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Original Article

Study of diagnostic predictability of dermoscopy over clinical diagnosis in common clinically-diagnosable outpatient dermatological diseases

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Abstract

Objective The purpose of this study was to study the role of dermoscopy in augmenting the diagnosis of various common dermatoses.

Methods Six clinicians with different levels of expertise (< one year or inexperienced, 1-5 years or moderately experienced, >5 years or expert) were administered questionnaires in form of clinical and dermoscopic images (with or without history), of common dermatoses. The questionnaires were divided into 5 categories: clinical image (CI), dermoscopic image (DI), clinical image with history (CIH), dermoscopic image with history (DIH) and clinical image, dermoscopic image with history (CDH). The correct responses in each of the sections were analyzed with respect to the diseases and the level of expertise.

Results The comparison of correct responses with respect to expertise revealed that the responses of expert, moderately experienced and inexperienced clinicians were 100%, 95.1% and 49.1% respectively which was statistically significant. The percentage of correct responses was higher with clinical images as compared to dermoscopic image. The addition of dermoscopy to clinical image and history (CIH) increased the percentage of correct responses only marginally by 3.03%. Comparison of correct responses with respect to various dermatoses showed that DI when used for diagnosis fared poorly when compared with CI though it was not found to be statistically significant.

Conclusion Dermoscopy is an useful tool in dermatological diagnosis which is evolving in terms of its application and user adaptability. The study showed that Clinical examination and history taking is still invaluable and can suffice for the diagnosis of many common dermatological conditions and dermoscopy does not significantly augment the clinical diagnosis in common dermatological conditions.

Key words
Dermoscopy; Clinical diagnosis; Common dermatoses.

Introduction

Over the last few years, dermoscopy has been increasingly used in the diagnosis of various common dermatological disorders. Although it was traditionally used for diagnosis of pigmentary disorders, the application of dermoscopy has increased to include various inflammatory and infectious disorders of skin, hair and nail.[1] Recognition of certain dermoscopic features that are characteristically associated with a particular disease can help in identification of the disease and may even reduce the need for skin biopsy. The dermoscopic features represent the reflectance, absorption or scattering of light from the skin

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structures, predominantly, melanin, keratin, collagen fibres and haemoglobin.[2]

Just as the dermoscopic features of melanocytic lesions have been thoroughly analysed, the common dermatoses also have been well documented and researched with specific clinical symptoms and signs. However the dermoscopic features in these common dermatoses range from specific to non specific. Also analysis of the dermoscopic findings requires a degree of experience and expertise of the dermatologist in the field of dermoscopy. Therefore we aimed at analysing the diagnostic predictibility of dermoscopy over clinical diagnosis in common clinically-diagnosable outpatient dermatological diseases.

Methods

The study was conducted at a tertiary care center over a period of 4 months. After obtaining permission from the hospital ethics committee (Reg. No. ECR/83/Inst/GOA/2013/RR-20 dated January 13, 2023), patients with diagnosis of common dermatological conditions like psoriasis, eczema, lichen planus, leprosy, molluscum contagiosum, viral warts, nevus, seborrheic keratosis, lichen planus pigmentosus, dermatophytosis and melasma proven by characteristic clinical findings or microbiological or histopathological examination, who gave consent for clinical and dermoscopic photographs were included in the study. Detailed history and findings of clinical examination were recorded. Clinical and dermoscopic photographs were taken. The dermoscopic images were analysed using the characteristic features as suggested in the referenced studies.[3-5]

A total of six clinicians with varying levels of experience in dermascopy were selected as evaluators in this study and consisted of one expert (more than 5 years of experience), three moderately experienced (1-5 years of experience) and two inexperienced (less than 1 year of experience).

All the evaluators were administered a PowerPoint presentation consisting of clinical findings and dermoscopy features with or without history. The questions were divided into 5 categories as follows:

1. Clinical image only (CI)
2. Dermoscopic image only (DI)
3. Clinical image and history (CIH)
4. Dermoscopic image and history (DIH)
5. Clinical image, Dermoscopic image and history (CDH)

All the evaluators belonging to three groups (expert, moderately experienced and inexperienced) were single-blinded and answered the questionnaires independently and their responses were recorded. The correct responses in each of the sections was analysed with respect to the diseases and the level of expertise and statistically evaluated using SPSS software version 22.

Results

A total of 110 slides equally divided among five sections (CI, DI, CIH, DIH, CDH) of 22 each were analyzed by evaluators. The responses to questions in each of the five categories were analyzed. Comparison of correct responses across various categories among expert, moderately experienced and inexperienced clinicians are depicted in **Figure 1**. The accuracy percentages among the evaluators is given in **Table 1**.

As evident from figure 1 and table 1, the diagnostic accuracy rises with increase in experience and is statistically significant. Analysis using paired *t-test* showed that there is statistically significant difference between the questions answered by the expert and

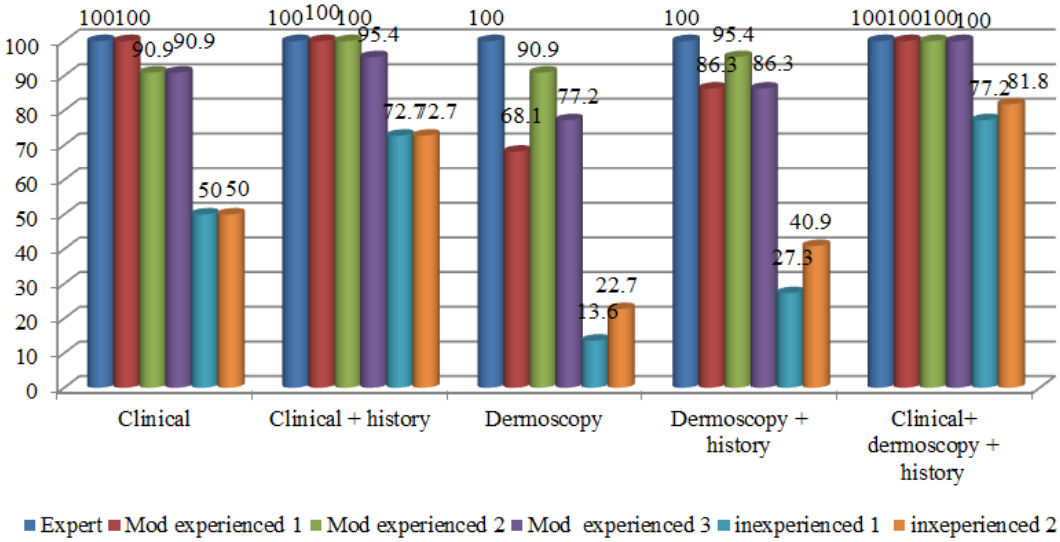

Figure 1 Comparison of correct responses across five categories among expert, moderately experienced and inexperienced clinicians.

inexperienced group and between moderate-experienced and inexperienced group with p value <0.016 (Bonferroni correction) with a mean difference of 0.5182 and 0.473 respectively. But while comparing expert with moderate-experienced the questions answered by them was not statistically significant.

Table 2 shows the comparative percentages of correct responses across the five categories with respect to expertise. As depicted in **Table 2**, the precision of diagnosis with clinical picture alone was 80.3%, whereas dermoscopic picture alone was provided accuracy in 62.1%. Addition of history to both these categories increased the percentage of correct responses by 10% to 90.1% and 72.8% respectively. The percentage of correct responses in categories CIH and CDH were 90.1% and 93.2% respectively. Thus, addition of dermoscopy to clinical examination and history increased the precision of diagnosis by 3.03%. The difference among these groups was not statistically significant.

The data of the evaluators (one expert and three moderately experienced) was further analysed with respect to the common dermatoses **(Table 3)**.

Table 3 shows the comparison of correct responses in each of the five categories with respect to various dermatoses. Overall CDH had the best response rate but was only found to be significant when compared with DI, but not with other sections (CDH vs. DI. *p*-value=0.016). The results obtained with CIH and DIH was better than CI and DI (CI vs. CIH. *p*-value=0.96) (DI vs. DIH p-value=0.03). Comparison of clinical and dermoscopy sections revealed that clinical diagnosis was better than dermoscopy in most

Table 1 Accuracy percentages with respect to expertise of the evaluator.

Expert (%)	*Mod-Experienced 1 (%)*	*Mod-Experienced 2 (%)*	*Mod-Experienced 3 (%)*	*In experienced 1 (%)*	*In experienced 2 (%)*	*P-value*
100	90.9	95.4	90	48.1	50	<0.001

Table 2 Comparison of percentages of correct responses across the five categories with respect to expertise.

CI (%)	*CIH (%)*	*DI (%)*	*DIH (%)*	*CDH (%)*	*P-value*
80.3	90.1	62.1	72.8	93.2	0.08

Table 3 Comparison of correct responses in each category with respect to various dermatoses.

	CI (%)	*CIH(%)*	*DI(%)*	*DIH(%)*	*CDH(%)*	*P value*
Lichen planus	100	100	100	100	100	1
Psoriasis	100	100	100	100	100	1
Lichen planus pigmentosus	87.5	100	100	87.5	100	0.74
Tinea	100	100	75	75	100	0.08
Leprosy	100	100	50	100	100	0.0001
Melasma	87.5	100	87.5	87.5	100	0.73
Nevus	87.5	100	75	87.5	100	0.3
Seborrheic keratosis	87.5	100	75	100	100	0.24
Molluscum contagiosum	100	100	100	100	100	1
Wart	100	100	100	100	100	1
Eczema	100	87.5	62.8	75	100	0.015
Overall average	95.5	98.8	84.1	92.1	100	0.78

dermatoses with a p-value of 0.08 which was not significant. As depicted in above table, the difference between percentages of correct responses across the five categories was statistically significant in leprosy and eczema. The diagnosis in cases of psoriasis, lichen planus, molluscum contagiosum and warts was found to remain unaltered on addition of dermoscopy with 100% correct responses in all categories. Addition of dermoscopy to clinical image and history resulted in increase in the number of correct responses in cases of eczema. The percentage of correct responses in categories CIH and CDH were 98.8% and 100% respectively. Thus, addition of dermoscopy to clinical examination and history increased the precision of diagnosis by 1.2%. The difference among these groups was not statistically significant.

Discussion

Dermoscopy is a non-invasive technique used for diagnosis of various skin disorders. In the present study, we compared the diagnosis of various common dermatological conditions among clinicians with varying levels of experience. The precision of diagnosis improved significantly with increase in experience. We observed that the precision of diagnosis was greater with CI as compared to DI for all participants irrespective of their level of experience. Also the addition of dermoscopy to clinical examination and history increased the precision of diagnosis by 3.03%. The difference among five categories were not found to be significant, which may be because of several factors like decreased experience with dermoscopy, nonspecific features in dermoscopy in certain dermatoses, increased exposure to clinical signs and symptoms in standard textbooks resulting in a degree of comfort level with clinical images. Addition of history to clinical as well as dermoscopic picture increased the percentage of correct responses by about 10% in both categories. This proves the age old dictum of good history taking as important factor in clinical diagnosis.

When the data was compared with the correct responses in each of the five categories with respect to various dermatoses, the authors compared data of the expert and moderately-experienced group and avoided the inexperience group as this would lead to skewed response against dermoscopy. History played a important role in dermoscopy (DIH) increasing the response by 8% over DI as compared to 3% increase of CIH over CI. Most of the participants diagnosed the conditions correctly based on CIH and addition of dermoscopy to this did not alter the diagnosis. This could be because the dermatoses included in this study are very common and have a characteristic clinical presentation and have been routinely diagnosed based on clinical presentation although their

dermoscopic patterns are characterized. Also the data on dermoscopy in skin of colour and atypical manifestations of common dermatoses is limited. There is also a lack of adequate training and application, uncertainty about its usefulness, posing a diagnostic challenge for the clinician.[6]

The limitations of the study was the low sample size particularly while evaluation of individual dermatoses therefore limiting detailed analysis,

Although dermoscopy is a useful diagnostic tool, the importance of clinical examination and history cannot be overlooked and is still invaluable and can suffice for diagnosis of many of the common dermatological conditions and dermoscopy does not significantly augment the clinical diagnosis in common dermatological conditions. While analysis of images (CI and DI) is similar where in the dermatologist attempts to pick up few specific features, these features though existing in both CI and DI have a vast difference in presentation. The difference obtained in this study may be due to the lack of exposure to multiple variations in the dermoscopic images as compared to clinical features which thereby necessitates adequate and improved training and exposure among dermatologist so that better use of this tool can be made in routine practice.

Conclusion

Dermoscopy is an useful tool in dermatological diagnosis which is evolving in terms of its application and user adaptability. The study showed that Clinical examination and history taking is still invaluable and can suffice for the diagnosis of many common dermatological conditions and dermoscopy does not significantly augment the clinical diagnosis in common dermatological conditions.

Declaration of patient consent The authors certify that they have obtained all appropriate patient consent.

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Conflict of interest Authors declared no conflict of interest.

Author's contribution

APJ, VVP: Substantial contributions to study design, manuscript writing, final approval of the version to be published.

APS: Substantial contributions to acquisition of data, manuscript writing, final approval of the version to be published.

PS, AR: Substantial contributions to acquisition of data, critical review, final approval of the version to be published.

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