

# Cutaneous Manifestations of Renal Failure in Khartoum Renal Centre in Khartoum, Sudan

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**Abstract Introduction:** This study was done at Khartoum renal Centre (KRC), Khartoum, with Bahri University, Department of Dermatology and Venereology in 200 patients with renal failure, during the period from June 3 - October 28, 2001. The **Objective:** this study was to identify the frequency of the common cutaneous manifestations in patients with renal failure attending KRC. **Patients & methodology:** The design was based on the clinical study, i.e., descriptive. 200 cases of renal failure from different causes were seen, 50 out them were pre-dialysis, 100 were on regular hemodialysis and 50 were transplant recipients. **Conclusions:** This study revealed that 83.5% of RF patients examined have Cutaneous Manifestations (CMs). The showed that most of the CMs seen in patients on regular haemodialysis 89%, transplant recipients 84%, and then pre-dialysis patients 72%. This study showed that males represent 58%, and 51.5% of CMs are in the age group above 45 years. The common symptoms represented in this study, hyperpigmentations 83.2%, pruritus 70.6%, and xerosis 50.9% respectively. In the examination according to lesions morphology, hyperpigmented macules 81.4%, patches 52.1%, while plaques 1.2%, and bullae 0.6% represents in frequency. The most commonly associated diseases with RF were hypertension 64.1%, DM 7.2%, and gout 2.4% respectively. In this study, fungal infections of the nails, pityriasis versicoloured, Kaposi, s sarcoma, and Herpes zoster are observed mainly in transplant recipients patients. This study showed that socioeconomic factors have no prominent role affecting CM of RF, as well as drugs used in the treatment of RF. Thus, it was concluded that; CMs were detected in this study, 83.5% out of study population, hyperpigmentation represents 83.2%, hyperpigmented macules show 81.4%, fungal nail infections represent the highest presentation 22.8%, and then Kaposi's sarcoma and Herpes zoster represents 1.8 & 1.2% respectively. Some of known CM of RF as dermatosis of dialysis, perforating collagenous, and cutaneous calcification not encountered in this study.

**Keywords** Cutaneous manifestations, Renal Failure, Renal dialysis, Sudan

## 1. Introductions

Uremia is the term applied to the clinical syndrome that results from profound loss of renal function [1]. Although the causes of the syndrome remain unknown, the term uremia was adopted initially because of the presumption that the abnormalities result from retention in the blood of urea, and other end products of metabolism, normally excreted in urine. However, the term uremia represents more than the

renal excretory failure alone. A host of metabolic, endocrinologic, haematology and dermatologic alterations usually accompany uremia. Therefore, uremia refers to the constellation of signs and symptoms associated with chronic renal failure (CRF) regardless of cause.

The progression of (CRF) leads, the majority of instances, to end-stage renal disease (ESRD) at which point renal-replacement therapy is required. Since the mid-1980s, there has been a marked increase in the incidence of ESRD in the world. In the UK, the incidence of ESRD varies between 45 and 85 new patients per million of the population (pmp) per year. The corresponding figure in the USA is much higher and was around 268 pmp in 1996. The prevalence of patients on replacement therapy in Europe was around 462

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ppm in 1996 and USA, 1041 pp in 1996. In general, the incidence of ESRD increases with age, reaching around 1000 ppm per year in patients over the age of 65 [2].

Renal failure is a known medical problem all over the world and associated with many cutaneous manifestations, e.g.,- pruritus, xerosis, hyperpigmentation, hyperkeratosis penetrations, purpura, bullous dermatosis, calciphylaxis and nail changes, etc. These skin manifestations may be seen in pre-dialysis patients, patients on dialysis and transplanted patients [3].

There are also some diseases characterised by distinctive cutaneous and renal manifestations that reciprocally can lead to renal failure, e.g., - systemic lupus erythematosus, scleroderma, polyarteritis nodosa, thrombocytopenic purpura, leukemia, lymphoma, diabetes mellitus, gout, amyloidosis and sarcoidosis [4].

Although renal failure is a worldwide problem no much has been written about its cutaneous manifestations in the world and this framework of renal failure in Sudan can be compared with international studies. This frame aimed to study the cutaneous manifestations Sudanese patients with renal failure. Thus, this can help to compare the cutaneous manifestations in Sudanese patients with renal failure with the international literature.

## 2. Patients and Methods

Study area: -

The was done at Khartoum renal center that is localised in Khartoum East. This centre is the first specialised centre in Sudan and serves patients with renal failure from all parts of Sudan with their different tribes. It is nicely organized and well equipped. It contains 20 hemodialysis machines, modern laboratory and a small theatre. In the future, a big theatre and wards will be open and renal transplantation operations will be carried on. The centre conduct hemodialysis six days per week from Saturday to Thursday in two shifts. It has organized referred clinics for the

different categories of renal failure patients and nice filing with computer registrations. The staff consist of consultant nephrologists, registrars, sisters and well-trained nurses plus the administrative staff and labour workers.

Study population: -

The centre contains files. The average number of patients seen at the centre about daily and per month.

Study design and sample size: -

Random 200 patients have seen 50 out of them are pre-dialysis, and 100 are on regular hemodialysis, and the last 50 were transplanted recipients. The patients already investigated and diagnosed. For every patient, a detailed history and proper clinical examination were done, and a questionnaire was filled. From these random samples, those patients with cutaneous manifestations were identified.

Tools: -

A comprehensive questionnaire including the demographic data, type and duration of renal failure, duration of cutaneous manifestations, symptoms and morphology of the cutaneous lesions filled by every patient.

The analysis: -

Was done by manual and computer through tables, percentages, histograms and charts.

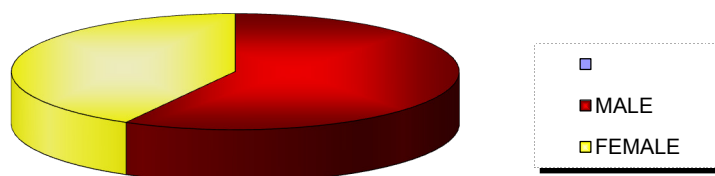
## 3. Results

**Table (1).** Frequency of Pts. with C.M. out of total R.F cases (200) attending K.R.C in period from (6-10-2001)

	Total No.	No. of pts with C.M.	%	%
Predialysis pt.	50	36	72%	18%
Pt. On dialysis	100	89	89%	44.5%
Transplanted	50	42	84%	21%
Total	200	167		83.5%

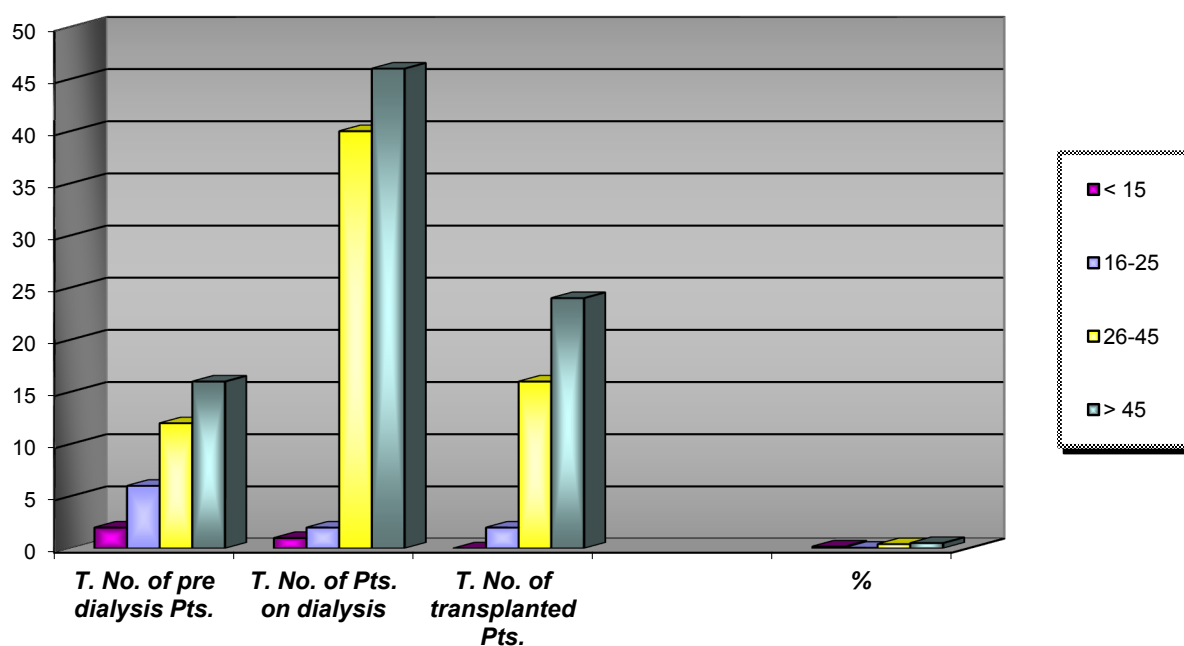
**Table (2).** Frequency of C.M. in Pts. With R.F attending K.R.C in period from (6-10-2001) according to sex

Sex	T. No. of pre-dialysis	No. of Pts on dialysis	T. of transplanted Pts.	Total	%
No. of male Pts	20 (55.5%)	51 (57.3%)	26 (61.9%)	97	58%
No. of female Pts.	16 (44.4%)	38 (42.7%)	16 (38.1%)	70	42%
Total	36	89	42	167	100%



**Table (3).** Frequency of C.M. in Pts. With R.F attending K.R.C in period from (6-10-2001) according to age group

Age group	T. No. of pre-dialysis Pts.	T. No. of Pts. on dialysis	T. No. of transplanted Pts.	Total	%
< 15	2	1	-	3	18%
16-25	6	2	2	10	6%
26-45	12	40	16	68	40.7%
> 45	16	46	24	86	51.5%
Total	36	89	42	167	100%

**Table (4).** Frequency of C.M. in Pts. With R.F attending K.R.C in period from (6-10-2001) according to the duration of R.F

Duration of R.F	Predialysis Pts.	Pts. on dialysis	Transplacental pts	Total	%
Days	-	-	-	-	-
Months	18	5	-	23	13.8%
Years	18	84	42	44	86.2%
Total	36	89	42	167	100%

**Table (5).** Frequency of C.M. in Pts. With R.F attending K.R.C in period from (6-10-2001) according to the duration of C.M

Duration of C.M	Predialysis Pts.	Pts. on dialysis	Transplacental pts	Total	%
Days	-	-	2	2	1.2%
Months	24	21	12	57	34.1%
Years	12	68	28	108	64.7%
Total	36	89	42	167	100%

**Table (6).** Frequency of C.M. in Pts. With R.F attending K.R.C in period from (6-10-2001) according to the associated diseases

Associated disease	Predialysis Pts.	Pts. on dialysis	Transplanted	Total
D.M	2	2	8	12
HPN	20	41	16	77
Thyroid disease	-	2	-	2
Parathyroid	-	1	2	3
Gout	-	2	2	4
D.M+HPN	4	8	10	22
HPN+Gout	6	8	4	18
No associated disease	4	25	-	29

**Table (7).** Frequency of cutaneous symptoms in pre-dialysis Pts. Attending K.R.C in period from (6-10-2001)

Symptom	Frequency	%
Pruritus	30	83.3%
Skin dryness	32	88.8%
Pigmentary changes	28	77.7%
Pain	-	-
Others	1 (hair fall)	2.8%
Total	36	100%

**Table (8).** Frequency of cutaneous symptoms in Pts. On haemodialysis attending K.R.C in period from (6-10-2001)

Symptom	Frequency	%
Pruritus	68	76.4%
Skin dryness	43	48.3%
Pigmentary changes	75	84.2%
Pain	3	3.3%
Others	-	-
Total	89	100%

**Table (9).** Frequency of cutaneous symptoms in transplanted Pts. Attending K.R.C in period from (6-10-2001)

Symptom	Frequency	%
Pruritus	20	47.6%
Skin dryness	10	23.8%
Pigmentary changes	36	85.7%
Pain	2	4.8%
Others	-	-
Total	42	100%

**Table (10).** Frequency of C.M in pre-dialysis Pts. Attending K.R.C in period from (6-10-2001) according to their lesions morphology

Lesion morphology	Frequency	%
Hyperpigmented macules	28	77.7%
Papules	2	5.5%
Modules	-	-
Vesicles	-	-
Bullae	1	2.7%
Pustules	1	2.7%
Hyperpigmented patches	19	52.8%
Plaques	1	2.7%
Nail changes	6	16.6%
Scales	6	16.6%
Others	-	-
Total	36	100%

**Table (11).** Frequency of C.M in Pts. On haemodialysis attending K.R.C in period from (6-10-2001) according to their lesions morphology

Lesion morphology	Frequency	%
Hyperpigmented macules	72	80.9%
Papules	11	12.3%
Modules	3	3.3%
Vesicles	1	1.1%
Bullae	-	-
Pustules	3	3.3%
Hyperpigmented patches	43	47.8%
Plaques	1	1.1%
Nail changes	24	26.9%
Scales	13	14.5%
Others	1 (cyst)	1.1%
Total	89	100%

**Table (12).** Frequency of C.M in transplanted Pts. On haemodialysis attending K.R.C in period from (6-10-2001) according to their lesions morphology

Lesion morphology	Frequency	%
Hyperpigmented macules	36	85.7%
Papules	4	9.5%
Modules	6	40.3%
Vesicles	8	19.5%
Bullae	-	-
Pustules	-	-
Hyperpigmented patches	25	59.5%
Plaques	-	-
Nail changes	8	19.5%
Scales	16	38.9%
Others	-	-
Total	42	100%

**Table (13).** The effect of haemodialysis on the C.M in Pts. Attending K.R.C in period from (6-10-2001)

The effect	No. of Pts.	%
Improvement	34	38.2%
No effect	45	50.6%
Deterioration	10	11.2%
Total	89	100%

Key: -

C.M: Cutaneous Manifestation.

Pts.: Patients.

K.R.C: Khartoum Renal Centre.

R.F: Renal Failure.

## 4. Discussion

Two hundred patients with renal failure of different causes were seen at Khartoum renal centre in the period from June -3 to October-28- 2001. Fifty patients are pre-dialysis; hundred were on regular hemodialysis, and fifty were transplanted (recipients).

Those patients with cutaneous manifestations were found 167 out of the 200 (83.5%) according to the table (1). The highest percentage of cutaneous manifestations seen in patients on regular hemodialysis (89%), then transplanted (recipients) (84%) and (72%) in pre-dialysis patients. These findings showed that the cutaneous manifestations increase when the renal failure progress and after transplantation the skin manifestations decrease to some extent but still more than in the pre-dialysis stage. That means the difficulty of management of cutaneous manifestations even after renal transplantation.

The frequency of cutaneous manifestations according to the sex showed that 97 out of 167 (58%) were males, and 70 (42%) were females. This result showed that the renal failure in Sudanese patients is more frequent in males than females, the ratio about 1.5: 1. Table (2).

According to the age, table (3) the rate of cutaneous manifestations in patients above 45 years were 51.5% and in age group (26-45 years) were 40.7%, which again means that the skin manifestations became more as renal failure progress.

The frequency of cutaneous manifestations according to the duration of renal failure showed that 86.2% appeared after years while 13.8% appeared after months [Table 4]. Moreover, the frequency of the skin manifestations according to the duration of the cutaneous manifestations, showed that 64.7% for years and 34.1 % for the duration of months [Table 5]. These findings in tables (4) & (5) revealed that the cutaneous manifestations go simultaneously with the chronicity of the renal failure.

The common symptoms observed are pruritus, skin dryness and hyperpigmentation; tables (7), (8) and (9). The pruritus is more noticed in the pre-dialysis patients (83.3%) and decreased in patients on hemodialysis to (76.4%) while in transplanted patients only (47.6%).

These findings pointed to that renal transplantation helps in the relief of this troublesome symptom. In this study found

that the percentage of pruritus similar to that found international literature 80% [66]. Dimkovic N.1992. Barbara et al. 1980 mentioned that patients with renal failure experienced exacerbation of their symptoms during summer due to the raising of skin temperature that may reduce the threshold for perception of uremic pruritus just as it does in other forms of pruritus. Maybe the weather in Sudan, which is hot, most of the year play a role in exacerbation in Sudanese patients. The same findings also observed for the skin dryness (xerosis) 88.8% in pre-dialysis patients, 48.3% in patients on hemodialysis and 23.8% in transplanted patients and usually the pruritus accompanied by xerosis that is considered as one of the main causes of the itching.

The hyperpigmentation is high in the three categories of patients, 77.7% of pre-dialysis patients, 84.2% in patients on hemodialysis and 85.7% in transplanted recipients. These findings pointed to that the hyperpigmentation not affected by hemodialysis or renal transplantation. The skin discoloration depends on the pre-morbid colour and may be the type of skin play a role, and most of the Sudanese patients belongs to skin type four.

For the cutaneous lesions morphology, tables (10), (11) and (12) the common are hyperpigmented macules and patches observed in the three categories of patients with high percentages 77.7% macules & 59.8% patches in pre-dialysis patients, 80.9% macules & 47.8% patches in patients on hemodialysis and 85.7% macules & 59.5% in transplanted recipients. These findings showed that the morphological signs became more while renal failure progress and they are not affected by hemodialysis or even renal transplantation.

The next common morphological lesions are nail changes that found as follows 16.6% in pre-dialysis patients, 26.9% of patients on hemodialysis and 19.5% in transplanted recipients. These nail changes ranged from Beau's lines, the half and half nail, to nail dystrophy.

Then scales that were found as follows 16.6% in pre-dialysis patients, 14.5% in patients on hemodialysis and 38.9% in transplanted recipients. There were few or minimal signs of papules, vesicles, cysts and bullae seen in a small number of patients in the different categories of renal failure patients.

Table (6): showed that the commonest associated disease is hypertension and next common is diabetes mellitus then gout. There are some patients associated with more than one disease, e.g., hypertension plus diabetes mellitus and hypertension plus gout. For the parathyroid diseases, only three patients were found and for the thyroid diseases only two patients recorded.

About the effect of hemodialysis on the skin manifestations, 50.6% showed no effect while 38.2% showed improvement and 11.2% deteriorate after hemodialysis [table 13].

In this study, three transplant recipients developed nodular and granulomatous's lesions that were confirmed by histopathology to be Kaposi sarcoma. Seven patients developed fungal nail infections, four patients developed Pityriasis Versicolor and two patients developed herpes

zoster infection. Most likely the low immune status of those patients due to immunosuppressive therapy play a major role in these conditions.

There are many other cutaneous manifestations mentioned in the literature like bullous dermatosis of dialysis, cutaneous calcification and calciphylaxis, perforating dermatosis, etc. - not encountered in this study.

In this study patients, seen were from different tribes and different social, economic and education classes. These findings pointed to that the socioeconomic factors do not play any role in the development of renal failure and associated cutaneous manifestations.

The drugs used in the management of renal failure that include calcium, Arabic gum, ferrous, folic acid, erythropoietin, etc. do not any effect on associated cutaneous manifestations. Also, neither the antihypertensives nor the antidiabetes drugs showed any effect. The drugs used in hemodialysis and those used in sterilization of the machine tubes that mentioned in the literature to cause allergic reactions did not show the effect and no allergic reactions recorded in the study.

## 5. Conclusions

Out of 200, known cases of renal failure examined for cutaneous findings, 167 (83.5%) showed cutaneous manifestations. Patients on regular hemodialysis showed the highest skin manifestations (89%), and then transplant recipients (84%) and pre-dialysis patients (72%). The most common symptoms observed were pigmentary changes (82.5%), itching (69.1%) and skin dryness (53.6%). The cutaneous signs seen were.

## 6. Recommendations

(1) Renal failure is a real problem, and the cases is increasing there for efforts must be done to develop this Khartoum renal centre to accommodate the increasing number of patients and to put a plan for new centres.

(2) There are a lot of cutaneous manifestations associated with renal failures like pruritus, hyperpigmentation, fungal infections and skin tumours so a dermatologist needed to be available at the renal centre to supervise these cases and manage them correctly or to be in contact if this not possible.

(3) There are many cutaneous manifestations been found in other studies like skin calcification and calciphylaxis, bullous dermatosis, etc. which were not found in this study, so further studies recommended being conducted.

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