A prospective clinical study of cutaneous manifestations in patients with renal disease

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Abstract
Patients with renal disease presented with at least one cutaneous manifestation. The common cutaneous changes seen in our study were xerosis, pruritus, hyperpigmentation, infections, perforating dermatosis, hair changes, nail changes, oral cavity lesions and miscellaneous changes. Cutaneous changes were more in patients on medical management than on dialysis. The cutaneous changes increased with the severity of the renal disease. Stage 5 renal disease patients showed more cutaneous changes than stage 4 and stage 3. Early diagnosis and treatment of these skin lesions are essential to reduce patients' morbidity and mortality and improve their quality of life.

Keywords: ESRD, Dermatosis.

Introduction
Skin is the mirror of internal diseases. Many systemic diseases produce skin manifestations before or after the onset of systemic events.[1] Signs and symptoms in the skin and mucous membranes support the diagnosis of internal diseases or form a part in the initial presentation of the disease.[2] Diseases of the kidneys are often clinically 'silent' and are detected by biochemical testing of blood urea and serum creatinine.[3] Kidney diseases are divided into acute kidney injury and chronic kidney diseases. A broad range of skin diseases occurs in patients with end-stage renal disease (ESRD). Some of these conditions are benign and have little impact on a patient's quality of life; however, others have a more significant effect on the quality of life, physically disabling and even life-threatening. They mostly result from a combination of factors, like comorbid conditions and electrolyte imbalances[4] Cutaneous manifestations occur due to an underlying pathological process that causes renal diseases related to the severity and duration of renal diseases.[5] About 50-100% of patients with End-stage renal failure (ESRD) have at least one associated cutaneous change.[6,7] Cutaneous changes in renal diseases are either specific or nonspecific.The specific manifestations include acquired perforating dermatosis, bullous dermatoses, metastatic calcification, and nephrogenic systemic fibrosis (NSF)4 . The non-specific manifestations include pruritus, skin-colour changes, xerosis, half-and-half nails. There is an increase in the prevalence of CKD over the last decade due to the rise in the incidence of various diseases like diabetes, hypertension and obesity. There are three modalities of Renal Replacement Therapies: they are Kidney transplantation, which is best, haemo and peritoneal dialysis are emerged as common therapeutic modalities which have improved the life expectancy of patients with CKD in ESRD stage. Long-standing kidney disease leads to dysfunction of skin, which results in various cutaneous manifestations.[8] CKD patients are treated either by medical management or by RRT (dialysis). The dermatological findings can precede or follow the initiation of dialysis treatment. Early diagnosis and treatment of these skin lesions are essential to reduce patients' morbidity and mortality and improve their quality of life.[4] The present study analyzed the prevalence of various Cutaneous manifestations in patients with various renal diseases.

Renocutaneous diseases are classified as:[9]

Heriditary syndromes	Neurofibromatosis, Tuberous sclerosis, Nail – patella syndrome, Sickle cell disease, Oro facial – digital syndrome, Von Hippel–Lindau disease, Hereditary hemorrhagic telangiectasia
Acquired disorders with skin and renal involvement:[1]	
a)Autoimmune diseases:	Systemic lupus Erythematosis, Systemic sclerosis
b)Vasculitis:	Henoch scholein purpura, Poly arteritis nodosa, Cryo globulinemia, Wegener's Glomeluronephritis, Raynaud's diseases
c)**Infective causes Miscelaneous**	Streptococcal infections, infectiveendocarditis, Tuberculosis, leprosy Hemorrhagic fevers-Dengue, yellow fever, hantavirus, HIV, leptospirosis Disseminated intra vascular coagulation, Sarcoidosis, Gout, Amyloidosis
3 Cutaneousmanifestations of CKD	**Xerosis[10,] Pruritus[11,]** **Changes in skin color:** Hyperpigmentation(melanin), Slate – grey discoloration (Hemo siderin), Yellowish discoloration (carotenoid and urochromes)

Skin	Perforatingdermatosis Acquired perforating dermatosis Perforating Folliculitis Kyrle's disease **Metastaticcalcification:** Calcinosis Cutis[12] Calcific uremic arteriolopathy Nephrogenic systemic fibrosis **Bullous diseases:** Pseudo porphyria **Uremic frost:** **Gynecomastia:**
Oral changes	Oral uremic stomatitis Dry mouth Periodontal disease Oral malignancy
Hair changes	Sparse hair Brittle hair Telogen effluvium, Seborrhoea capitis, Diffuse alopecia, lupus hair, sparse hair
Nail changes	Half and half nails: Mee'slines: Muercke's lines Onycholysis Leuconychia
Skin manifestations specific for patients on hemodialysis	CutaneouschangesatsitesofAVfistulas:[13] Such as Allergic contact dermatitis Vascular complications like digital ischemia, aneurysm, and pseudo-Kaposi sarcoma. Dialysis-associated steal syndrome[14]

Aims and Objectives of the study

1. To study various cutaneous manifestations in patients with kidney disease.
2. To study the prevalence of cutaneous manifestations in patients of kidney disease on medical management and dialysis.
3. To evaluate the correlation between the severity of renal disease and skin changes.

Methodology

After obtaining clearance and approval from the institutional ethics committee, 120 cases were included for the study. Informed and written consent was taken from patients, and the clinical data were recorded as per the pre-structured proforma.

A detailed history was taken with particular reference to the duration of lesions and symptoms, initial site of the appearance of the lesion, Extension of lesions, duration of renal disease, duration of dialysis, the onset of changes with relation to renal disease and dialysis.

A history of underlying systemic conditions like diabetes mellitus, hypertension, tuberculosis, connective tissue disorder was obtained.

Clinical photographs were taken at the same sitting. The skin, hair, nails, and mucosa were examined.

All the patients were thoroughly investigated with routine hematological and biochemical investigations. Wherever required, radiographs and ultrasonography were done. The diagnosis of kidney disease was done, The severity of chronic kidney disease was graded into stages1-5 based on eGFR(CKD –EPI equation).

Special investigations, including serum creatinine, blood urea, GFR, and skin scrapings for 10% KOH, fungal culture, skin biopsy for histopathology, pus for culture and sensitivity were done wherever required.

Observations and Results

Table 2: Demographics

Age distribution	1– 20 (10%)
	21 – 40 (18.3%)
	41 – 60 (40%) 61 – 80 (28.3%)
	81 – 90 (3.3%)
Sex(Male: Female)	55.8(67):44.2(53) = 1.2 : 1

Duration of kidney disease	<6M - 24 (20%)
	6 – 2Yrs – 32 (26.7%)
	>2yrs – 64(53.3%)
T2DM : No DM	54(45%): 66(55%)
HTN : No HTN	34(28.3%):86
Etiology of kidney diseases	
DKD	46(38.3%)
Nephrotic syndrome	20(16.7%)
CKD secondary to hypertension	16(13.3%)
CGN	28(23.3%)
AKI	2(1.7%)
Lupus Nephritis	6(5%)
Polycystic kidney disease	2(1.7%)
No Dialysis : Dialysis	71(59.2%):49(40.8%)

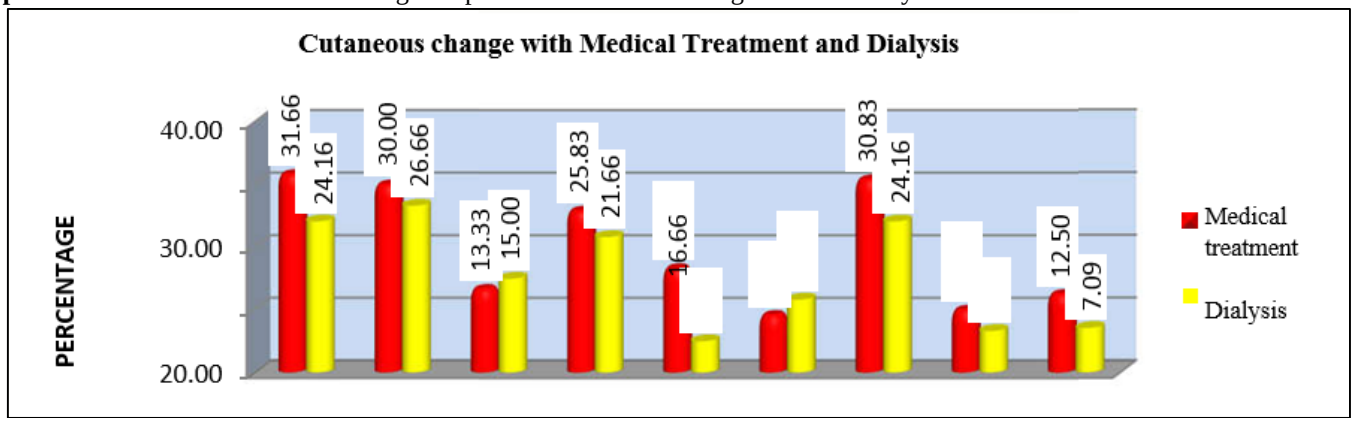
In the present study prevalence of renal disease was highest in the age group of 61-70yrs and least in age groups of 1-10yrs. which was 4.2%. There was a male preponderance with Male to female ratio was 1.2:1, In this study, 53.3% of patients had the renal disease for a duration of more than 2yrs, and 20% of them had renal disease below 6months. Diabetes was present in 45% of patients and Hypertension was present in 28.3% of patients with renal disease. The most common cause of renal disease in our study was Diabetic kidney disease, which includes 38.3%, followed by chronic Glomeluro nephritis, which was 23.3%. In our study 59.2% of cases were under medical management. 40.83% of patients were undergoing dialysis, which includes both peritoneal and hemodialysis.

Table 3: Distribution of various cutaneous changes in patients with renal diseases

Cutaneous changes	No of cases	Percentage (%)
Xerosis	74	61.7
Pruritus	68	56.7
Pigmentation	34	28.3
Perforating	8	6.7
Infection	57	47.5
Oral	25	20.8
Nail	66	55.0
Hair	20	16.7
Miscellaneous	25	20.8

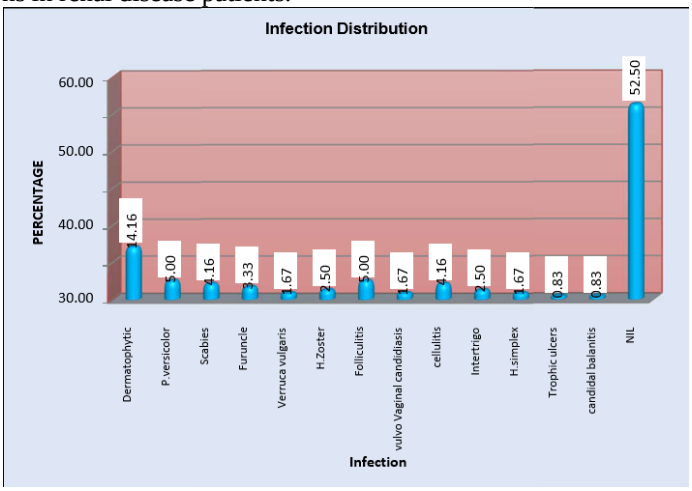
The most common cutaneous change in renal disease patients in our study was xerosis seen in 74(61.7%) of cases, followed by Pruritus seen in 68(56.7%) of cases.

Graph 1: Distribution of cutaneous changes in patients on medicalmanagement and dialysis



The prevalence of cutaneous changes was more in patients on medicalmanagement than in Patients on dialysis.

Graphs 2: Distribution of infections in renal disease patients.



Dermatophytic	Verruca vulgaris	Intertrigo
Pityriasis Versicolour	Herpes zoster	Herpes simplex
Scabies	Folliculitis	Trophic ulcer
Furuncle	Vulvovaginal Candidiasis	Candidal balanitis
`	Cellulitis	

The most common infection seen in our study were dermatophytic infectionsin 17(14.17%) cases, followed by Pityriasis Versicolor and scabies.

Table 4: Oral changes in patients of renal diseases.

Oral changes	**No. of patients**	**Percentage (%)**
Coated tongue	10	8.33
Geographic tongue	9	7.50
Oral candidiasis	6	5.00
Bald tongue	4	3.33
Macroglossia	2	1.66
Angular chelitis	2	1.66
Pigmented tongue	1	0.83
Apthous ulcer	1	0.83
Nil	85	70.83
Total	120	100.0

The most common oral change was Coated tongue seen in 10(8.33%) of patients, followed by Geographic tongue seen in 9(7.50%) of patients

Table 5: Nail changes in patients of renal disease.

Type of nail change	**No. of patients**	**Percentage (%)**
Leuconychia	15	12.50
Koilonychias	10	8.33
Longitudinal Striations	12	10.00
Dystrophic nails	8	6.66
Onychomycosis	6	5.00
Half an half nails	5	4.16
Shiny nails	6	5.00
Paronychia	4	3.30
Nil	54	45.00
Total	120	100.0

The most common nail change was leuconychia seen in 15(12.50%) patients, followed by koilonychia in 10(8.33%) cases.

Table 6: Hair changes in Patients of renal diseases

Hair changes	No. of patients	Percentage (%)
Telogen Effluvium	8	6.7
Seborrhea Capitis	4	3.3
Diffuse Alopecia	3	2.5
Lupus Hair	2	1.7
sparse hair	2	1.7
Lusterless hair	1	0.8
Normal Hair	100	83.3
Total	120	100.0

Most common hair change was telogen Effluvium seen in 8(6.7%) of patients.

Table-7: Miscellaneous changes in patients of renal disease.

Miscellaneous changes	No. of patients	Percentage (%)
Eczema	8	6.67
Chronic Urticaria	6	5.00
Drug reactions	4	3.33
Vitiligo	4	3.33
Exfoliative dermatitis	1	0.83
Canula site dermatitis	1	0.83
Purpura	1	0.83
Nil	95	79.17
Total	120	100.0

Most common Miscellaneous change was Eczema seen in 8(6.67%) of patients followed by chronic urticaria seen in 6(5%) of cases.

Table- 8: Staging of kidney disease

Grading	No. of patients	Percentage (%)
S – 3	12	11.9
S – 4	29	28.7
S – 5	60	59.4
Total	101	100.0

Out of 120 patients, 101 had chronic renal disease and graded from S-3 to S -5.
60(59.4%) of cases belonged to stage 5 of CKD disease.

Table 9: Cutaneous changes in chronic kidney disease according to Severity of Renal disease.

		Grading of Kidney disease			p-value
		S-3 (n=12)	S-4 (n=29)	S-5 (n=60)	
Cutaneous changes	Xerosis	5(41.7%)	18(62%)	49(81.7%)	0.0086*
	Itching	6(50%)	18(62.0%)	42(70%)	0.37
	Pigmentation	2(16.7%)	8(27.6%)	24(40.0%)	0.211
	Perforating Dermatosis	0(0%)	1(3.4%)	7(11.7%)	0.44
	Infection	3(25%)	11(37.9%)	35(58.3%)	0.04*
	Oral	1(8.3%)	6(20.7%)	11(18.3%)	0.63
	Nail	5(41.7%)	17(58.6%)	39(65%)	0.31
	Hair	1(8.3%)	5(17.2%)	11(18.3%)	0.69
	Miscellaneous	0(0%)	6(20.7%)	15(25%)	0.436
	Total no. of events	23	90	233	

*indicates significant p-value. Chi-square test.
Cutaneous changes were more in stage 5 renal disease followed by stage -4 andstage 3, that indicates cutaneous changes increased with severity of renal disease.Among these Cutaneous changes in our study, xerosis and infections were statistically significant in stage 5 compared to stage 3 and 4.

Hyperpigmentation

Perforating Dermatosis

Xerosis

Scabies

Reactive perforating collagenosis

Tinea corporis

Pityriasis versicolor

Herpes simplex

Cellulitis

Herpes zoster

Candidal intertrigo

Bald tongue

Tongue sign of uremia

Oral candidiasis

Geographic tongue

Pigmentation of tongue and buccal mucosa

Leukonychyia

Onychomycosis

Dystrophic nails

Half and half nails

Telogen effluvium

LUPUS hair

Infectious Eczematous Dermatosis

Discussion

The cutaneous changes were most commonly seen in patients with chronic kidney disease and end-stage renal disease in our study.

In the present study, which includes 120 patients of kidney disease male preponderance was seen (Male: Female ratio,1.2:1) which was similar to the study conducted by Asokan S et al.[15] and Rashapa et al.[16]

Our study's age group was 1-90yrs with the mean age group of patients being 41-70years similar to Udaykumar et al.[17]and Thomas EA et al.87 studies.

In the present study, majority (53.3%) of patients had renal disease for more than 2yrs.

In our study, 45% of patients with renal disease had diabetes mellitus, which was similar to study by Thomas EA et al.[18] 28.3% of patients had hypertension, similar to study by Hajheydari Z et al.[19] diabetes and hypertension were the major causes of kidney disease in our study similar to Rashapa et al.[16]

In the present study, 59.2% of patients were under medical management, and 40.83% were under dialysis. With the introduction of dialysis, the severity of skin lesions has improved. Prevalence of cutaneous diseases according to the stage of CKD

Cutaneous manifestations were present mostly in stage 3,

stage 4, and stage 5 of CKD. The prevalence of cutaneous lesions increased with an increase in renal disease stage, which was statistically significant, 59.4% were in stage 5, 28.7% were in stage 4, 11.9% were in stage 3.

Cutaneous manifestations in patients with renal diseases

In the present study, cutaneous manifestations were more commonly seen in patients with chronic kidney disease, end-stage renal failure, and patients undergoing dialysis than other kidney diseases.

More than one cutaneous change was observed in these patients involvingthe skin, hairs, nails, and mucous membranes of the body, similar to Nunley et al,[6] which showed that 50-100% of patients with renal diseases are affected by at least one dermatological disorder.

Our study's common changes were xerosis, pruritus, pigmentation, perforatingdiseases, infections, lesions in the oral cavity, nail changes, hair changes, and few miscellaneous changes.

In the present study, xerosis was the most common cutaneous change seenin 74(61.7%) of patients, mainly present in the upper limb, abdomen, and lower limb, similar to Thomas et al.[18] and Falodun et al.[20] studies.

The prevalence of xerosis increased with the grade of kidney disease, withthe highest frequency in Stage 5, with 81.7% of cases, followed by 62% in Stage 4 and 41.7% in stage 3, which was statistically significant, in contrast to a study conducted by Rashpa et al.,[16] the prevalence of xerosis in Stages3, 4, 5 were 66.7%,77.4%, and 76.5%, respectively, slightly higher than our study.

In our study, pruritus was the second most common cutaneous change seen in56.71% of patients similar to studies by Udaykumar et al.[17] Ponticell C et al[21] Thomas et al.[18]The prevalence of pruritus increased with the stage of kidney disease, withthe highest prevalence in Stage 5, 70%, followed by stage 4, 62%, and least prevalence in stage 3, 50%, which were not statistically significant, in contrast to

Rashpa et al.[16] study, where the prevalence of pruritus was as follows: stage 3, 50%, stage 4, 38.7%, and for stage 5, 49.4%.

In the present study, the prevalence of hyperpigmentation was 28.3%. This prevalence is within the documented range reported in previous studies. Prevalence of 7.5-43% reported in previous studies of, Udaykumar et al.[15] (43%), Kolla PK etal.[22] (39.4%) and Thomas EA et al.[18] (32.3%).The patients in our study belonged to Fitzpatricks skin type IV and V.

The present study reports less (13.33%) of hyperpigmentation in patients on medical management in comparison to those (15%) on dialysis. Similar to a study conducted by Asokan s et al.[15] which stresses the fact that hyperpigmentation was more common in patients who had a longer CKD duration and in patients receiving hemodialysis. The prevalence of hyperpigmentation also increased with the stage of kidney disease, with the highest prevalence in Stage 5, 40%, followed by stage 4, 27.6%, and least prevalence in stage 3, 16.7%, which was not statistically significant, simiar to a study by Rashpa et al[16] where prevalence of hyperpigmentation was as follows for stage 3, CKD was 33.3%, stage 4 was 22.6%, and for stage 5, 44.7%, similar to our study.

Specific skin manifestations of renal diseases are Acquired perforating disorders, calcinosis cutis, calciphylaxis, uremic frost, bullous dermatosis of dialysis, and nephrogenic systemic fibrosis; of all the above disease only **perforating dermatosis** were seen in our study. Perforating disorders include Kyrles disease and perforating folliculitis, most commonly seen in patients with Diabetes mellitus and chronic kidney disease.In the present study, the prevalence of perforating disease is 6.7%which is similar to a study of Kolla PK et al.[22] (6.9%) and Asokan S et al.[15] 7.5%. According to the kidney disease stage, the perforating diseases were asfollows, in stage 3, perforating diseases were absent, in stage 4, perforating diseases were present in 3.4%, and in stage 5, 11.7%. In contrast to Rashapa et al.,[16] the perforating disease was (3.5%) seen only in stage 5.

Renal disease patients were more susceptible to infections due to impaired humoral and cell-mediated immunity. The impaired skin barrier function in these patients predisposes to various bacterial, fungal, and viral cutaneous infections. In the present study, the prevalence of infections was 47.5%, similar to the study conducted by Rashpa et al.[16] 48.4%. Fungal infection was most commonly seen in our study with a prevalence of 24.16%, followed by bacterial infection: 13.33%, viral infection 5.83%, and parasitic infection 4%. In contrast to a study conducted by Rashpa et al.,[16] where fungal infections were more common, 38.5% of patients higher than our study, bacterial infections were 12.3%, and viral infections were 5.7%, similar to our study.

The prevalence of infections in patients with medical management was 25.83%. In dialysis, they were 21.66%, compared to a study conducted by Asokan s et al.[15] where infections were 12.5% in patients on medical management and 19.3% In dialysis patients. In our study, the prevalence of infections increased with stage of renal disease which was statistically significant. In stage 3, the prevalence was 25%, stage 4, 37.9%, and in stage 5, it was 58.3%, similar to a study conducted by Chand et al.[23] where infections were more in stage 5 of chronic kidney disease.

The most common fungal infections in our study were Dermatophytic infections like Tinea corporis, Tinea cruris, and Tinea pedis that contributed to (17) 14.17% of all fungal infections, followed by Pityriasis Versicolor which were 6 (5%) cases, candidal intertrigo(3) cases, vulvovaginal candidiasis (2) cases, candidal balanitis(1) case. Fungal infections were more common in patients with associated diabetes mellitus, which occured due to immunosuppression. Rashpa et al.[16] reported dermatophytic infections in 9.83% of patients lower than our study, followed by pityriasis Versicolor in (2) cases and candidal intertrigo in (3) cases similar to our study.

Bacterial infections in our study were 13.33%, similar to the study conducted by Chanda et al.[23] where bacterial infections were present in 14% of cases. Among bacterial infections, the most common was folliculitis present in (6) cases, followed by cellulitis in (5) cases, Furuncles in (4) cases, trophic ulcers in (1) case. In Rashpa et al,[16] study folliculitis was the most common bacterial infection similar to our study, with (8) cases and furuncles in (2) cases.

Viral infections in our study were 5.83% (7) cases, which included herpes zoster in (3) cases, Herpes simplex in (2) cases,

Verruca Vulgaris in (2) cases, which was similar to the study conducted by khare and Gulanikhar et al.[24] with Herpes zoster in (3) cases and Verruca Vulgaris in (2) cases.

In our, study Scabies was present in 5 cases, which occurred in patients with poor hygiene and immunosuppression. Thomas et al.[18] reported parasitic infection in 1 case.

Oral manifestations in renal disease occur due to poor oral hygiene and immunosuppression, which predisposes them to secondary bacterial or fungal infections. Oral lesions like Geographic tongue and bald tongue occur due to nutritional deficiency in end-stage renal disease patients and patients on dialysis.

The prevalence of oral lesions in our study was 20.8% of patients, similar to the study conducted by Chand et al.[23] 20%. Common oral lesions in the present study were coated tongue in 10(8.33%) cases, similar to the study conducted by Khare and Gulanikar[24] and Rashpa et al.[16]The geographic tongue was seen in 9(7.5%) of patients, similar to the study conducted by Rashpa et al.[16] Oral candidiasis was seen in 6(5%) of patients, higher than Asokan S et al.[15] studies with 1 case. The bald tongue was seen in 4(3.33%) cases, similar to the study conducted by Asokan s et al.[15] Mathew first described macroglossia with teeth marking(tongue sign of uremia) Macroglossia with teeth markings seen in 2(1.66%) of cases in our study, in contrast to high prevalence in Rashpa et al.[16] and khare and Gulakhar et al.'s study[24] Angular cheilitis seen in 2(1.66%) patients, Pigmented tongue was seen in 1(0.83%) case, and Aphthous ulcer seen in 1(0.83%) case, which was similar to the study conducted by Asokan s et al.[15]., khare, and Gulakhar et al.[24] and Rashpa etal. study.[16]

The prevalence of oral lesions in patients with medical management was 11(9.6%), and dialysis was 14(11.66%), similar to a study reported by Asokan s et al.[15] 6.2%, 8%, respectively. Prevalence of oral manifestations according to the severity of renal disease seen in stage 3 was 8.3%, stage 4 was 20.7%, and in stage 5 was 18.3%. In contrast to Rashpa et al.[16] the study, the oral lesions increased with the severity of the renal disease.

Nail changes in renal failure occur either due to renal disease or secondary bacterial and fungal infections of nails. In a few cases, the cause of nail changes is unknown or idiopathic. In the present study, nail changes in renal disease patients was 55%, higher than the Chand et al[23] study, where the prevalence of nail changes was 46%. Nail changes in patients on medical management were 30.83 %, and in dialysis were 24.16% in our study. In Asokan et al.[15] study, nail changes were morein patients on medical management than on dialysis.

Nail changes according to the stage of chronic kidney disease in our study reported by Rashpa et al.[16]

Common nail changes observed in our study were Leuconychia seen in 15(12.5%) of patients, Longitudinal striations in 12(10%) of patients, koilonychia in 10(8.33%) of patients, Dystrophic nails in 8(6.67%) of patients, shiny nails in 6(5%)of patients, onychomycosis in 6(5%) of patients, half and half nails in 5(4.16%) of patients and paronychia in 4(3.3%) of cases. In Rashpa et al.[16] study most common nail changes were Leuconychia seen in 35% cases; prevalence was higher than our study, followed by half and half nails(16.4%), higher than our study. Prevalence of nail changes with longitudinal ridging present in (10.7%), dystrophic nails in (5.7%), and koilonychia in (4.1%)were similar to our study. In Asokan et al. [15]. study, half and half nails were more common in (10%) of cases higher than our study, followed by onychomycosis, (2.5%) lower than our study; longitudinal melanonychia in (2.5%) of cases higher than our study, onychodystrophy, beau's lines and nail pitting were seen which were absent in our study

Hair changes in CKD include hair loss, which could be due to telogen effluvium "following ill health," xerosis, pruritus and drugs such as heparin, antihypertensives, and antilipids [26] Other hair changes include color changes and shaft abnormalities (such as twisting flattening, varying diameter) which can bedetected by electron microscopy.[26,27]

The other causes of hair loss was reduced sebum production, anemia, the stress of end-stage renal disease and dialysis, or poor hair care.[28]

The prevalence of hair changes seen in our study was (16.7%) in 20 patients, similar to the survey done by Asokan S et al.[15] (18%).

Prevalence of hair changes in patients with medical management were 12(10%) and in dialysis were 8(6.66%), similar to study conducted by Asokan S.et al [15]; with hair changes seen in 9 patients each on medical management and dialysis.

Our study was similar to the study conducted by Chanda et al.[23]

The prevalence of hair changes in the present study increased with the severity of the renal disease. In stage 3 of CKD prevalence was 1(8.3%) of patients, in stage 4 were 5(17.5%) of patients, and in Stage 5 were 11(18.3%) of cases, which was similar to the study conducted by Rashpa et al.[16] where hair changes prevalence increased with severity of the renal disease.

Hair changes in the present study were Telogen effluvium seen in 8(6.7%) of cases, Seborrhea capitis in 4(3.3%) of cases, Diffuse Alopecia in 3(2.5%) of cases, Lupus hair in 2(1.7%) of cases, sparse hairs in 2(1.7%) of cases, Lusterless hair is seen in 1(0.8%) of cases. Hair was normal in 83.3% of cases.

In studies done by Asokan s et al.[15] Chanda et al.[23] Rashpa et al.[16] the common hair changes were diffuse alopecia, sparse hair of the scalp and dry lustreless hair.

Miscellaneous changes

The prevalence of miscellaneous diseases in patients with renal disease seen in our study was 25(20.8%) cases, similar to the study conducted by Asokan s et al.[15] which was 26 cases.

Miscellaneous diseases seen in patients with medical management was 15(12.5%), and in dialysis, were 10(7.09%) of cases.

Our study's miscellaneous diseases were present in stage 4 and stage 5 of CKD, which were 6(20.7%) and 15(25%), respectively.

Various miscellaneous disorders associated with renal disease present in our study were eczema seen in 8(6.67%) cases, similar to Asokan s et al.[15] study where eczema was present in 16 cases.

Chronic urticaria was present in 6(5%) cases, where the cause could beidiopathic or would have occurred as an allergic response to dialysis substance.

Drug reactions was present in 4 (3.33%) cases caused by antibiotics given in renal disease patients.

Vitiligo was present in 4(3.33%) cases similar to the Asokan S et al. [15]. study.

Exfoliative dermatitis was present in 1 case.

In a patient on peritoneal dialysis, at the cannula's site, irritant contact dermatitis was present.

Purpura was present in 1 case in our study.

Table 10: Comparison of our study with the other studies

	Asokan S et al.	**Rashapa et al.**	**Our study**
Demographics			
Sex	M:F 1.8:1	M:F 1.7:1	M:F 1.2:1
Age	Mean age – 51-60yrs	41 – 50years	41 – 60years
Diabetes mellitus	42.42%	56.6%	45%
Hypertension		32%	28.7%
Skin changes			
Xerosis	60%	76.2%	61.7%
Pruritus	46.7%	46.7%	56.71%
hyperpigmentation	37.5%	38.5%	28%
Perforating dermatoses	7.5%	3.5%	6.7%
Infections	31.8%	48.4%	47.5%
Fungal	10%	38.5%	24.16%
Bacterial	4.17%	12.3%	13.33%
Viral	2.5%	5.7%	5.83%
Parasitic			4%
Oral lesions	7.5%	9-43%	20.8%
Nail changes	21.7%	18%	55%
Hair changes	15%	45.1%	16.7%
Miscellaneous	21%		20.8%

Summary

The study population includes 120 patients with renal diseases having cutaneous manifestations, with M:F ratio of 1.2:1, with the mean age of 45. The most common cause of renal disease was Diabetic kidney disease. The prevalence of cutaneous changes was more in patients on medical management than on dialysis. The most common cutaneous change was xerosis, followed by pruritus, hyperpigmentation and perforating disease .The most common infection seen in our study were dermatophytic infections.The most common oral change was coated tongue, followed by Geographic tongue. The most common nail change was leuconychia. The most common hair changes were telogen effluvium.

Out of 120 patients, 101 had chronic renal disease and graded from stage 3to stage 5. Majority patients were belonged to stage 5 of chronic kidney disease, which indicates cutaneous changes increased with the severity of the renal disease, among all cutaneous manifestations, xerosis and infections were statistically significant different.

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Conflicts of Interest

There are no conflicts of interest

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