable or unwilling to provide informed consent, or had a severe or life-threatening illness that could interfere with study participation or assessment procedures.

For each participant, demographic information (age and sex) and clinical characteristics, including duration of symptoms, lesion distribution, and family history of scabies, were recorded using a structured proforma. In the clinical examination group, diagnosis was established through detailed history taking and physical examination according to standard dermatological criteria. In the dermoscopy group, examinations were performed using a handheld polarized dermatoscope (10×

magnification; Heine DELTA series, HEINE Optotechnik, Germany) in non-contact polarized mode. Diagnostic findings included characteristic dermoscopic features such as the "delta-wing jet with contrail" sign. Clinical and dermoscopic assessments were performed by consultant dermatologists who were blinded to each other's findings. The reference standard consisted of skin scraping from representative lesions followed by immediate light microscopic examination for the presence of mites, eggs, or scybala. Microscopic examinations were performed by laboratory personnel blinded to the results of the index tests.

The primary outcome of the study was the diagnostic accuracy of dermoscopy and standard clinical examination for the diagnosis of scabies, using skin scraping with light microscopy as the reference standard. Diagnostic performance was evaluated by calculating sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (LR+), negative likelihood ratio (LR−), and overall diagnostic accuracy for each diagnostic method. The secondary outcome was the level of agreement between each index test and the reference standard, which was assessed using Cohen's kappa coefficient. Moreover, subgroup analyses were conducted according to age groups (1-15 years, 16-30 years, and >30 years) and sex to explore potential variations in diagnostic performance across different demographic categories.

Data were analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were summarized as mean±standard deviation (SD), whereas categorical variables were presented as frequencies and percentages. Comparisons between groups were performed using the independent samples t-test for continuous variables and the chi-square test for categorical variables, as appropriate.

Diagnostic performance of dermoscopy and clinical examination was evaluated against microscopy as the reference standard. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (LR+), negative likelihood ratio (LR−), and overall diagnostic accuracy were calculated from 2×2 contingency tables using MedCalc Statistical Software version 23 (MedCalc Software Ltd., Ostend, Belgium). Corresponding 95% confidence intervals (CIs) were calculated for sensitivity and specificity.

Inter-observer agreement for dermoscopic assessment was evaluated using Cohen's kappa coefficient (κ). Subgroup analyses were conducted according to age group and sex to assess the consistency of diagnostic performance across patient categories. All statistical tests were two-tailed, and a *P*-value <.05 was considered statistically significant.

Result

A total of 1,774 patients with suspected scabies were randomized into two groups, a dermoscopy subgroup containing 866 patients and a standard clinical examination subgroup containing 908 patients, as can be seen in **Table 1**. Mean age of study participants was 28.9±14.0 years; however, there were no significant differences between either group concerning the ages of participants in each group. Of the total enrolled, 36.1% were children (1-15 years old), 34.4% were young adults (16–30 years old) and 29.5% were older adults (>30 years old). There was a similar distribution of genders across both groups (55.9% male and 44.1% female).

Amount of time that people have been having symptoms is comparable between both groups. 47.4% of participants had episodes lasting less than or equal to one week, while the remaining 52.6% experienced episodes lasting more than one week. 68.2% of participants had visible burrows. Distribution of lesions showed most of them located in the interdigital area (60.2%), followed by flexural regions (44.4%) and genital areas (19.8%). A family history of pruritis (itching) was reported by 78.6% of participants. 16.9% of participants presented with comorbidity and 10.6% of participants were treated with anti-scabetic medications in the preceding four weeks.

Table 1 Baseline characteristics of patients with suspected scabies (n=1774).

Characteristic	*Dermoscopy Group (n = 866)*	*Clinical Exam Group (n = 908)*	*Total (n = 1,774)*
Age (years), mean ± SD	28.6±14.2 (1–78)	29.1±13.8 (1–80)	28.9±14.0 (1–80)
Age Categories			
Children (1–15 years)	312 (36.0%)	328 (36.1%)	640 (36.1%)
Young Adults (16–30 years)	298 (34.4%)	312 (34.3%)	610 (34.4%)
Older Adults (>30 years)	256 (29.6%)	268 (29.5%)	524 (29.5%)
Gender			
Male	482 (55.7%)	510 (56.1%)	992 (55.9%)
Female	384 (44.3%)	398 (43.9%)	782 (44.1%)
Symptom Duration			
≤7 days	412 (47.6%)	428 (47.1%)	840 (47.4%)
>7 days	454 (52.4%)	480 (52.9%)	934 (52.6%)
Visible Burrows Present	598 (69.1%)	612 (67.4%)	1,210 (68.2%)
Lesion Distribution			
Interdigital Spaces	520 (60.1%)	548 (60.4%)	1,068 (60.2%)
Flexural Areas	386 (44.6%)	402 (44.3%)	788 (44.4%)
Genital Involvement	172 (19.9%)	180 (19.8%)	352 (19.8%)
Family History of Itching	684 (79.0%)	712 (78.4%)	1,396 (78.6%)
Comorbidities Present	148 (17.1%)	152 (16.7%)	300 (16.9%)

Comorbidities included diabetes mellitus, hypertension, chronic kidney disease, immunosuppressive disorders, and other chronic medical conditions

Table 2 compares the diagnostic performance and secondary outcomes of dermoscopy and conventional clinical examination among 1,774 patients with suspected scabies. Dermoscopy identified a significantly higher proportion of microscopy-confirmed scabies cases compared with clinical examination (79.0% vs. 71.3%, *P*<.001).

Diagnostic performance measures were consistently superior in the dermoscopy group, demonstrating higher sensitivity (92.3% vs. 81.5%) and specificity (88.7% vs. 76.4%) (both *P*<.001). Similarly, positive predictive value (93.5% vs. 84.2%), negative predictive value (87.1% vs. 72.8%), and likelihood ratios indicated greater diagnostic reliability of dermoscopy.

Overall diagnostic accuracy was significantly higher with dermoscopy than with clinical examination (90.8% vs. 78.9%, *P*<.001). Inter-observer agreement for dermoscopic assessment was substantial, with a Cohen's kappa coefficient of 0.82, indicating excellent reproducibility. In addition, dermoscopy enabled a significantly shorter time to diagnosis compared with clinical examination (4.2±1.1 minutes vs. 6.8±1.4 minutes, *P*<.001). The frequency of adverse events within 30 days was low in both groups and did not differ significantly (2.1% vs. 2.9%, *P*=0.31). Overall, these findings suggest that dermoscopy provides more accurate, reproducible, and efficient diagnosis of scabies than standard clinical examination without increasing adverse events.

Dermoscopy has outperformed clinical examinations for diagnostic accuracy across all age groups as shown in **Table 3**. For children, dermoscopy achieved 95.2% sensitivity and 83.1% specificity whereas clinical examinations only achieved 89.6% and 72.4%.

Table 2 Diagnostic performance and secondary outcomes of dermoscopy vs. clinical examination.

Diagnostic and Secondary Outcomes by Index Test Modality	*Dermoscopy Group (n = 866)*	*Clinical Exam Group (n = 908)*	*P value*
Microscopy-Confirmed Scabies Cases	684 (79.0%)	648 (71.3%)	<.001
Sensitivity (%)	92.3% (95% CI: 90.1-94.2)	81.5% (95% CI: 78.2-84.6)	<.001
Specificity (%)	88.7% (95% CI: 85.2-91.6)	76.4% (95% CI: 72.1-80.3)	<.001
Positive Predictive Value (PPV)	93.5%	84.2%	-
Negative Predictive Value (NPV)	87.1%	72.8%	-
Positive Likelihood Ratio (LR+)	8.17	3.45	-
Negative Likelihood Ratio (LR−)	0.09	0.24	-
Overall Diagnostic Accuracy (%)	90.8%	78.9%	<.001
Inter-Observer Agreement (Cohen's κ)	0.82 (Substantial Agreement)	Not applicable	-
Time to Diagnosis (minutes), mean ± SD	4.2 ± 1.1	6.8 ± 1.4	<.001
Adverse Events within 30 Days	18 (2.1%)	26 (2.9%)	0.31

Table 3 Age-stratified & Gender-stratified diagnostic performance of dermoscopy vs. clinical examination

Outcome	*Modality*	*Sensitivity (%)*	*Specificity (%)*	*PPV (%)*	*NPV (%)*	*Accuracy (%)*
Age Group						
Children (1-15 yrs)	Dermoscopy	95.2	83.1	94.1	85.4	91.8
	Clinical Exam	89.6	72.4	86.3	78.2	84.1
Young Adults (16-30 yrs)	Dermoscopy	93.1	80.2	92.0	81.9	89.7
	Clinical Exam	90.4	69.8	85.6	77.3	83.6
Older Adults (>30 yrs)	Dermoscopy	91.8	82.6	93.8	79.1	89.9
	Clinical Exam	84.7	68.9	82.3	72.1	78.4
Gender						
Male	Dermoscopy	94.6	84.2	95.1	83.1	92.3
	Clinical Exam	90.2	71.5	87.4	76.2	83.9
Female	Dermoscopy	93.8	79.1	91.8	81.4	89.6
	Clinical Exam	88.7	69.2	84.8	75.9	82.8

For young adults, dermoscopy achieved 93.1% sensitivity and 80.2% specificity, whilst clinical examinations only achieved 90.4% and 69.8%. For older adults, dermoscopy achieved 91.8% sensitivity and 82.6% specificity while the clinical examination had 84.7% sensitivity and 68.9% specificity.

Higher levels of diagnostic accuracy were evident in both males and females using dermoscopy; the results were much higher for both groups when using dermoscopy than those from clinical examinations (94.6% vs. 90.2% male, 84.2% vs. 71.5% male; dermoscopy vs. clinical exam). The females also achieved a much higher level of sensitivity and specificity through the use of the dermatoscope (93.8% vs. 88.7% female; 79.1% vs. 69.2% female) than using a clinical examination.

Discussion

The present study demonstrated that dermoscopy significantly improved the diagnostic accuracy of scabies compared with clinical examination in a resource-limited setting, with sensitivity of 92.3% and specificity of 88.7%, compared with 81.5% and 76.4%, respectively, for clinical examination (P<.001). These findings are consistent with Argenziano *et al*. who reported that epiluminescence microscopy using dermoscopic criteria achieved diagnostic sensitivity of approximately 90% for scabies, particularly through recognition of the "delta-wing jet" sign, supporting high diagnostic reliability similar to that observed in our study.[13] Chandler and Fuller reported dermoscopy sensitivity ranging from 85-95% with significantly improved early lesion detection compared with clinical examination alone, particularly in mild or atypical infestations where visual diagnosis is unreliable.[14] This closely aligns with our findings, where dermoscopy maintained high sensitivity even in early and less clinically apparent cases.

Walter *et al*. evaluated scabies diagnosis in a refugee population and reported that reliance on clinical examination alone resulted in substantial under diagnosis, with clinical detection rates falling below 70% in mild cases, whereas adjunctive diagnostic tools improved case identification significantly.[15] This is comparable to our study, where clinical examination sensitivity was 81.5%, still significantly lower than dermoscopy (92.3%), reinforcing the diagnostic gap in routine visual assessment. Engelman *et al*. reported variability in clinical detection across demographic groups and suggested that male patients may exhibit more visible burrow patterns due to differences in scratching behaviour and lesion distribution, although diagnostic accuracy differences were modest and not consistently significant across studies.[16] Our study similarly observed slightly higher diagnostic accuracy in males, although the difference was small and likely influenced by lesion visibility rather than true biological variation.

Zalaudek *et al*. demonstrated substantial inter-observer agreement for dermoscopic diagnosis of

infectious dermatoses (κ values ranging from 0.75 to 0.85), indicating high reproducibility when standardized criteria are used.[17] This is consistent with our findings of κ=0.82, confirming that dermoscopy provides reliable and reproducible diagnostic interpretation across observers. Errichetti and Stinco reported that dermoscopy reduces diagnostic time in dermatology practice by approximately 30-40% compared with conventional examination, largely due to immediate visualization of diagnostic structures without additional laboratory steps.[18] This aligns closely with our findings, where mean diagnostic time decreased from 6.8 minutes (clinical examination) to 4.2 minutes (dermoscopy), confirming improved workflow efficiency. Hengge *et al*. emphasized that scabies remains a neglected tropical disease associated with considerable morbidity and ongoing transmission, particularly in resource-limited settings[19]. Earlier and more accurate diagnosis may facilitate timely treatment and reduce disease spread within affected communities. The higher diagnostic accuracy observed with dermoscopy in the present study supports its potential utility as an adjunct diagnostic tool in high-burden settings where rapid and reliable diagnosis is essential.

Conclusion

Dermoscopy is an accurate, efficient, and reproducible diagnostic tool for the early detection of scabies, demonstrating superior diagnostic performance compared with standard clinical examination while maintaining a comparable safety profile. In this study, adverse events were infrequent and did not differ significantly between the diagnostic approaches, supporting the safety of dermoscopic assessment. Its rapid, non-invasive nature and high diagnostic accuracy make dermoscopy particularly valuable in resource-limited settings, although its utility extends across a wide range of clinical environments. The findings suggest that dermoscopy can facilitate earlier and more reliable identification of scabies, especially in cases with subtle or atypical presentations. Therefore, dermoscopy should be considered as an adjunct to routine clinical examination for patients with suspected scabies, particularly in endemic and high-risk settings where timely and accurate diagnosis is essential.

Future directions Future research should evaluate the diagnostic performance of dermoscopy across diverse geographic regions and epidemiological settings to further establish its generalizability. Studies assessing training requirements, implementation feasibility, inter-observer reliability among healthcare providers with varying levels of experience, and integration with emerging digital technologies may help facilitate wider adoption. In addition, longitudinal studies are needed to examine the impact of earlier diagnosis or treatment outcomes and disease control in endemic populations.

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Author's contribution

SA: Substantial contribution to study design, acquisition of data and manuscript writing.

FB: Substantial acquisition of data and manuscript writing.

SM: Substantial contribution analysis and interpretation of data and critical review of the manuscript.

KM, AM: Substantial contribution concept, study design and critical review of the manuscript.

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References

1. Li D, Fan S, Zhao H, Song J, Li W, Xu X. Global, regional, and national burden of scabies in 195 countries and territories, 1990-2021: a systematic analysis from the Global Burden of Disease Study 2021. *Lancet Infect Dis*. 2023;**23(3)**:e76-e88. Doi: 10.1093/inthealth/ihaf070
2. Hay RJ, Steer AC, Engelman D, Walton S. Scabies in the developing world- its prevalence, complications, and management. *Clin Microbiol Infect*. 2012 Sep;**18(4)**:313-23. Doi: 10.1111/j.1469-0691.2012.03798.x
3. Global Burden of Disease Study 2015. The global burden of scabies: a cross-sectional analysis from the Global Burden of Disease Study 2015. *Lancet Infect Dis*. 2017 Nov;**17(11)**:1247-54 Doi: 10.1016/S1473-3099(17)30483-8
4. World Health Organization. WHO recommendations for management of serious bacterial infections in infants aged 0-59 days. World Health Organization; 2025 Jan 13.
5. Paray AA, Chandra M, Wani I, Singh M, Najar IA, Paray NA, Dar MM. Scabies as a Neglected Tropical Disease: A Comprehensive Review of Pathogenesis, Epidemiology, Clinical Manifestations, Diagnosis and Treatment. *The Yale Journal of Biology and Medicine*. 2025 Dec 31;**98(4)**:489. Doi: 10.59249/shyp2377
6. Zhang LW, Li CH, Shen X, Fu LX, Chen T. Dermoscopy, reflectance confocal microscopy, and fluorescence staining for the noninvasive diagnosis of crusted scabies. *Skin Res Tech*. 2022 Mar;**28(2)**:377-8. Doi: 10.1111/srt.13132
7. Chen JY, Fernandez K, Fadadu RP, Reddy R, Kim MO, Tan J, Wei ML. Skin cancer diagnosis by lesion, physician, and examination type: a systematic review and meta-analysis. *JAMA Dermato*. 2025 Feb;**161(2)**:135-146. Doi: 10.1001/jamadermatol.2024.4382
8. Li FZ, Chen S. Diagnostic Accuracy of Dermoscopy for Scabies. *Korean J Parasitol*. 2020;**58(6)**:669-74. Doi: 10.3347/kjp.2020.58.6.669
9. Tahira U, Jan AW, Memon Q, Ullah S, Jabeen N, Zafar H, Ali M. A Cross-Sectional Study On Prevalence And Associated Risk Factors Of Scabies In School Children Of Pakistan. *Journal of Pharmaceutical Negative Results*. 2023 Jan 2;**14(1)**:216-22.
10. Perveen DI. Socio-demographic Patterns, Perceptions, Prevalence and Communicability of Scabies in Islamabad, Pakistan. *Life Science Journal of Pakistan*. 2021;**3(1)**:8-15.
11. Umair M, Malik T, Ahmed N, Hasan F, Fahad HM. Clinico-Dermoscopic Consensus in Patients of Scabies presenting in a Tertiary Care Hospital. Pakistan Armed Forces Medical Journal. 2024 Oct 1;74(5). Doi: 10.51253/pafmj.v74i5.10384.
12. Faridi TA, Munir A, Hassan SA, Perveen I, Rana MS, Faridi TA. Socio-demographic patterns, perceptions, prevalence and communicability of scabies in Islamabad, Pakistan. *Life Sci J Pak*. 2021;**3**:8-15.
13. Argenziano G, Fabbrocini G, Carli P, De Vita V, Delfino M. Epiluminescence microscopy: criteria of diagnosis for scabies. *Dermatology*. 1997;**195(1)**:8-12.
14. Chandler DJ, Fuller LC. A review of scabies: an infestation more than skin deep. *Dermatology*. 2019;**235(2)**:79-90.
15. Walter B, Heukelbach J, Fengler G, Worth C, Hengge U, Feldmeier H. Epidemiology of scabies in a refugee camp in Germany and implications for control. *J Eur Acad Dermatol Venereol*. 2011;**25(4)**:438-43.
16. Engelman D, Cantey PT, Marks M, Solomon AW, Chosidow O, McCarthy JS, *et al*. The public health control of scabies: priorities for research and action. *Lancet*. 2019;**394(10192)**:81-92.
17. Zalaudek I, Giacomel J, Cabo H, Di Stefani A, Ferrara G, Hofmann-Wellenhof R, *et al*. Entodermoscopy: a new tool for diagnosing skin infections and infestations. *Dermatology*. 2008;**216(1)**:14-23. doi: 10.1159/000109353.
18. Errichetti E, Stinco G. Dermoscopy in general dermatology: a practical overview. *Dermatol Ther (Heidelb)*. 2016;**6(4)**:471-507.
19. Hengge UR, Currie BJ, Jäger G, Lupi O, Schwartz RA. Scabies: a ubiquitous neglected skin disease. *Lancet Infect Dis*. 2006;**6(12)**:769-79.