

# Degree of agreement between clinical diagnosis and dermoscopy in scabies

Nida Kafayat, Abeer Fahad, Lamees Mahmood Malik, Nadia Ali Azfar, Tariq Rashid, Mohammad Jahangir

Department of Dermatology Unit I, Jinnah Hospital, Lahore.

## Abstract

**Objective** To determine the degree of agreement between clinical and dermoscopic diagnosis in patients of scabies.

**Methods** A total of 210 patients with clinical suspicion of scabies were enrolled in the study. Patients were evaluated in a well lit room and those patients who met the definition of clinical diagnosis were recorded as having scabies. All patients were then subjected to dermoscopic examination of the suspicious areas e.g. interdigital clefts of hands, abdomen and groin. Findings were recorded on a predesigned proforma. Outcome variable was a positive or negative dermoscopic examination.

**Results** Mean age of patients was  $16 \pm 8.5$  years with a range of 1 month to 87 yrs. Among 210 patients 116 (55.2%) were males and 94 (44.7 %) were females. Total of 112 patients (53.3%) were clinically diagnosed as scabies and 98 patients (46.7%) were not. Positive dermoscopic examination was recorded in 104 patients (49.5%) of whom 99 (95.2%) were also positive on clinical examination. Mite head was the most frequently visualized part, in 94.1% of the 104 cases. Negative dermoscopic examination was seen in 106 patients (50.5%) of whom 93 (87.7%) were also negative clinically. Hence 99 patients were true positives and 93 were true negatives. Kappa test was used to assess the difference between the two ( $K=0.829$ ,  $P < 0.05$ ).

**Conclusion** The results of this study suggest that there is almost a perfect agreement between the clinical diagnoses and dermoscopy for scabies ( $K=0.829$ ).

## Key words

Scabies, dermoscopy, clinical diagnosis, agreement.

## Discussion

Scabies is diagnosed most often by correlating clinical suspicion with the identification of a burrow.<sup>1</sup> Once scabies is diagnosed, cases can be successfully treated. The rash of the primary infestation takes 4 to 6 weeks to develop and transmission to others often occurs during this period. In humans, the symptoms of scabies may mimic other dermatological diseases, and

traditional tests to diagnose scabies are less than 50% accurate.<sup>1</sup> To aid early identification of disease and thus treatment, a simple, inexpensive, sensitive, and specific test for routine diagnosis of active scabies is essential.

Early identification of disease is important as it enables selective treatment of infested cases and reduced transmission to others hence helping in controlling scabies in endemic areas.

The usual methods for confirmation of diagnosis include microscopic identification of the mites, their eggs and faeces in skin scraping, burrow ink test, adhesive tape testing<sup>3</sup> epidermal shave

## Address for correspondence

Dr. Nida Kafayat  
Senior Registrar Dermatology Department,  
Avicenna Medical College and Hospital,  
Lahore.  
Email: nidakafayat@gmail.com

biopsy and PCR.<sup>2</sup> Ex vivo microscopic examination of skin scrapings performed at appropriate sites is usually the recommended procedure.<sup>3</sup> However, microscopic identification using conventional invasive procedures is not always practical if the clinical finding of patients with scabies is atypical or the patients are not compliant with the diagnostic procedures. Also the low number of parasites present in the cornified layer may be a contributory factor. In these cases, newer methods including epiluminescence microscopy and polymerase chain reaction can be helpful to detect scabies. Among them, 10 × magnification examinations using a pocket handheld dermoscope can be especially useful.

Dermoscopy was first used in 1997 by Argenziano et al. for in vivo detection of *Sarcoptes scabiei*.<sup>4</sup> Many studies are available in which dermoscopy has been used in comparison with other methods like skin scrapings, adhesive tape testing etc. for the diagnosis of scabies. Only one study in 2012 by Park et al. showed agreement between dermoscopy and clinical diagnosis in 83.67% patients.<sup>3</sup> However the sample size was very small. Also there is no local published literature available regarding the use of dermoscope for diagnosing scabies. Skin scrapings test is routinely performed which is not readily available everywhere. Also it is not always practical to perform especially in children.

The purpose of this study was to confirm how many of the clinically suspicious cases of scabies had evidence of mite or its parts visible by dermoscope hence confirming the diagnosis. Timely diagnosis and treatment is important so as to prevent its spread to others and also to prevent over diagnosis and overtreatment. This helps reduce burden of disease especially in a low income country like ours.

## Methods

This cross sectional study was conducted in OPD of Dermatology Unit I, Jinnah Hospital, Lahore. A total of 210 patients of any age and either gender, with clinical suspicion of scabies were enrolled in the study. Those patients who had a history of using topical or systemic corticosteroids or other immunosuppressive agents were excluded, as these modify the clinical picture of scabies. After informed consent demographic details were recorded on a predesigned proforma. Patients were examined in a well lit room and those patients who met the definition of clinical diagnosis were recorded as having scabies. These included presence of nocturnal exacerbation of itching, presence of visible papules, pustules, burrows or nodules on at least two sites with or without positive family history. All patients were then subjected to dermoscopic examination of the suspicious areas e.g. interdigital clefts of hands, abdomen and groin. The device used in this study was Dermatolight-LED Dermatoscope by RA Bock Diagnostics which had a 10X variable focus optical quality lens. It required direct contact with the skin for visualizing the mite. The findings were recorded on the proforma. Outcome variable was a positive or negative dermoscopic examination. Both clinical and dermoscopic examination were performed by a single researcher.

Data was analysed using SPSS version 17.0. Mean and standard deviation were calculated for age. Frequency and percentages were calculated for gender and presence or absence of scabies on dermoscopy. Kappa test was used to calculate the degree of agreement between clinical findings and dermoscopy for scabies.

**Results**

A total of 210 patients with suspicion of scabies were included in this study. The youngest was 1 month and the oldest was 87 years. The maximum number of patients fell in the age group 0-10 years (31%) followed by age group 21-30 (25%). Mean age of the patients was 16 ± 8.5 years (**Table 1**). Among the studied patients, 116 (55.2%) were males and 94(44.7 %) were females. M: F ratio was 1.25:1

As per the criteria for clinical diagnosis, 112 patients (53. 3% of total) were diagnosed as having scabies and 98 patients (46.7%) did not fulfill the clinical criteria for diagnosis. Dermoscopy was performed on all 210 patients. It was positive in 104 patients (49.5%), of whom 99 (95.2%) were also positive on clinical examination. Negative dermoscopic examination was seen in 106 patients (50.5%) of whom 93 (87.7%) were also negative clinically. Hence 99 patients were true positives and 93 were true negative. So the frequency of positive dermoscopic examination was seen in 104 patients (49.5%) and negative in 106 patients (50.5%) (**Table 2**).

Of the body part of mite visualized on dermoscopic examination, head was the most commonly visualized i.e. in 94.1% of total cases (in 62.5% cases alone, in 25.9% cases with body of mite and 5.7 % cases with eggs). Eggs alone were seen in 4.8 % cases and body alone in 5.7% (**Table3**).

Kappa test was applied to assess the difference between the clinical and dermoscopic examination (K=0.829, P < 0.05) (**Table 4**). Hence there is almost a perfect agreement between clinical diagnoses and dermoscopy for scabies (P < 0.05).

**Table 1** Age distribution of the Study Population

Age group (years)	Frequency of cases (n)
0-10	67
11-20	39
21-30	53
31-40	30
41-50	12
51-60	7
61-70	2
>70	1

**Table 2** Frequency of positive dermoscopy in study population

Dermoscopy Outcome	Frequency	Percentage (%)
Positive	104	49.5 %
Negative	106	50.4 %
Total	210	100 %

**Table 3** Frequency of Mite parts in positive dermoscopy in study population

Mite part seen	No of patients (n)	Percentage (%)
Head	65	62.5 %
Head + body	27	25.9 %
Head + eggs	6	5.7 %
Eggs	5	4.8 %
Body	1	0.9 %

**Interpretation of Kappa**

Poor, Slight, Fair, Moderate, Substantial, Almost perfect

Kappa 0.0, 0.20, 0.40, 0 .60, 0.80, 1.0

Kappa -- Agreement

< 0 less than chance agreement

0.01–0.20 Slight agreement

0.21– 0.40 Fair agreement

0.41–0.60 Moderate agreement

0.61–0.80 Substantial agreement

0.81–0.99 Almost perfect agreement

**Discussion**

Scabies is a major health problem of the underdeveloped and developing countries. Since it is a highly contagious skin infestation,

**Table 4** Degree of agreement

		Diagnosis on Clinical examination			Total
		Yes	No		
Diagnosis on Dermoscopy	Count	99	5	104	
	Yes % within Diagnosis on Dermoscopy	95.2%	4.8%	100.0%	
	% within Diagnosis on Clinical examination	88.4%	5.1%	49.5%	
	Count	13	93	106	
No	% within Diagnosis on Dermoscopy	12.3%	87.7%	100.0%	
	% within Diagnosis on Clinical examination	11.6%	94.9%	50.5%	
Total	Count	112	98	210	
	% within Diagnosis on Dermoscopy	53.3%	46.7%	100.0%	
	% within Diagnosis on Clinical examination	100.0%	100.0%	100.0%	

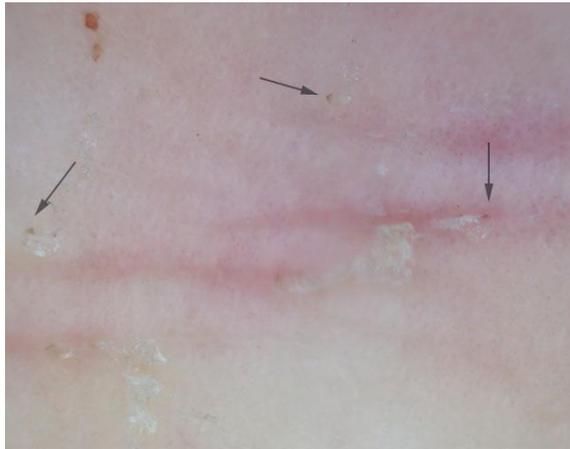
Symmetric Measures

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Measure of Agreement	Kappa	.829	.038	12.044	.000
N of Valid Cases		210			

<sup>a</sup>. Not assuming the null hypothesis.

<sup>b</sup>. Using the asymptomatic standard error assuming the null hypothesis.

Kappa test was used to assess the difference between the two (K=0.829, P < 0.05)



**Figure 1** Delta wing jet sign of the scabies mite head parts



**Figure 2** Jet with contrail sign

improper diagnosis leads to spread amongst close personal contacts making treatment and eradication difficult.

Skin scrapings have long been considered as gold standard for diagnosis of scabies. However, handling and processing scrapings rapidly and effectively in the clinic is not always possible. Besides, it requires a microscope for

visualization of the specimen, which is not available in every set up. The process of obtaining scrapings with a blade is also cumbersome for patients. Dermoscope on the other hand is a hand-held device which gives a magnified image of the skin making the mite visible. Both contact and a non-contact technique scopes are available. Previous studies have shown that dermoscopy is used for in vivo

detection and monitoring of treatment response in patients with scabies. With 10X magnification the characteristic triangular shape (French letter “Ô”) represents the head and two pairs of front legs of mite. The triangular scabies mite head can also be visualized as a “delta wing jet sign”.<sup>5</sup> When magnification is increased to 40 X, “jet with contrail sign” is seen which again represents the head part and burrow in the background. Sometimes the contour of the translucent round body of the mite can also be identified.<sup>6</sup>

Dermoscopy for scabies is 91% sensitive and 86% specificity with a magnification of 10X.<sup>7</sup> For busy clinicians, dermoscopy represents a simple, accurate and rapid technique that is worth considering for the diagnosis of scabies. It greatly enhances the clinical skills especially in those settings where facility of microscope is not available. Besides it can also be used in screening patients as a way of preselecting patients’ body areas where skin scrapings can be performed.

The present study was done to compare how well clinical diagnosis and dermoscopy agree with each other. The results were comparable with other studies. In this study the mean age of the patients was  $16 \pm 8.5$  years which was 14 years in a study conducted by Walter et al. in 2011, on 125 patients of clinically suspected scabies.<sup>7</sup>

Gender analysis showed that 55.2% of the patients were males and 44.7% were females. This was slightly different from the results of Walter et al. in which 38.9% were males. The slight difference in gender ratio between the two studies may be attributed to the fact that it is difficult for the females in our society to access health care as compared to males.<sup>8</sup>

This study also showed that the mite part most commonly seen on dermoscopy is the head. The characteristic delta wing jet sign was seen in 94.1% of cases. This is also comparable to the results of previous studies where it is 98%.<sup>9</sup> Reason for rapid visualization of head is that it is the most dense part of the mite body.

In 2012, Park et al. performed skin scrapings on 49 clinically suspected patients, out of which 41 were positive with dermoscopy as well, 23 patients were positive without dermoscopy and 8 patients were negative by both procedures. The degree of agreement between clinical and dermoscopic diagnosis was found to be 83.67%.<sup>3</sup> Our study shows comparable results to this study i.e. 82.9 % with a much larger sample size.

The limitations of our study were that study population was relatively small, i.e. 210 cases only, as compared to the burden of disease in our setup. There is a risk of transmission of scabies from one patient to another via contact dermoscopy. This was minimized by cleaning the dermoscope lens with alcohol swab after each examination. Also dermoscopy was performed only once at the beginning and not repeated after treatment. Had it been done, response to treatment could also have been monitored.

Hence dermoscopy is a non-invasive, less time consuming and highly accurate diagnostic method for scabies. When trained personnel are available, dermoscopy is a valid tool for diagnosing scabies in a resource-poor setting. It should be performed in every patient of scabies and especially where there is doubt about the diagnosis, hence preventing over diagnosis and reducing the burden on family and society for management.

## Conclusion

The results of this study conclude that there is almost a perfect agreement between the clinical diagnoses and dermoscopy for scabies (K=0.829). Further studies may be carried out which determine response to treatment as well by repeating dermoscopy after treatment.

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