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**Original Article**

# Diagnostic accuracy ratings in dermatological outpatient department in a tertiary care centre in Kathmandu, Nepal

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## Abstract

***Background*** Diagnostic accuracy ratings of different dermatological disorders are helpful in critical evaluation of correct diagnosis and hence timely management of condition to reduce morbidity and mortality. The objective of this study was to assess diagnostic accuracy in dermatological outpatient department in a tertiary care hospital in Kathmandu, Nepal.

***Methods*** Patients whose clinical diagnosis was not clear or needed further confirmation were subjected to biopsies and were included in the study after history and clinical examination. The clinician was asked to rank three clinical diagnoses in order priority. The first three clinical diagnoses were compared with the final histopathological diagnosis and diagnostic accuracy was calculated in terms of percentage. A comparison of diagnostic accuracy was done between different skin lesions and rashes.

***Results*** Thirty-eight patients (76%) presented with rash and 12 (24%) patients presented with lesions. It was seen that 34 clinical diagnoses (68%) correlated well with final diagnoses. Alopecia, papulo squamous diseases, panniculitis, disorder of pigmentation and urticaria had the highest accurate diagnostic ratings (100% each) followed by eczemas (87.5%), immunobullous diseases (75%), connective tissue diseases (75%), infections (60%), and tumors (57.1%). Vasculitis (0%) and melanocytic disorders (33.3%) had the least diagnostic ratings. The difference between correct and incorrect diagnoses between lesions and rashes was not significant (P >0.05).

***Conclusion*** The diagnostic accuracy of skin lesions in this study is 68%, with the highest accuracy seen with alopecia, papulosquamous diseases, panniculitis, disorder of pigmentation and urticaria. There is no difference in the diagnostic accuracy between lesion and rashes.

***Key words***
Diagnosis; Dermatology; Lesions; Outpatients; Rashes.

## Introduction

Skin diseases are common in medical practice and are one of the top reasons for health facility visits in Nepal.[1,2] They are usually diagnosed clinically most of the time. In cases of difficulty in diagnosis, biopsies are done for correlation and confirmation of clinical diagnosis. Clinical information is usually conveyed to pathologist as a list of differential diagnoses. It is important that the clinician provide nearest diagnoses based on his/ her clinical acumen which will then help pathologist to reach a conclusion. If the information provided is incorrect, it may be

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misleading for the pathologist in making the correct diagnosis. Despite availability of newer technologies such as dermoscopy,[3] or reflectance confocal microscopy for aiding clinical diagnosis, with the exception of infective disorders, histopathological diagnoses are considered the gold-standard for making an accurate diagnosis of dermatological lesions (malignancies) and rashes.[4]

Skin diseases cause a significant impairment in quality of life and are comparable to disability caused by coronary artery disease and asthma in patients.[5,6] The prevalence of skin disease in Nepal is 25% and is associated with significant impairment in quality of life.[7] A correct diagnosis is therefore required in skin diseases for timely management of the condition, to reduce morbidity and socioeconomic burden to the patient which finally improves quality of life. There is scarcity of literature on diagnostic accuracy of skin lesions throughout the world with only few studies found during literature search.[8,9] Moreover, these studies show differences in their findings as mentioned previously. The differences in these findings could be because of difference in experience of clinician and pathologists, the place they are trained from or because of site specific differences in presentation of the lesion, which has not been addressed in these studies.

Furthermore, some knowledge of diagnostic accuracy is needed for critical appraisal of knowledge of treating physician and improving health care services. In this research, as a first attempt for improving skin health care services in our country, diagnostic accuracy of skin lesions and rashes in one of the tertiary care centers of Nepal has been evaluated. Since the results were used to assess diagnostic accuracy of different skin lesions and rashes, the disorders that need more training for diagnosis have been enlisted. The results can be used for formulation of national guidelines in management of common skin conditions in the future which will finally help clinician in managing their patients in a more scientific way. The results can also be used to incorporate topics which require more skill for diagnosis into curriculum of medical schools to produce batches of more skillful doctors. It will also provide grounds to find out causes of difference in diagnostic accuracy in future.

## Methods

The patients attending the dermatological outpatient departments of Maharajgunj Medical campus, Nepal were enrolled the study by the respective assigned consultant dermatologist. After reviewing the history and examination a final clinical diagnosis and differential diagnosis was made. Only patients whose clinical diagnosis were not clear or needed further confirmation were subjected to biopsies and included in the study. The clinician was asked to rank three clinical diagnoses in order priority. Biopsies are a part of regular work in skin outpatient departments for confirmation of diagnoses. They are considered a gold standard for diagnosis and are usually guided by clinical information. The first three clinical diagnoses were compared with the final histopathological diagnosis and diagnostic accuracy was calculated in terms of percentage. A comparison of diagnostic accuracy was done between different skin lesions and rashes.

The data collected for this research was entered in SPSS 25 for final analysis. Descriptive data analysis was done in this study. Frequency and percentage of the categorical variables were calculated. The mean of the continuous variables and ordinal variables were calculated. Chi square test was used to compare diagnostic accuracy of different skin lesions.

The study was approved by the institutional review committee of Institute of Medicine, Maharajgunj, Tribhuvan University (Reference number: 444(6-11)E2 078/079, dated: 20th April 2022).

## Results

There were total 5932 new patients who visited the outpatient department of Dermatology during this study period. Fifty patients (27 males and 23 females) were recruited for this study. The rate of skin biopsy thus accounted for 0.8% of all new patients visited. The mean age of patients was 38.1 (±18.94) years.

Thirty-eight patients (76%) presented with rash and 12 (24%) patients presented with lesions. The final diagnosis of all the cases has been depicted in **Table 1**.

For each disease, diagnostic accuracy was calculated. It was observed that alopecia, papulo squamous diseases, panniculitis, disorder of pigmentation and urticaria had the highest accurate diagnostic ratings (100% each) followed by eczemas (87.5%), immunobullous diseases (75%), connective tissue diseases (75%), infections (60%), and tumors (57.1%).

**Table 1** Final diagnoses of the cases recruited in the study.

| *Diagnosis* | *Frequency (%)* |
|---|---|
| Infections | 5 (10%) |
| Papulosquamous diseases | 1 (2%) |
| Panniculitis | 1 (2%) |
| Urticaria | 1 (2%) |
| Tumours | 7 (14%) |
| Immunobullous diseases | 4 (8%) |
| Alopecia | 7 (14%) |
| Eczemas | 8 (16%) |
| Disorders of hyperpigmentation | 2 (4%) |
| Connective tissue diseases | 4 (8%) |
| Disorders of melanocytes | 3 (6%) |
| Vasculitis | 2 (4%) |
| Others | 5 (10%) |
| Total | 50 (100%) |

**Table 2** Summary of diagnostic accuracies of dermatological diseases.

| *Diseases* | *Incorrect diagnoses* | *Correct diagnoses* | *Total* |
|---|---|---|---|
| Infections | 2 | 3 | 5 |
| Papulosquamous Diseases | 0 | 1 | 1 |
| Panniculitis | 0 | 1 | 1 |
| Urticaria | 0 | 1 | 1 |
| Tumours | 3 | 4 | 7 |
| Immunobullous diseases | 1 | 3 | 4 |
| Alopecias | 0 | 7 | 7 |
| Eczemas | 1 | 7 | 8 |
| Disorder of pigmentation | 0 | 2 | 2 |
| Connective Tissue Diseases | 1 | 3 | 4 |
| Disorder of Melanocytes | 2 | 1 | 3 |
| Vasculitis | 2 | 0 | 2 |
| Others | 4 | 1 | 5 |
| Total | 16 | 34 | 50 |

**Table 3** Comparison of diagnoses among lesion or rashes (P=0.12).

| | *Incorrect diagnoses* | *Correct diagnoses* | *Total* |
|---|---|---|---|
| Rash | 10 | 28 | 38 |
| Lesion | 6 | 6 | 12 |
| Total | 16 | 34 | 50 |

Vasculitis (0%) and melanocytic disorders (33.3%) had the lowest diagnostic ratings. The results are summarized in **Table 2**. Thirty four clinical diagnoses (68%) correlated well with final diagnoses while 16 (32%) did not correlate with any of first three clinical differential diagnoses. The difference between correct and incorrect diagnoses between lesions and rashes were not significant (P>0.05). The results have been shown in **Table 3**.

## Discussion

This study showed that the most common reason for biopsy was to establish the diagnosis of eczemas (16%) followed by skin tumors (14%) and alopecia (14%). In about 10% of the cases included under the heading of others, the diagnoses were inconclusive.

The rate of skin biopsy in our study is low compared to other studies. In one study conducted in western part of Nepal, the rate of skin biopsy was 1.37%,[10] higher than that observed in this study. The most common reason for biopsy in this study included papulosquamous lesions, skin tuberculosis of different types, benign skin tumors, leprosy, connective tissue diseases, and fungal diseases.

In another study from India, the common causes of biopsies included lichenoid dermatitis, discoid lupus erythematosus, psoriasis and eczemas.[11] S. McCusker and G. Dawn from Scotland published a paper on personal diagnostic accuracies, in which 40% of the lesions underwent biopsy,[12] a completely different picture from our study. The differences in presentation of skin diseases in different geographical reason explains the difference in biopsy rates in our study as compared to other studies.

The diagnostic accuracy of different skin conditions in this study roughly gives an idea about clinical acumen of the treating physician. Alopecia, papulosquamous diseases, panniculitis, disorder of pigmentation and urticaria had highest diagnostic accuracy in this study. The discordant diagnoses were mostly seen in cases of vasculitis and melanocytic disorders.

There have been previous studies on diagnostic accuracies of skin lesions and rashes with varied results. In one of the studies,[11] it was found that concordance between 1$^{st}$ three clinical diagnosis and histopathological diagnosis was 90.5%, much higher than in our studies. Aslan *et al*. reported the concordance rate of 76.8%, also higher than our study.[13] McKusker S *et al*. reported the diagnostic accuracy of 60% for rashes and around 80% for lesions.[12]

The main limitation of this study is that this research is carried out in a single center. The pathologists involved in assessment of the histopathological slides may not be accurate or up to standards in making diagnosis because of the lack of training in dermatopathology or because of lack of advanced diagnostic techniques like immunohistochemistry.

## Conclusion

The diagnostic accuracy of skin lesions in a tertiary care center is 68%, with highest accuracy seen with alopecia, papulosquamous diseases, panniculitis, disorder of pigmentation and urticaria. There is no difference in the diagnostic accuracy between lesion and rashes.

This research highlights the importance and need of training programs in skin diseases, targeting lowest diagnostic accuracies-vasculitis and melanocytic disorders. Moreover, because of overall diagnostic accuracy of around 68%, emphasis must be given during training program in these disorders to increase the diagnostic capabilities of budding physicians.

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***Authors' contribution***

**OP:** Substantial contribution to study design, manuscript writing, final approval of the version to be published.

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