

A Retrospective Study to Evaluate the Impact of In-Patient Dermatological Consultations on Diagnostic Accuracy in a Tertiary Care Setting

Abstract

Background: Dermatology is primarily an outpatient specialty. However, dermatology consultations play an important role in care of inpatients. Data on inpatient dermatological consultations in tertiary care settings is limited. **Objectives:** To evaluate clinical characteristics of inpatient dermatological consultations and effect on clinical outcomes in a tertiary care setting. **Methods:** This was a single-center retrospective study where the records of all dermatological consultations for patients admitted under various specialties, emergency services, and intensive care units (ICU) at our tertiary care institute over 2 years period were reviewed. The details of patients, primary care unit, dermatological complaints, diagnosis, investigations performed, treatment given, and follow-up were recorded and analyzed. **Results:** Total of 1717 dermatologic consultations (1000 males) were recorded, with mean age of study population being 33.6 ± 21.6 years (median - 32 years). Out of total 1717 patients, 136 (7.9%), 321 (18.7%), 1135 (66.1%), and 125 (7.3%) patients were infants, children, adolescents, adults, and elderly, respectively. The most frequent diagnostic group was infective diseases (586; 34.1%) followed by inflammatory diseases (442; 25.7%), mucocutaneous adverse drug reactions (160; 9.3%), and autoimmune diseases (65; 3.8%). Primary team's diagnosis was concordant with the dermatology consultation in 1112 (64.8%) patients and discordant observations were recorded in 605 patients (35.2%). Most discordant dermatological diagnoses included inflammatory disorders such as lichen planus, atopic dermatitis, bullous pemphigoid; mechanical disorders; nutritional deficiency disorders, and benign neoplasms. **Conclusion:** Common skin conditions account for a large majority of dermatologic consultations in a hospital setting. Inpatient dermatology consultations improve the diagnostic accuracy.

Keywords: Concordance, hospital dermatology, inpatient dermatology consultation

Introduction

Inpatient dermatological consultations for patients admitted under non-dermatology specialties form an important aspect of holistic patient care and can have a significant positive impact on patient management.^[1-3] A dermatology consultation for an inpatient may be sought for a pre-existing dermatological disease (either unrelated to a primary disease or resulting from the primary disease for which the admission was performed), or a new-onset dermatological disease during in-patient stay (cutaneous manifestations resulting from treatment of the primary disease for which the admission was performed, mechanical skin injury due to prolonged immobilization, infections, and others). Many a times, these manifestations are overlooked or misdiagnosed by

non-dermatologists.^[4,5] The published literature from developing countries on inpatient dermatological consultations and its influence on patient outcomes is scarce. We performed this retrospective study to evaluate the clinical and epidemiological characteristics of inpatients dermatological consultations, and to assess the effect of dermatology consultation on patient outcome.

Materials and Methods

This retrospective study was conducted at a tertiary care academic center in north India, where in, the records of all dermatological consultations of inpatients admitted under various specialties, emergency services, and intensive care units (ICU) from July 2017 to June 2019 were reviewed. The details of patients including age, sex,

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Access this article online

Website: www.idoj.in

DOI: 10.4103/idoj.IDOJ_555_20

Quick Response Code:



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How to cite this article: Vinay K, Thakur V, Choudhary R, Dev A, Chatterjee D, Handa S. A retrospective study to evaluate the impact of in-patient dermatological consultations on diagnostic accuracy in a tertiary care setting. Indian Dermatol Online J 2021;12:417-22.

Received: 19-Jul-2020. **Revised:** 25-Aug-2020.

Accepted: 24-Sep-2020. **Published:** 12-May-2021.

primary care unit, dermatological complaints and duration, diagnosis, investigations performed, treatment given, and follow-up were recorded and analyzed. Inpatients of dermatology wards and patients attending the day-care units were excluded from the study. The consultations were provided by a dermatology resident and/or a registrar under the supervision of a consultant dermatologist. The dermatological concerns were classified based on the duration of complaint as acute (present for <1 week), subacute (present for 1 week to 1 month), chronic (present for 1 to 6 months), and longstanding (present for >6 months). The specialties requesting dermatologic consultations were recorded as internal medicine and its subspecialties, surgery and its subspecialties, ICU, emergency services, obstetrics and gynecology, pediatrics, ophthalmology, and otorhinolaryngology. Diseases were categorized as infective, inflammatory dermatoses, autoimmune diseases, mucocutaneous side-effects of drugs and neoplasms, etc., Agreement between the consulting team and final dermatological diagnosis was also analyzed and recorded as concordant or discordant.

Results

Demography of inpatients and duration of dermatologic complaints

During the study period, a total of 1717 dermatologic consultations were recorded, of which 1000 patients were males. Mean age of the study population was 33.6 ± 21.6 years (median - 32 years; range; 1 day-93 years). Majority of patients were adults 1135 (66.1%); infants, children, adolescents accounted for 457 (26.6%) patients, and 125 (7.3%) were elderly. Duration of dermatologic concern was acute in 773 (45%) patients, subacute in 393 (22.9%) patients, chronic in 279 (16.2%) patients and longstanding in 243 (14.2%) patients. Cutaneous lesions had subsided in 29 (1.7%) patients by the time of dermatologic consultation.

Specialties seeking dermatologic consultation

The specialties requesting dermatological consultations are listed in Table 1. Six hundred ninety nine (40.8%) dermatologic consultation requests were from internal medicine and its subspecialties followed by surgery and its subspecialties (365; 21.4%), pediatrics (252; 14.7%), obstetrics and gynecology (124; 7.2%). One-hundred and ninety (11.1%) and 50 (2.9%) requests for dermatologic consultations were received from emergency services and ICU respectively.

Agreement between primary team's diagnosis and dermatology consultation diagnosis

Of total 1717 patients, primary team's diagnosis was concordant with the dermatology consultation in 1112 (64.8%) patients. However, discordant observations

were recorded in 605 patients (35.2%). Concordance rates observed in various specialties (in decreasing order) were pediatrics (71.4%), internal medicine (65.8%), emergency services (65.8%), obstetrics and gynecology (65.3%), surgery (61.1%), ICU (60%), otorhinolaryngology (57.9%), and ophthalmology (55.5%) [Figure 1a]. Among internal medicine specialties, the highest concordance was observed in rheumatology (82.3%) and hematology (73.8%).

Broad categories of dermatologic diagnoses made

The most frequent diagnostic group was infective diseases (586; 34.1%) followed by inflammatory diseases (442; 25.7%), mucocutaneous adverse drug reactions (160; 9.3%) and autoimmune diseases (65; 3.8%). Neoplasms, pigmentary disorders, and hair disorders were present in 22 (1.3%), 21 (1.2%), and 8 (0.5%) patients, respectively [Figure 1b]. In internal medicine, infections including viral and fungal, vasculitis and connective tissue diseases, and eczematous disorders were among the commonly encountered dermatoses. In surgical specialties, the most common dermatoses found were dermatophytosis, scabies, herpes zoster, drug rash, and irritant contact dermatitis. In pediatrics, most common dermatoses were maculopapular drug rash, viral exanthem, atopic dermatitis, and scabies. Adverse cutaneous drug reaction was most frequently encountered dermatoses in emergency services. Various dermatological diagnoses made in all patients are listed in Table 2. Various investigations were performed in 254 patients (14.8%) as listed in Table 3. All patients seen during consultations were treated accordingly and procedures such as electrocautery, cryotherapy, and chemical cautery were done in 17 (1%) patients.

Discussion

Dermatology is considered primarily an outpatient specialty. However, the concept of "hospital dermatology" is increasingly expanding, given the number of inpatients admitted in specialties other than dermatology, who have dermatological complaints. Moreover, the profile of these patients is different from the ones routinely seen in dermatology clinics. In addition, due to apparent visibility, and usually symptomatic nature of skin lesions arising even in the setting of a primary non-dermatologic disease, it can cause tremendous anxiety to the patients and their attendants.

The availability of inpatient dermatological consultations depends on the availability of proficiency (primary/secondary vs tertiary), the specialty branches catered for, and hospital setting (academic vs private).^[6] Primary cutaneous ailments are often misdiagnosed and inappropriately treated by non-dermatologists, which might lead to prolonged hospitalization and undue burden on the health care system.^[7] Also, dermatological consultations of inpatients contribute to an accurate diagnosis and better management of the primary systemic illness. Therefore,

Table 1: Inpatient dermatological consultations from different specialities

Specialty	No. of patients (%)	Concordant (%)	Discordant (%)
Total	1717	1112 (64.8)	605 (35.2)
Internal medicine	699 (40.8)	460 (65.8)	239 (34.2)
General medicine	163 (9.5)	110 (67.5)	53 (32.5)
Gastroenterology	84 (4.9)	51 (60.7)	33 (39.3)
Neurology	82 (4.8)	53 (64.6)	29 (35.4)
Psychiatry	77 (4.5)	49 (63.6)	28 (36.4)
Nephrology	67 (3.9)	45 (67.2)	22 (32.8)
Hematology	61 (3.6)	45 (73.8)	16 (26.2)
Cardiology	45 (2.6)	30 (66.7)	15 (33.3)
Hepatology	45 (2.6)	28 (62.2)	17 (37.8)
Endocrinology	37 (2.2)	25 (67.6)	12 (32.4)
Pulmonology	21 (1.2)	10 (47.6)	11 (52.4)
Rheumatology	17 (1)	14 (82.4)	3 (17.6)
Surgery	365 (21.4)	223 (61.1)	142 (38.9)
General surgery	142 (8.3)	92 (64.8)	50 (35.2)
Orthopedics	69 (4)	44 (63.8)	25 (36.2)
Neurosurgery	43 (2.5)	23 (53.5)	20 (46.5)
Urology	39 (2.3)	26 (66.7)	13 (33.3)
Cardiothoracic and vascular surgery	26 (1.5)	9 (34.6)	17 (65.4)
Trauma	25 (1.5)	15 (60)	10 (40)
Plastic surgery	13 (0.8)	8 (61.5)	5 (38.5)
Renal Transplant surgery	8 (0.5)	6 (75)	2 (25)
Pediatrics	252 (14.7)	180 (71.4)	72 (28.6)
Obstetrics and gynecology	124 (7.2)	81 (65.3)	43 (34.7)
Emergency services	190 (11.1)	125 (65.8)	65 (34.2)
Intensive care units	50 (2.9)	30 (60)	20 (40)
Otorhinolaryngology	19 (1.1)	11 (57.9)	8 (42.1)
Ophthalmology	18 (1)	10 (55.5)	8 (44.5)

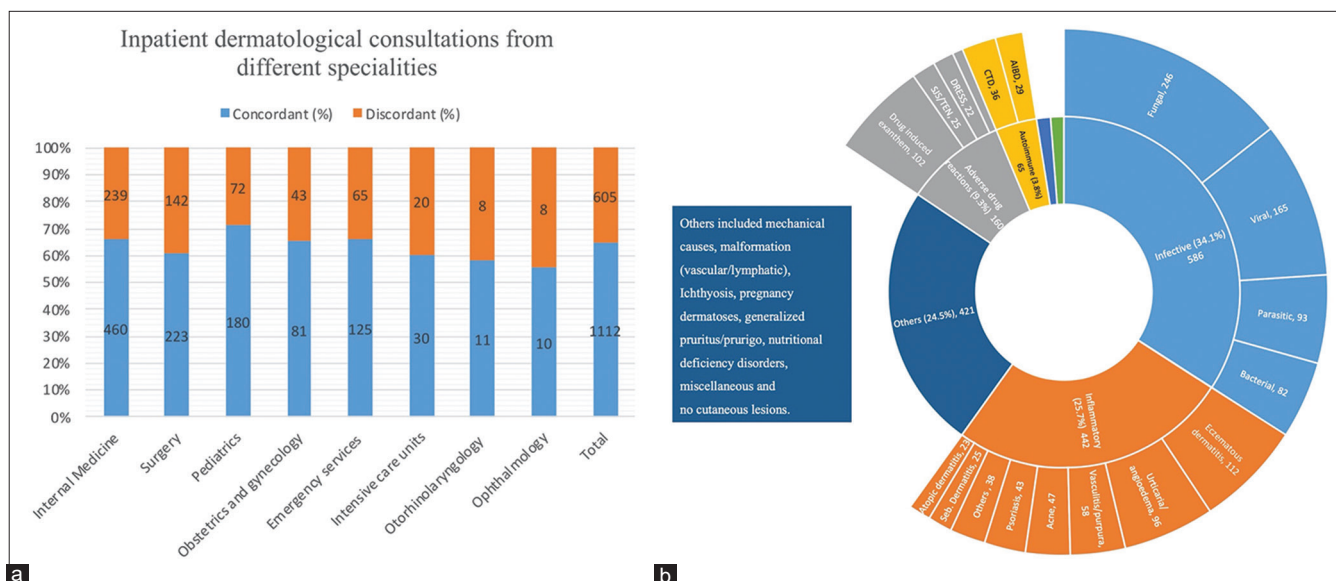


Figure 1: (a) Bar chart showing concordance rates of dermatological consultations among different specialities. (b) Pie chart demonstrating various dermatological diagnoses in patients of all specialities

Table 2: Classification of diagnoses of inpatients' dermatologic consultations

Diagnosis	Number of patients (%); n=1717
Infective	586 (34.1)
Viral	165 (9.6%)
Varicella/Herpes zoster	72
Herpes simplex	48
Viral exanthem	29
Warts	11
Molluscum contagiosum	5
Fungal	246 (14.3)
Candidiasis	68
Dermatophytosis/onychomycosis	168
Deep fungal infection	10
Bacterial	82 (4.8)
Cellulitis/furuncle/bullous impetigo/folliculitis/SSSS/ecthyma	75
Leprosy	1
Syphilis	6
Scabies/pediculosis	93 (5.4)
Inflammatory	442 (25.7)
Atopic dermatitis	23
Eczematous dermatitis	112
Seborrheic dermatitis	25
Psoriasis	43
Acne	47
Urticaria and angioedema	96
Erythema Multiforme	11
Vasculitis/purpura	58
Panniculitis	7
Lichen planus	11
GVHD	2
Pyoderma gangrenosum	7
Adverse drug reactions	160 (9.3)
Drug induced exanthem	102
DRESS	22
SJS/TEN	25
FDE	3
Methotrexate toxicity	4
Adverse reactions to chemotherapy	4
Autoimmune	65 (3.8)
Lupus erythematosus/other CTDs	36
Pemphigus/other intraepidermal blistering diseases	15
Bullous pemphigoid/other sub-epidermal blistering diseases	14
Neoplasms	22 (1.3)
SCC	1
Melanoma	1
Leukemia cutis	4
Cutaneous metastasis (others)	2
Benign lesions	14

Contd...

Table 2: Contd...

Diagnosis	Number of patients (%); n=1717
Pigmentary disorders	21 (1.2)
Melasma	17
Vitiligo	4
Hair disorders (alopecia/telogen effluvium)	8 (0.5)
Others	413 (24)
Mechanical	87
Malformation (vascular/lymphatic)	9
Ichthyosis	8
Pregnancy dermatoses	13
Generalized pruritus/prurigo	39
Nutritional deficiency disorders	16
Miscellaneous	212
No cutaneous lesions	29

#CTDs - connective tissue diseases; DRESS - drug rash eosinophilia and systemic symptoms; FDE - fixed drug eruption; GVHD - graft versus host disease; SCC - squamous cell carcinoma; SJS - Stevens Johnson syndrome; TEN - toxic epidermal necrolysis

Table 3: Investigations and procedures performed during dermatologic consultations

Investigations Performed	Number of patients (%); n=1717
Overall	254 (14.8)
Skin Biopsy	68 (4)
Histopathology	67 (3.9)
Consistent with clinical diagnosis	44/67 (65.7)
Not consistent with clinical diagnosis Inconclusive	5/67 (7.5)
Direct Immunofluorescence	18/67 (26.8)
KOH	21 (1.2)
Tzanck smear	85 (5)
Wound swab C/S	65 (3.8)
Gram stain	37 (2.2)
Slit Skin smear	21 (1.2)
FNAC	8 (0.5)
	4 (0.2)
Procedures	
Extirpation and KOH cautery	7
Electrocautery	6
Cryotherapy	2
Chemical Cautery	2

#C/S - culture sensitivity; FNAC - fine needle aspiration cytology

a proficient dermatologist is invaluable in the holistic management of a patient with cutaneous signs and symptoms.

This study is one of the largest inpatient dermatology consultation data till date. We observed that consult requests occurred most commonly in patients between 19 and 64 years of age (66.1%), which is consistent with the study by Falanga *et al.*^[5] In the present study, as well as in other published studies,^[6,8,9] the proportion of dermatological

requests made by internal medicine was highest. A recent study from India also showed a similar pattern with respect to the number of consultations from different departments.^[10] However, in our study, gastroenterology, nephrology, hematology requests also formed a major share as seen in a study by Williams *et al.*^[11] The substantial number of requests made by these specialties could be attributed to the number of patients admitted to their care.

The most frequent dermatoses observed in previous studies were infections, eczema, and adverse drug reactions,^[6,8] which were also the most common diagnoses in our study. Skin infections are frequent in the outpatient setting,^[12] but are even more prevalent in inpatients, probably due to the concomitant immunosuppression and associated co-morbidities in some patients. Eczematous dermatitis is one of the most common dermatological problems encountered in dermatology outpatients,^[12] and was also quite prevalent in inpatients. Limited mobility, and exposure to antiseptics, dressings, occlusion, diapers on hospital admission can attribute to eczematous dermatoses in these patients. Drugs, especially calcium channel blockers, ACE inhibitors, diuretics, and statins are important causes of eczematous eruption in the elderly.^[13] Hospital admission also leads to the administration of multiple drugs to the patient, especially antibiotics, analgesics, antiepileptics, and neuroleptics, which are frequent causes of drug reactions, including DRESS and SJS/TEN.

Our study showed that the change in the diagnosis and treatment based on dermatologic consultation occurred in 35.2% of the cases reviewed. Similar concordance rates have been observed in previous studies and have shown the change in diagnosis after dermatology consultations in almost 30–78% patients.^[1,5,14,15] Thus, such high rates of misdiagnosis by the primary treatment unit may result in inappropriate management of the patients, prolonged hospital

stay, and unacceptably high morbidity and mortality rates for the affected patients. Considering that in-patient consultation altered the management in nearly one-third of patients in whom dermatology services were sought, an ideal practice model must include a dedicated dermatology unit for inpatient consultation at least in secondary and tertiary care centers.

Inpatient dermatological consultations remain an important component of residency training and an adequate weightage should be provided for it in the residency program. This is especially needed with declining trends in number of admitted patients in dermatology wards. Deficiencies of inpatient dermatology consultations in residency training programs have also been addressed in previous studies.^[16,17] Assigning dermatology residents to inpatient consultation allows more exposure in terms of hospital dermatology, and such residents are more likely to be comfortable in hospital dermatology after graduation. Moreover, certain dermatoses such as cutaneous manifestations of systemic diseases, drug eruptions, and viral exanthem are more likely to be seen in an inpatient scenario vis-à-vis clinic consultations. The major limitation of our study is its retrospective nature. Some final diagnoses and diagnostic tests results, which were delivered after hospital discharge, could not be recorded.

Common dermatologic conditions, especially infective and inflammatory dermatoses, account for majority of dermatologic consultations in a hospital setting. Difficulty in recognition and management of such common dermatoses extends to all medical disciplines and dermatology consultation altered the final management in nearly one-third of patients. Therefore, a multidisciplinary interaction and a dedicated dermatology unit for inpatient consultation are necessary to provide holistic patient care.

Acknowledgements

Dr. Anuradha Bishnoi, Assistant Professor, Department of Dermatology, Venereology and Leprology, Post Graduate Institute of Medical Education and Research, Chandigarh, for manuscript editing.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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