RESEARCH ARTICLE

Clinical accuracy of dermatologists and nondermatologists in the diagnosis of dermatological diseases

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Abstract

Objective: To compare the clinical diagnostic accuracy of dermatologists and non-dermatologists in the diagnosis of dermatological diseases.

Method: The descriptive, cross-sectional study was conducted at the Dermatopathology department of a tertiary healthcare hospital in the Punjab province of Pakistan from January 1 to December 31, 2019, and comprised biopsy specimens of patients with diseases of the skin and subcutaneous tissue. The clinical diagnoses of general surgeons, otolaryngologists, dental/maxillofacial surgeons, plastic surgeons and gynaecologists were noted and compared with those of dermatologists in the light of histopathological findings. Data was analysed using SPSS 16.

Results: Of the 386 specimens submitted, 113(29.3%) were sent by dermatologists and 273(70.7%) by non-dermatologists. Clinical diagnostic accuracy of dermatologists 92(81.4%) compared to non-dermatologists 137(50.2%) ($p<0.005$). The dermatologists diagnosed significantly more cases belonging to inflammatory and miscellaneous cutaneous diseases category accurately than non-dermatologists ($p<0.005$). Similarly, the dermatologists diagnosed significantly more cases of neoplastic disorders accurately than the non-dermatologists ($p= 0.018$). There was no significant difference in the clinical diagnostic accuracy of dermatologists and non-dermatologists in cases of cystic lesions ($p>0.05$). In the neoplastic category, no significant difference was found in the clinical accuracy of dermatologists and plastic surgeons ($p=0.347$).

Conclusions: The specialised skills of dermatologists could not be matched by any other group of physicians.

Keywords: Diagnostic accuracy, Dermatologist, Surgical excision, Dermatological diseases, Histopathological diagnosis.

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Introduction

Dermatological diseases are the fourth leading cause of disease-related morbidity worldwide and account for 12.4% to 14% of all diseases seen by family physicians.[1,2] In the United States, approximately 6% of outpatient visits are for dermatological diseases. Approximately 60% of the patients with skin and subcutaneous diseases are managed by non-dermatologists.[3-5] Obviously, non-dermatologists perform poorly in the diagnosis and treatment of skin diseases.[4-8]

Sellheyer K, et al.[6] and Federman D, et al.[9] have reported that the clinical diagnostic abilities of non-dermatologist physicians are low compared to dermatologists.

The current study was planned to compare the clinical diagnostic accuracy of dermatologists and non-dermatologists in the diagnosis of dermatological diseases in the local context.

Materials and Methods

The descriptive, cross-sectional study was conducted at the Dermatopathology department of a tertiary healthcare hospital in the Punjab province of Pakistan from January 1 to December 31, 2019. After approval from the institutional ethics review committee, the sample was raised from among the biopsy specimens of patients with a clinical diagnosis indicating diseases of the skin and subcutaneous tissue. Cases without clinical information or diagnosis were also included if a pathological diagnosis of dermatological disease was made. Specimens included were from the study hospital as well as from and a number of other hospitals and clinics where histopathology services were not available. Those not meeting the inclusion criteria were excluded.

The term biopsy was used to describe various surgical methods performed for the removal of tissues for examination by a histopathologist to establish a precise diagnosis. The clinical data submitted by the clinicians with the biopsy specimens were used to gather information about the patients and clinical diagnosis. The age of the patient and gender was recorded for each patient. The speciality of the submitting clinician and the type of biopsy requested were also noted. The specimens were processed and slides were prepared for examination under a microscope by a team comprising a dermatologist and a histopathologist. The histopathological diagnosis for each case was made jointly by the dermatologist and the

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histopathologist. The histopathological diagnoses were grouped into three broad categories of neoplastic diseases, cystic disorders, and inflammatory and miscellaneous diseases. Clinical and histopathological diagnoses for each case were compared to know the diagnostic accuracy. Clinical diagnosis was considered correct if any of the clinical diagnoses mentioned by the submitting clinician in the list of differential diagnoses was confirmed histopathologically. The clinical diagnosis was considered incorrect if the histopathological diagnosis did not match any of the clinical diagnoses mentioned. Clinical diagnosis was also considered incorrect in case only a single clinical diagnosis was mentioned and it was not confirmed histopathologically. The diagnosis was also considered incorrect if no clinical diagnosis was mentioned or no relevant clinical data was provided by the submitting clinician. Nonspecific clinical informations, such as rash, change, growth or swelling, were considered incorrect as they implied a vast majority of different diseases and did not relate to a specific dermatological diagnosis.

Data was analysed using SPSS 16. Mean and standard deviations as well as frequencies and percentages were used to express data, as appropriate. Pearson's chi-square test was used to compare the categorical data between the groups.

Results

Of the 4,091 biopsy specimens received for histopathological diagnosis, 386(%) were analysed. The specimens belonged to 248(64.3%) male patients and 138(35.8%) female patients who had an overall mean age of 44.01±18.66 years (range: 1-95 years).

Excision biopsy was most commonly performed procedure 195(50.5%), followed by incisional biopsies 146(37.8%). (Table 1).

Of the 386 specimens submitted, 113(29.3%) were sent by dermatologists and 273(70.7%) by non-dermatologists. Besides, 126(32.6%) specimens belonged to the category of inflammatory and miscellaneous cutaneous diseases, 57(14.8%) to the category of cystic disorders, and 203(52.6%) to the category of neoplastic disorders (Figure).

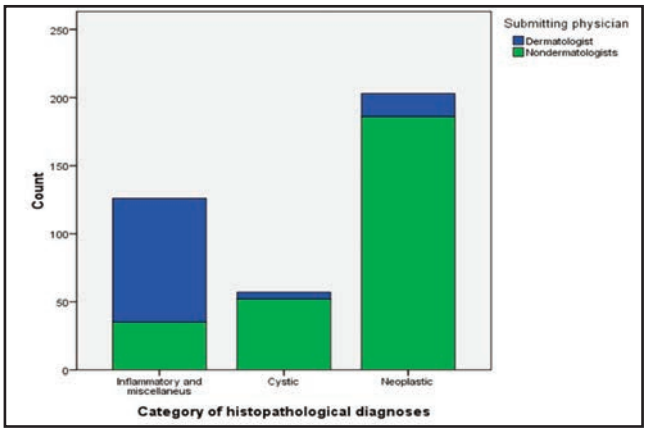

Figure: Number of biopsies submitted by dermatologists and non-dermatologists.

Table-1: Types of biopsies submitted by dermatologists and non-dermatologists.

Physicians		Type of biopsy				Total
		Excision biopsy	Incisional biopsy	Mucosal biopsy	Punch biopsy	
Dermatologist	Count	12	74	2	25	113
	% within Referring Physician	10.6%	65.5%	1.8%	22.1%	100.0%
	% within Type of biopsy	6.2%	50.7%	10.0%	100.0%	29.3%
General Surgeons	Count	143	43	2	Nil	188
	% within Referring Physician	76.1%	22.9%	1.1%	Nil	100.0%
	% within Type of biopsy	73.3%	29.5%	10.0%	Nil	48.7%
Otolaryngologists	Count	7	6	10	Nil	23
	% within Referring Physician	30.4%	26.1%	43.5%	Nil	100.0%
	% within Type of biopsy	3.6%	4.1%	50.0%	Nil	6.0%
Dental/Maxillofacial surgeon	Count	4	5	6	Nil	15
	% within Referring Physician	26.7%	33.3%	40.0%	Nil	100.0%
	% within Type of biopsy	2.1%	3.4%	30.0%	Nil	3.9%
Plastic surgeon	Count	27	17	Nil	Nil	44
	% within Referring Physician	61.4%	38.6%	Nil	Nil	100.0%
	% within Type of biopsy	13.8%	11.6%	Nil	Nil	11.4%
Gynaecologist	Count	2	1	Nil	Nil	3
	% within Referring Physician	66.7%	33.3%	Nil	Nil	100.0%
	% within Type of biopsy	1.0%	0.7%	Nil	Nil	0.8%
Total	Count	195	146	20	25	386
	% within Referring Physician	50.5%	37.8%	5.2%	6.5%	100.0%
	% within Type of biopsy	100.0%	100.0%	100.0%	100.0%	100.0%

Clinical diagnostic accuracy of dermatologists 92(81.4%) compared to non-dermatologists 137(50.2%) (p<0.005) (Table 2).

The overall clinical diagnostic accuracy in cases of inflammatory and miscellaneous cutaneous diseases between dermatologists and non-dermatologists was significantly different.

Overall clinical diagnostic accuracy in cases of cystic disorders between dermatologists and non-dermatologists was not significant (p=0.279).

In cases of neoplastic disorders, overall clinical diagnostic accuracy of dermatologists and non-dermatologists was significantly different (p=0.018).

Plastic surgeons diagnosed the largest number of neoplastic disorders accurately amongst the non-dermatologists, but there was no significant difference in the clinical diagnostic accuracy of dermatologists and plastic surgeons in diagnosing neoplastic disorders (p=0.347) (Table 3).

Table-2: Clinical diagnostic accuracy of different physicians.

	Referring Physician	Clinical diagnostic accuracy n (%)	Category of diagnosis Histopathological	Clinical diagnostic accuracy n (%)
Dermatologist	Dermatologist	92 (81.4)	Inflammatory and miscellaneous	74 (81.3)
			Cystic	4 (80.0)
			Neoplastic	14 (82.4)
Non-dermatologists	General surgeons	97 (51.6)	Inflammatory and miscellaneous	9 (37.5)
			Cystic	26 (56.3)
			Neoplastic	62 (53.0)
	Otolaryngologists	7 (30.4)	Inflammatory and miscellaneous	1 (50.0)
			Cystic	1 (100)
			Neoplastic	5 (25.01
	Dental/Maxillofacial surgeons	4 (26.7)	Inflammatory and miscellaneous	-
			Cystic	1 (-)
			Neoplastic	3 (25)
	Plastic surgeons	26 (59.1)	Inflammatory and miscellaneous	-
			Neoplastic	26 (70.3)
	Gynaecologists	3 (100)	Inflammatory and miscellaneous	1 (100)
			Cystic	2 (100)

Table-3: Clinical diagnostic accuracy of physicians in diagnosing three categories of histopathological diagnoses.

Diseases	Referring Physician		Correct clinical diagnosis n (%)	Total cases	p- value (dermatologists vs non-dermatologists
Inflammatory	Dermatologists		74 (81.3)	91	<0.001
and miscellaneous	Non-dermatologists	General surgeon	9 (37.5)	24	
		Otolaryngologist	1 (50.0)	2	
		Dental/Maxillofacial surgeon	-	1	
		Plastic surgeon	-	7	
		Gynaecologist	1 (100)	1	
		Total	11 (31.4)	35	
Cystic	Dermatologists		4 (80)	5	0.279
	Non-dermatologists	General surgeon	26 (55.3)	47	
		Otolaryngologist	1 (100)	1	
		Dental/Maxillofacial surgeon	1 (50)	2	
		Gynaecologist	2 (100)	2	
		Total	30 (57.7)	52	
Neoplastic	Dermatologists		14 (82.4)	17	0.018
	Non-dermatologists	General surgeon	62 (53)	117	
		Otolaryngologist	5 (25)	20	
		Dental/Maxillofacial surgeon	3 (25)	12	
		Plastic surgeon	26 (70.3)	37	
		Total	96 (51.6)	186	

Discussion

Patients with skin diseases form a major proportion of total patients seen by general practitioners (GPs) and family physicians worldwide.[1-3,5,8-10] Around one-quarter of the entire American population was seen by their GPs for some form of skin disease in 2013.[2] Only 6.1% of the patients with skin disease were referred for specialist advice.[8] Non-dermatologists treat a large percentage of patients with skin problems.[2-5]

Many studies have explored the diagnosis and treatment of skin diseases by non-dermatologists and compared it with dermatologists.[4-7,8-12] Non-dermatologists have poor clinical knowledge of skin disorders, and a vast number of non-dermatologists are under a false perception that they can manage skin diseases.[4-12] Non-dermatologists prescribe unnecessary tests and perform unnecessary excisions of the skin lesions.[6,7] The dermatologists are most likely to use the most cost-effective treatment.[6,7,13-15]

The present study was unique in the way that it analysed the clinical diagnostic accuracy of dermatologists and non-dermatologists in the prospective context, and did not rely on hospital record.

It was found that dermatologists diagnosed significantly more cases accurately when compared with non-dermatologists ($p<0.05$). Similar findings have been reported earlier.[6,7,10-17]

General surgeons performed the largest number of cutaneous surgical excisions and submitted a maximum number of biopsies, but their clinical diagnosis matched the histopathological diagnosis in only 51.6% of the cases. Their clinical diagnostic accuracy was significantly less than dermatologists ($p<0.005$), even in the case of neoplastic skin disorders ($p=0.022$). The findings were similar to those of Brodkin RH, et al.[17]

Patients with skin diseases affecting the head and neck region frequently present to otolaryngologists, dental/maxillofacial surgeons and plastic surgeons.[18-21] Skin cancers, including melanoma, most frequently affect the head and neck region, including the face and the oral cavity.[19,20] These surgical subspecialists very frequently perform excisions of skin lesions affecting the head and neck region.[17,19,20]

The current study found that the clinical diagnostic accuracy of plastic surgeons was only 59.1% which was significantly less than dermatologists who had a clinical diagnostic accuracy of 81.4% ($p=0.004$). Plastic surgeons performed a little better than general surgeons (59.1% vs 51.6%). But there was no significant difference in the clinical diagnostic accuracy of plastic surgeons and general surgeons ($p>0.05$). Plastic surgeons performed better in clinically diagnosing neoplastic skin disorders. Their clinical diagnostic accuracy was 70.3%. The clinical diagnostic accuracy of plastic surgeons in the cases of neoplastic skin disorders trailed behind that of dermatologists (82.4%), but the difference was not significant ($p=0.347$). Similar findings have been reported previously.[17,22,23]

Otolaryngologists are another group of non-dermatologists who manage skin diseases affecting the head and neck region.[17,18,21] The current study found that their clinical diagnostic accuracy was only 30.4% which was significantly less than dermatologists ($p<0.005$). Their clinical diagnostic accuracy in the case of neoplastic diseases was 25% which was significantly lower than dermatologists ($p=0.001$). Maxillofacial surgeons apart from treating disease of the oral cavity also perform cosmetic surgeries of the face.[21,24] The current study compared their overall clinical diagnostic accuracy and clinical diagnostic accuracy in cases of neoplastic dermatological diseases. They clinically diagnosed 26.7% of the cases overall and 25% of the neoplastic disorders correctly for which biopsy specimens were submitted. This was significantly less than dermatologists ($p<0.005$ and $p=0.002$). The findings were in concordance with previous studies.[14,15,17,21]

Thus, it is obvious that the diagnostic skill of the clinicians is related to their training and the type of diseases routinely managed. Dermatologists are supposed to perform better in the diagnosis and treatment of skin diseases given their specialised training in dermatology and their experience in the management of skin diseases. The specialised skills of dermatologists in the diagnosis and management of skin diseases cannot be matched by any of the group of physicians.[25]

Because of better clinical skills, dermatologists are less likely to perform unnecessary and inappropriate surgical excisions.[15,23] Diagnosis and management of skin diseases is the responsibility of dermatologists. Early referral to the dermatologist by the consultants and GPs should be practised. Due to delay, the disease becomes chronic and difficult to treat, in addition to causing psychological stress to the patient. Consulting a dermatologist before performing a biopsy for the purpose of diagnosis and treatment would be beneficial and reduce the cost of treatment. Although the current study has clearly pointed out that the clinical diagnostic accuracy of dermatologists was significantly high compared to non-dermatologists, a limited number of biopsy specimens from a single centre were included which is the main limitation of the current study.

Conclusion

The specialised skills of dermatologists in the clinical diagnosis of dermatological diseases could not be matched by any other group of physicians. Consulting a dermatologist before performing surgical excision of dermatological diseases for the purpose of diagnosis or treatment would be beneficial, save the patients from unnecessary excisions and reduce the cost of treatment.

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