



# Assessment of Skin Manifestations in End-Stage Renal Disease Patients Undergoing Hemodialysis in Shahid Beheshti Hospital of Abadan and Vali-e-Asr Hospital of Khorramshahr

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## Abstract

**Background:** The prevalence of skin manifestations in hemodialysis patients is increasing.

**Objectives:** The aim of this study was to evaluate skin manifestations in patients with end-stage renal disease (ESRD) undergoing hemodialysis.

**Methods:** In this descriptive-analytical study, 100 patients undergoing hemodialysis from among 120 patients referring to Shahid Beheshti Hospital of Abadan and Vali-e-Asr Hospital of Khorramshahr were assessed. A demographic questionnaire and a checklist about skin disorders were used for data collection. The data were analyzed by SPSS version 16 software using descriptive and analytical statistics.

**Results:** The most common skin findings were pale skin (87%), dry skin (71%), hyperpigmentation (46%), and purpura (35%). Among nail manifestations, the most common finding was a half-and-half nail (50%) and the rarest symptom was dystrophy (1%).

**Conclusions:** The results of this study indicated that ESRD was associated with multiple skin symptoms, the most prevalent of which were pale skin and dry skin symptoms. Therefore, early diagnosis of these problems is a major step in improving the quality of life of these patients.

**Keywords:** ESRD, Skin Symptoms, Nail Disorders, Hemodialysis, Side Effects

## 1. Background

End-stage renal disease (ESRD) is the irreversible loss of renal function that permanently affects the patient to undergo kidney replacement therapy (graft or dialysis). The kidney failure not only leads to uremia, but also affects many normal metabolic and endocrine functions of the kidneys, which can lead to anemia, malnutrition, impaired fat, carbohydrate and protein metabolism, incomplete consumption of energy, and metabolic bone disease (1-3). The disorder is also accompanied by multiple skin manifestations that start to increase with dialysis. Therefore, it is necessary to recognize various skin changes. Previous studies have reported dryness and itching as the most common skin manifestations in hemodialysis patients (4).

By the end of 2016, the number of dialysis patients was 30800 people in Iran. Considering the average growth rate of 4% - 5% in ESRD patients in Iran, the hemodialysis treatment is still expected to be the most important method for dialysis in treating ESRD patients in the country. In an overview, over 50% of the hemodialysis patients were living in only six provinces of the country and the rest in the other 25 provinces. Tehran province with more than 5000 hemodialysis patients, accounting for 17% of all hemodialysis patients, has the highest number of hemodialysis patients in the country. The provinces of Khorasan Razavi, Esfahan, Fars, Khuzestan, and East Azarbaijan are in the next ranks (5). In two studies in Iran, the most common dermatologic sign of hemodialysis patients was skin discoloration (6, 7). In the study of Udayakumar et al. the symptoms of skin lesions were seen in 82% of the patients

and the most common finding was dry skin (8). In another study by Pico et al. all patients had at least one skin disorder, the most common of which was a change in skin pigmentation (9). In addition, the itching was another skin manifestation in the patients as mentioned in a study by Masmoudi et al. (10).

According to the literature, skin manifestations are prevalent in these patients, leading to some important adverse effects, for example, on quality of life, self-confidence, isolation, and body image, and even creating underlying conditions for infections and other illnesses. On the other hand, a relatively high prevalence of chronic renal failure and hemodialysis cases in Abadan and Khorramshahr cities and some specific traits of people who live in these cities, such as the habit of fast food eating and spicy diet, have made the skin problems serious. Based on our search, there was no study conducted on this issue in Abadan and Khorramshahr.

## 2. Objectives

This study was conducted to determine skin manifestations in patients undergoing hemodialysis in Shahid Beheshti Hospital of Abadan and Vali-e-Asr Hospital of Khorramshahr.

## 3. Methods

The present study was a descriptive-analytical study to evaluate the prevalence of skin manifestations in ESRD patients undergoing hemodialysis in Shahid Beheshti Hospital of Abadan and Vali-e-Asr Hospital of Khorramshahr in 2015. In this study, all patients referring to the two mentioned hemodialysis centers were recruited if they were willing to participate in the study. The census method was used to select 100 patients from among 120 patients. The inclusion criteria for this study included an age of 20 years or older and a history of at least three months of dialysis while the exclusion criteria were an unwillingness to continue or the death of the patient.

The data-gathering tool had two parts; the first part was a demographic questionnaire including age, sex, underlying disease, hemodialysis frequency per week, and duration of hemodialysis (Table 1). The second part of the questionnaire consisted of questions on skin disorders in ESRD patients undergoing hemodialysis such as dry skin, itching, seborrheic dermatitis, pale skin, and so on. This checklist was prepared by reviewing the relevant literature, books, and consultation with the nurses and physicians working at the hemodialysis wards. The questionnaire was distributed to 10 faculty members of Abadan Faculty of Nursing who were expert and qualified in this field

**Table 1.** Frequency Distribution of Demographic Data in Hemodialysis Patients

Variable	Frequency (%)
<b>Gender</b>	
Male	52 (52)
Female	48 (48)
<b>Age, y</b>	
20 - 40	33 (33)
41 - 60	54 (54)
61 - 80	13 (13)
<b>Duration of dialysis treatment, mo</b>	
4 - 12	22 (22)
13 - 24	20 (20)
25 - 36	20 (20)
37 - 48	11 (11)
49 - 60	10 (10)
> 60	17 (17)
<b>Underlying diseases</b>	
No	23 (23)
Yes	
Hypertension	32 (32)
Diabetes	20 (20)
Cardiovascular disease	8 (8)
Other diseases	17 (17)

for evaluating the content and face validity. After updating the questionnaire according to the experts' opinions, in order to verify its reliability, a preliminary study was conducted on 20 patients. The Cronbach's alpha coefficient was used to evaluate the internal consistency and reliability of this tool that was obtained as 0.86.

After receiving written consent, all patients were examined by a dermatologist, and their symptoms were recorded on the checklists. After attending the dialysis units (every day and in different work shifts) and obtaining patients' written consent, the researchers asked a dermatologist to examine all patients for symptoms and skin manifestations and recorded the data in the checklists.

In order to maintain the patient's privacy during examination by the dermatologist, a folding screen was used. Finally, the collected data were analyzed by SPSS version 16 software using *t* and Chi-square statistical tests. In this study, the significance level was set at 0.05.

#### 4. Results

The most common skin manifestations included pale skin (87%), dry skin (71%), hyperpigmentation (46%), and purpura (35%). Among nail manifestations, the most common finding among patients was a half-and-half nail (50%) and the rarest finding was nail dystrophy (1%) (Table 2). In addition, there was a significant relationship between the duration of dialysis and mild itching and dry skin ( $P = 0.02$ ). There was a significant relationship between the number of years of hemodialysis and other skin diseases ( $P = 0.04$ ). In addition, the findings showed that the association between age and skin problems was statistically significant ( $P < 0.0001$ ).

#### 5. Discussion

The effects of chronic renal failure are complex and involve multiple systems in the body. In today's world, early diagnosis and treatment of chronic renal failure patients have developed, leading to the improvement of life expectancy and quality of life of these patients. The exact examination of skin in these patients presents a variety of skin manifestations. Timely diagnosis and treatment of these manifestations can enhance the quality of life of the patients and eliminate subsequent concerns (11).

According to the findings of this study, most patients had at least one skin lesion. Pale skin was the most common skin disorder among the subjects, which was seen in 87% of the patients. This finding was in accordance with the findings of Ansar and Farshchian study. In a study of 75 patients undergoing dialysis, the most common skin manifestation was the skin discoloration with a frequency of

74.4% (6). In the study of Hajheydari and Makhloogh, skin color reddening and yellowing were also reported as the most common skin conditions, confirming the results of the current study (12). In addition, a study by Udayakumar et al. on 100 hemodialysis patients showed that 82% of the patients had skin signs and symptoms, in which 60% of the subjects were examined (8). Kolla et al. studying 143 kidney failure patients who underwent hemodialysis, showed that skin discoloration was one of the most common skin conditions in the study patients, which is consistent with the current study. They stated that recognizing and managing skin manifestations will significantly reduce the disease and improve the quality of life (13). However, Pico et al. (9) Yaghoubi et al. and Naderi et al. studies reported 8%, 31.5%, and 30% incidence rates for pale skin, which had a dramatic difference with our study findings. This difference can be justified by differences in the conditions during the patients' skin assessment (11, 14). It needs to be explained that in the typical skin color assessment, a skin color recognition requires accurate eye observation and environmental conditions such as intensity of the light; therefore, the evaluation of this case requires a high degree of accuracy and elegance.

Dry skin (71%), skin hyperpigmentation (46%), and purpura (35%) were the other skin manifestations among the study population, which were most frequent after skin discoloration, in sequence. Different studies have been done in this regard; the findings of our study are consistent with those of previous studies on skin manifestations in hemodialysis patients. Baghestani et al. examined the prevalence of dermatological manifestations in hemodialysis patients and concluded that the most common finding was dry skin and pallor, which despite the difference in sample size, was consistent with the findings of the current study (11). The results of Sanad et al. study showed that there was a high prevalence of skin manifestations in patients, with hyperpigmentation in 44% of the patients. Although the patients in the two studies were different in terms of the cultural context, they are in agreement with each other in terms of achieving similar results (4). Similarly, the results of a study by Choi et al. indicated an increase in hyperpigmentation in renal patients treated with hemodialysis, which is in agreement with the findings of the present study (15). However, Pico et al. (9) showed that hyperpigmentation decreased with increasing dialysis duration, which is in contrast with the results of the current study. Although hyperpigmentation is reported in patients with chronic renal failure, hypopigmentation has also been reported in these individuals since this condition can reduce the contact with sunlight in a specific area other than the current study setting.

The skin acts as a window for the detection of many

**Table 2.** Frequency Distribution of Skin Manifestations in Hemodialysis Patients

Variable	Frequency (%)
Dry skin	71 (71)
Pale skin	87 (87)
Mild itching	27 (27)
Intense itching	33 (33)
Skin jaundice	32 (32)
Hyperpigmentation	46 (46)
Purpura	35 (35)
Ecchymosis	27 (27)
Half-and-half nail	50 (50)
Spoon nails	10 (10)
Bleeding under the nail	20 (20)
Nail dystrophy	1 (10)

internal organs, including the renal system. Delicate skin changes can be a sign of kidney damage (16). In studies by Sanad et al. (4), Kolla et al. (13), and Ghunawat et al. (16), skin dryness was reported in some of the subjects, which are in line with the results of the current study. However, in the study of Hajhaydari and Makhloogh the prevalence of skin dryness was reported to be 23%, and the authors explained that the reason for this remarkable difference could be attributed to climatic conditions (12). Dry skin prevalence in this study was consistent with the reports of Udayakumar et al. (8) and Baghel et al. (17) in ESRD patients undergoing hemodialysis.

There was also a significant relationship between variables such as age, duration of dialysis, and years of dialysis, and skin diseases in our study, which is in line with the results of studies by Naderi et al. (14) and Sanad et al. (4) and contrary to the findings of a study by Baghestani et al. (11). In a study by Naderi et al. there was a significant relationship between age and skin dryness so that the prevalence of dry skin was higher in patients over 53 years of age (14). Sanad et al. also stated that the incidence of skin complications increased with the duration and severity of kidney disease (4). In addition, the frequency of itching had a direct correlation with the duration of hemodialysis. In the study of Pico et al., the incidence of itching increased with increasing the hemodialysis duration, which might be due to an increase in the patient's longevity (7); these results are contradictory to the findings of the current study.

The prevalence of purpura in this study was 35%, with a reported prevalence range of 9% to 20% in the previous studies, which may be due to platelet dysfunction and heparin use during dialysis (8). It should be noted that the most common finding of nail manifestations was a half-and-half nail (50%) among patients, which is more common than in other studies. For example, Baghestani et al. (11) and Udayakumar et al. (8) reported the prevalence of half-and-half nails as 20%, and 21%, respectively. Even in the study of Yaghoubi et al. the prevalence of half-and-half nail was reported to be 5.8% and 7%, respectively, that have a significant difference with the results of the present study (11). One of the findings of the present study was itching, which was 33% in prevalence. In various studies, the incidence of itching was reported in the range of 19% to 90% (8, 9, 11) and its beginning was often after hemodialysis (12, 18).

Nevertheless, in our study, due to the incomplete history of patients, it was not possible to investigate the association of itching with the onset and the duration of dialysis.

Almost all people with advanced renal insufficiency have at least one skin lesion, and the most common skin lesion in this study was pale skin. However, the incidence of skin manifestations has been reported differently in var-

ious studies. These differences can be due to the effects of the examiner, environmental factors, and laboratory differences at the time of the study.

### 5.1. Conclusion

Chronic and advanced renal failure is associated with various skin and nail changes, including dry skin, pallor, purpura, half-and-half nail, and so on. According to the results of this study and other similar studies, it seems racial differences, social status, socioeconomic status, geographical location, the climate of the region, and the accuracy and experience of the examiner affect the reported prevalence of these manifestations. We suggest conducting further studies with larger sample sizes. Patients with chronic renal failure should undergo quantitative examinations in terms of the changes, and in case of the presence of these complications, the necessary therapeutic and supportive measures must be taken. They can be treated with timely treatment and taking positive steps towards promotion. Thus, the quality of life of these people and consequently, their life expectancy can increase.

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### Footnotes

**Conflict of Interest:** The authors declare no conflict of interest.

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