

## Cutaneous Manifestations of Chronic Renal Disease among Patients of Combined Military Hospital, Dhaka

Karim ATMR<sup>1</sup>, Sarker R<sup>2</sup>, Siraj MS<sup>3</sup>, Sadeque SP<sup>4</sup>, Chowdhury SN<sup>5</sup>

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### Abstract

**Introduction:** Chronic renal or kidney disease (CKD) presents with a range of cutaneous manifestation. Many New changes have been described since the advancement of hemodialysis, which prolonged the life expectancy, providing sufficient time for these changes to manifest.

**Objective:** To observe the cutaneous changes in chronic kidney patients.

**Methods:** This descriptive cross sectional study was conducted at Dermatology and Venereology department, Combined Military Hospital (CMH) Dhaka from July 2019 to June 2020. A total 100 CKD patients were recruited through purposive random sampling technique and observed for cutaneous changes.

**Results:** Among the total, 88% study population had some form of skin disorders, pallor 65(65%) was found to be the most common cutaneous manifestation, while xerosis 61(61%), pruritus (53%), hyperpigmentation 37(37%) and bacterial infection 28(28%) were other common features. Prevalence of purpura was 29(29%) and fungal infection was 24(24%).

**Conclusion:** CKD is associated with a broad spectrum of skin manifestations caused by the disease or by the treatment. The more commonly with pallor, xerosis and pruritus proper recognition of cutaneous signs and symptoms can relieve sufferings and reduce morbidity of the CKD patients.

**Key-words:** Chronic kidney disease (CKD), Hemodialysis, Skin manifestations.

### Introduction

Chronic kidney disease (CKD) is an irreversible and permanent deterioration in the renal function that usually develops over years. Initially, it manifests only as biochemical abnormality but eventually, loss of metabolic, excretory and endocrine functions that leads to clinical signs and symptoms, other than that of renal failure<sup>1</sup>. The commonest manifestations are diabetes mellitus, hypertension, etc<sup>2,3</sup>. There are various cutaneous manifestations in patients of CRF. These skin and nail changes can occur before or even after initiation of dialysis. The spectrum of cutaneous manifestations is much higher in patients on hemodialysis.

In the past, most frequent skin features were 'uraemic frost', 'uraemic roseola', 'uraemic erysepeloid' and 'erythema papulatum uremicum', those were seen in patients with advanced renal failure. Xerosis was the most common cutaneous feature observed in previous reports<sup>4</sup> (46-90%). Most recently with advancement of dialysis several other new abnormalities have emerged such as Fibrosing nephrogenic dermopathy which is associated with calciphylaxis and metastatic calcification<sup>5</sup>. Pruritus is one of the most significant characteristic cutaneous symptoms of CKD. It is usually absent in acute renal failure and does not subside with dialysis but improves with kidney transplantation<sup>6</sup>.

Two types of pigmentary changes have been observed: hyperpigmentation and yellowish tinge to the skin. Prominent and dark hyperpigmentation over the sun exposed skin was seen in 20-22%. Diffuse hyperpigmentation over sun exposed skin occurs due to increase melanin in the basal layer of epidermis and superficial dermis due to failure of the kidneys to excrete the beta melanocyte-stimulating hormone (b-MSH). A yellowish tinge to the skin has been observed in 40% patients. It is due to accumulation of the carotenoids and nitrogenous pigments (urochromes) in the dermis or due to the presence of lipochromes and carotenoids in the epidermis and subcutaneous tissue<sup>7</sup>.

Perforating disorders like Kyrle's disease, acquired perforating collagenosis, perforating folliculitis and reactive perforating collagenosis had been described with CKD and diabetes mellitus. Trauma to the skin associated with pruritus secondary to chronic renal failure (CRF) may be the inciting agent to produce these lesions. The unique feature of the perforating disorders is the trans-epidermal elimination of Type IV collagen seen in histology<sup>8</sup>. Easy bruising was also reported in another study where the researcher observed this change in 20% of CRF patients those were not on dialysis<sup>9</sup>.

Lindsay's nails (half and half nails) are the red, pink or brown discoloration in the distal half (doesn't fade with pressure) and white in the proximal half of the nails. Previous studies found a prevalence of 16-50.6%. The most common hair disorder was diffuse hair loss of the scalp. Sparse body hair, discoloration and dryness of the hair are other observed changes in patients of CRF<sup>10</sup>. Bencini et al have reported the prevalence of fungal

1. Lt Col ATM Rezaul Karim, MBBS, DDV, MCPS, FCPS, Associate Professor & Head, Department of Dermatology, AFMC, Dhaka (E-mail: drreza1031@gmail.com)  
2. Maj Rizoana Sarker, MBBS, DDV, MCPS, Graded Specialist in Dermatology, AFMC, Dhaka 3. Lt Col Md Shahjahan Siraj, MBBS, DDV, FCPS, Classified Specialist in Dermatology, CMH, Dhaka 4. Dr Shayesta Pervin Sadeque, MBBS, DGO, Assistant Professor in Gynaecology, Army Medical College, Cumilla 5. Maj Sabiqun Nahar Chowdhury, MBBS, MPH, Graded Specialist in Dermatology and Venereology, AFMI, Dhaka.

infection among patients undergoing hemodialysis were 67%<sup>11</sup>. Another form of dermatitis known as arteriovenous shunt dermatitis may be seen in 8% of the patients those on long term hemodialysis<sup>12</sup>.

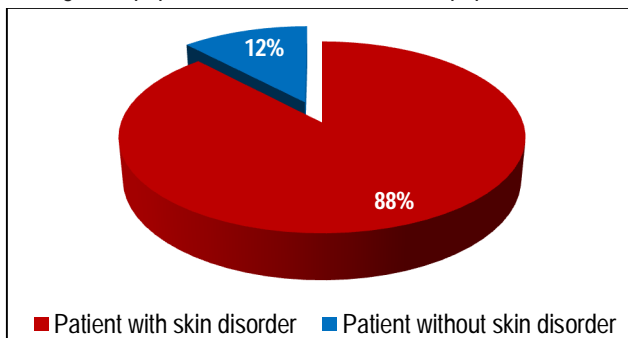
Skin changes due to immunosuppression include increased susceptibility to bacterial, viral and fungal infections and also development of precancerous and cancerous lesions. A prevalence of 4.5% has been observed by Bencini et al<sup>11</sup> in another study. Basal cell carcinoma (BCC) is the most common form of skin cancer. The objective of this current study is to find out the prevalence and pattern of cutaneous disorders in chronic kidney disease patients along with finding any correlation of different demographic variables to chronic kidney disease patients, with etiology and different modalities of treatment for chronic kidney disease.

**Materials and Methods**

This was a descriptive type cross sectional study where purposive sampling technique was used. Study was conducted in both inpatient and outpatient department (IPD & OPD) of dermatology and venereology, CMH Dhaka from July 2019 to June 2020. Total 100 patients with CKD visiting indoor and outdoor of dermatology department, were taken as samples after considering both the inclusion and exclusion criteria. The inclusion criteria were age above 12 years of both sex who were on conservative treatment for CKD for more than 6 months or on haemodialysis for more than 6 months and gave informed written consent. The exclusion criteria were renal transplant patients, patients on peritoneal dialysis, patients with active malignancy and pregnancy. Data were collected from the samples, checked and rechecked properly for omissions, inconsistencies and improbabilities. Data analysis was done by statistical package of social science (SPSS) version 25. Level of significance (P value) and confidence interval were set at 0.05 and 95% respectively. Results were shown in tables and figures.

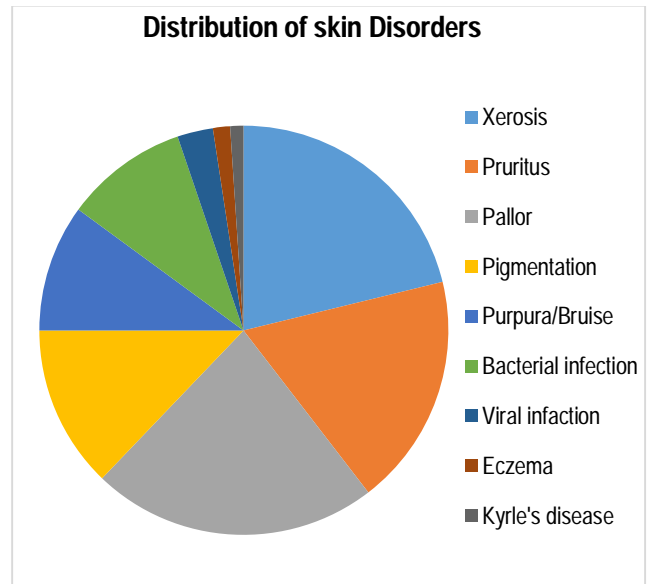
**Results**

100 cases were selected; lowest age was 18 years and highest 81. Highest number of patients belong to 7<sup>th</sup> decade 28(28%), followed by 6<sup>th</sup> decade 24(24%) and 5<sup>th</sup> decade 15(15%). Sex distribution of the patients showed prevalence of CKD was higher among male population 76(76%) than female population.



**Figure-1:** Prevalence of skin disorder in study population

Among the study population, 88(88%) had some form of skin disorders, while only 12(12%) were free from all skin disorders (Figure-1).



**Figure-2:** Distribution of skin disorders among study populations

Pallor was seen to be the most common skin manifestation 65(65%) among CKD patients, while xerosis 61(61%), pruritus 53(53%), pigmentation 37(37%) and bacterial 28(28%) infections were the other common features. Prevalence of purpura and fungal infections were 29(29%) and 24(24%) respectively. Viral infections 8(8%), Eczema 4(4%) and Kyrle's disease 3(3%) were relatively less common cutaneous findings (Figure-2).

**Table-I:** Distribution of skin disorder according to aetiology of CKD

	DM	HTN	GN	Obstructive uropathy	SLE	ADPKD	Alports syndrome	Total
Xerosis	37	14	4	4	0	2	0	61
Pruritus	24	20	5	2	2	0	0	53
Pallor	36	14	4	6	2	2	1	65
Pigmentation	15	14	6	1	1	0	0	37
Purpura/bruise	18	2	8	0	1	0	0	29
Bacterial infection	16	3	6	2	0	0	1	28
Fungal infection	13	2	8	0	1	0	0	24
Viral infection	4	4	0	0	0	0	0	8
Eczema	2	2	0	0	0	0	0	4
Kyrle's disease	2	1	0	0	0	0	0	3

**Table-II:** Distribution of different skin disorder among the CKD patients under different modalities of treatment

Skin disorder	Conservative treatment	HD	ISA
Xerosis	20	40	1
Pruritus	12	38	3
Pallor	27	35	3
Pigmentation	6	30	1
Purpura/ Bruise	20	6	9
Bacterial infection	10	14	4
Fungal infection	11	10	3
Viral infection	3	4	1
Eczema	2	2	0
Kyrle's disease	2	1	0

Distribution of the patients among different etiological groups responsible for CKD reveals Diabetes Mellitus 44(44%) is the leading cause of CKD in study population, followed by hypertension 30(30%), glomerulonephritis 13(13%) and obstructive uropathy 7(7%) are other major causes. Male were predominantly affected in all groups except SLE (Table-I).

In present study Lindsay's nails (Half and half nails) were seen in 13(26%) patients and was more prevalent in patients with glomerulonephritis and diabetic patients with a prevalence of 7(31%) and 5(45%) respectively. Other significant nail changes include koilonychia 2(4%), subungual hyperkeratosis 1(2%), splinter hemorrhage 1(4%), onychomycosis 4(8%) and Beau's line 1(2%). In this study among oral manifestations, uremic breath was the most common finding in 12(12%) patients. Other features observed were oral ulcer 6(6%), angular cheilitis 4(4%), xerostomia 2(2%).

## Discussion

Highest number of patients belongs to 7<sup>th</sup> decade 28(28%). Sex distribution of the patients showed prevalence of CKD is higher among male population 76(76%) than female population. This age distribution is different from Udayakumar et al<sup>10</sup> study where most of the patients are between 41 to 50 years which was done among patients under treatment with haemodialysis. However sex distribution of study population is close to Udayakumar et al<sup>10</sup>.

Cutaneous manifestations usually vary in chronic kidney disease patients. Pico et al<sup>13</sup> and Bencini et al<sup>11</sup> found prevalence of skin manifestations in almost 100% kidney disease patients and 79% patients in their respective studies. Udayakumar et al<sup>10</sup> performed another study among patients those receiving haemodialysis and found skin disorders in 82% patients. Among this study population, 88% patients had some forms of skin features while only 18% patients were found free from all skin disorders which matches with the previous studies<sup>10,11</sup>.

Pallor was the most common form of skin manifestation 65(65%) among CKD patients in this study. Udayakumar et al<sup>10</sup> in his study, found pallor in 69% patients, possibly due to the darker complexion of the skin. The hemoglobin level was less than 8 g/dL in 64% patients in that study. This is a very common early finding of CKD patients and significantly contributes to the increased mortality<sup>11</sup>. Pallor was more prevalent in the study in comparison to present study; one possibility for this difference may be that the patients were on maintenance hemodialysis, usually receiving regular blood transfusion and belongs to different stages of CKD with different treatment modalities.

Xerosis was the second most common skin presentation 61(61%) in this study, while it was the most common skin feature (79%) in another study done by Udayakumar et al<sup>10</sup>.

Pruritus was found in 53(53%) in this study. This is exactly similar to the finding of the study of Udayakumar et al<sup>10</sup>. In that study, 53% patients complained of pruritus. Among them, fifteen (28%) had pruritus before the diagnosis of CRF. Besides, 38 out of 53 patients (72%) found no improvement in pruritus after the dialysis, 5(9.4%) patients showed improvement and 10(18.8%) patients reported to be aggravated after hemodialysis.

Distribution of the patients among different etiological groups responsible for CKD reveals Diabetes Mellitus 44(44%) is the leading cause of CKD in this study population, followed by hypertension 30(30%), glomerulonephritis 13(13%) and obstructive uropathy 7(7%) are other major causes. Male were predominantly affected in all groups except SLE. There were few cases with relatively uncommon causes like Alport syndrome 1(1%), ADPKD 2(2%) were included. In study with Udayakumar et al<sup>10</sup>, among the common causes diabetes mellitus was leading cause 38%, next common cause was Contrast-induced nephropathy (CIN) (25%), chronic glomerulo-nephropathy (CGN) (12%), hypertension (12%), obstructive uropathy (2%); these differences in prevalence of etiology of CKD can be due to multiple variables.

In this study, bacterial, fungal and viral infections were found in 28%, 24% and 8% respectively. However, the pattern of fungal infection matches with that pattern found in the previous study<sup>10</sup>. One possible reason for increased bacterial infection found among 10 patients in this study may be that those patients developed thrombophlebitis after cannulation.

Perforating disorders such as Kyrle's disease, acquired perforating collagenosis, perforating folliculitis and reactive perforating collagenosis have been associated with CRF<sup>14</sup>. The term acquired perforating disorders (APD) is used to describe the hyperkeratotic follicular papules present in these CKD patients<sup>14</sup>. APD has been seen to occur in 4.5-17% patients on hemodialysis<sup>13,15</sup> Udayakumar et al<sup>10</sup> observed Kyrle's disease in 21(21%) patients; among those 19 of them had underwent dialysis for less than 6 months. These changes were seen to be

significantly prevalent among diabetic patients. In this study, Kyrle's disease is found in only 2% patients. The difference between these two studies is quite significant and the reason behind that may be the total study population in this current study was CKD patients and among whom 50% were treated with hemodialysis.

In present study, Lindsay's nails (Half and half nails) were seen in 13(26%) patients and was more prevalent in patients with glomerulonephritis and diabetic patients with a prevalence of 7(31%) and 5(45%) respectively. Other significant nail changes include koilonychia 2(4%), subungual hyperkeratosis 1(2%), splinter hemorrhage 1(4%), onychomycosis 4(8%) and Beau's line 1(2%). In the study done by Udaykumar et al<sup>10</sup> half and half nails were seen in 21% patients and were significantly more prevalent in diabetic patients. Previous studies have shown the prevalence of half and half nails was 16-50.6%<sup>8,10</sup>. Other nail changes include koilonychia (18%), subungual hyperkeratosis (12%), onycholysis (10%), mees' line (7%), splinter hemorrhages (5%), muercke's lines (5%) and Beau's line (2%) were seen in the study of Udaykumar et al<sup>10</sup>.

In this study among oral manifestations, uremic breath was the most common finding in 12(12%) patients. Other features observed were oral ulcer 6(6%), angular cheilitis 4(4%), xerostomia 2(2%). Oral mucosal changes have been found in almost 90% patients with CRF in other study<sup>16</sup>.

### Limitation of the Study and Recommendation

The study population was only armed forces personnel so the result of this study may not absolutely reflect the exact picture of the country. The current study was conducted within a very short period of time in the covid-19 pandemic. Besides, small sample size was also a limitation of the current study.

It is recommended that more relevant studies with a larger population size with longer period of study duration are required to confirm this result.

### Conclusion

The prevalence of skin manifestations is high among individuals with renal disease. Almost all the patients with end stage renal disease (ESRD) usually present with a broad spectrum of skin abnormalities. With the advancement of hemodialysis and other modern treatment modalities, the life expectancy of these CKD patients has increased dramatically, providing sufficient time for newer skin features to manifest. At times, these dermatologic findings may even precede any clinical or biochemical evidence of CRF. So, early recognition and timely management of cutaneous

signs and symptoms can relieve sufferings and decrease morbidity and mortality in these patients.

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