

## ORIGINAL ARTICLE

## Periodontal Treatment Needs of Patients with Chronic Kidney Disease

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## ABSTRACT

**Objective:** To assess the periodontal treatment needs of patients in different stages of chronic kidney disease**Methodology:** A Cross sectional comparative study was conducted in the department of Nephrology and Urology, Sharif Medical and Dental College, Lahore on 32 patients with chronic kidney disease in the time duration of one year. Data was collected after taking an informed consent from the patients. The demographic data along with a list of variables associated with chronic kidney disease was recorded using a structured questionnaire. Data collection was based on the following parameters: Community Periodontal Index of Treatment Needs (CPITN).**Results:** The highest percentage (10%) of patients who required no treatment (TN<sub>0</sub>) were stage 3 patients. Majority of the stage 5 (93.1%) patients required scaling, prophylaxis and oral hygiene instruction (TN<sub>2</sub>) followed by stage 4 (90.9%) and stage 3 (40%) respectively. None of the patients required complex treatment, scaling, prophylaxis and oral hygiene instructions (TN<sub>3</sub>)**Conclusion:** The highest percentage of patients with healthy periodontium were stage 3 patients. Periodontal pocket depths 4-5 mm were found to be in stage 4 patients the most followed by stage 5 and then stage 3. None of the patients had pocket depths of 6mm or more. Majority of the stage 5 patients required scaling, prophylaxis and oral hygiene instruction (TN<sub>2</sub>) followed by stage 4 and stage 3 respectively. None of the patients required complex treatment, scaling, prophylaxis and oral hygiene instructions (TN<sub>3</sub>).**Keywords:** Chronic kidney disease, periodontal treatment needs, oral hygiene instructions, oral prophylaxis, complex treatment

## INTRODUCTION

Chronic kidney disease (CKD), also known as chronic renal disease, is a progressive loss in a patient's renal function over a period of months or years<sup>1</sup>. It is defined by the National kidney foundation of USA as – "Kidney damage or glomerular filtration rate <60 mL/min/1.73 m<sup>2</sup> for more than three months"<sup>2</sup>. CKD is divided into 5 stages based on glomerular filtration rate and stage five CKD is also known as end-stage renal disease (GFR <15 mL/min). Many studies suggest an increase in prevalence and severity of periodontal disease in patients with CKD<sup>3-5</sup>

In Chronic kidney disease (CKD) the gradual and usually permanent reduction in the glomerular filtration rate (GFR) of the kidneys, leads to increases in serum creatinine and blood urea nitrogen (BUN) levels, resulting in uraemia or azotaemia<sup>6</sup>. Common causes of CKD include hypertension, diabetes mellitus, chronic glomerulonephritis, obstructive uropathy, autoimmune disease and obesity<sup>7</sup>. Once uraemia develops it adversely affects every system of the body. Patients with end-stage renal disease (ESRD) receiving haemodialysis experience greatly increased rate of atherosclerotic complications<sup>8</sup>. CRP and other acute phase proteins are elevated in dialysis patients and cardiovascular diseases represent the single largest cause of mortality in chronic renal failure patients<sup>9</sup>.

Patients presenting with uremia typically complain of nausea, vomiting, fatigue, anorexia, weight loss, muscle cramps, pruritus, or changes in mental status<sup>10</sup>. Oral manifestations of chronic renal disease are also common during the progression of uraemia. Uraemic patients experience more oral problems than healthy controls in oral mucosa, teeth, salivary glands and jaw bones, problems that seem to develop before dialysis<sup>11</sup>. Symptoms include uremic odour, dry mouth, and taste change, and signs may include petechia, ecchymosis and increased tongue coating, and decreased salivary flow<sup>12</sup>. Osseous tumors and enlargement have also been described as manifestations of secondary hyperparathyroidism<sup>13</sup>.

Periodontal diseases are also highly prevalent in patients with CKD specifically gingivitis, due to excessive plaque formation and poor oral hygiene<sup>14</sup>. Periodontal diseases are those that involve diseased structures of the periodontium (one or more

which includes the alveolar bone, the periodontal ligament, the root cementum, and the gingiva)<sup>15</sup>. The aim of this study was to assess the periodontal treatment needs of patients in different stages of chronic kidney disease.

## METHODOLOGY

A Cross sectional comparative study was conducted in the department of Nephrology and Urology, Sharif Medical and Dental College, Lahore on 32 patients with chronic kidney disease in the time duration of one year. The study was conducted after ethical approval certificate No. SMDC/SMRC/100-19 from Sharif Medical Research Centre (SMRC). Keeping the precision at 15% and prevalence of chronic kidney disease 3.5%<sup>16</sup> and confidence level 95%, the same size was calculated to be 50. Chronic kidney disease stage 3, 4 and 5 patients with age above 18 years, belonging to both the genders and same socioeconomic status were a part of the study. Patients undergoing renal dialysis for reasons other than CRF, those who were critically ill and those with any systemic illnesses were excluded from the study.

Data was collected after taking an informed consent from the patients. The demographic data along with a list of variables associated with chronic kidney disease was recorded using a structured questionnaire. Data collection was based on the following parameters: Community Periodontal Index of Treatment Needs (CPITN). The data was analyzed using IBM SPSS Statistics 23. P value ≤ 0.05 was considered significant. Numeric data was presented as mean and its respective standard deviation. Nominal data was presented as frequency and percentages.

## RESULTS

A cross sectional study was performed on patients with chronic kidney disease out of which 10 were stage 3, 11 were stage 4 and 29 were stage 5 patients. The mean age of the 38.08±17.042 years with 55.6% males and 44.6% females.

Table 1 shows that the highest percentage of patients with healthy periodontium were stage 3 patients. It was also seen that bleeding gums was reported by stage 3 patients the most. Stage 5 chronic kidney disease patients were reported calculus deposition as their major periodontal problem followed by stage 4. Periodontal

pocket depths 4-5 mm were found to be in stage 4 patients the most followed by stage 5 and then stage 3. None of the patients had pocket depths of 6mm or more as shown in table 1.

Table 1: Prevalence of Persons Affected in Different Stages of Chronic Kidney Disease

Stage of CKD	Age	Prevalence of Persons Affected				
		% Persons coded				
		Healthy (H)	Bleeding (B)	Calculus (C)	Periodontal pocket depth 4-5 mm (P1)	Periodontal pocket depth 6 mm and above P2 )
Stage 3	14-65 years	10	50	0	40	0
Stage 4	20-67 years	9.1	0	27.3	63.6	0
Stage 5	20-67 years	0	6.9	41.4	51.7	0

Table 2: Periodontal Treatment Needs of Patients in Different Stages of Chronic Kidney Disease

Periodontal Treatment Needs of Patients with Chronic Kidney Disease				
Stage of CKD	%TN 0 (No treatment)	% TN 1 (Oral hygiene instructions)	% TN 2 (Scaling and prophylaxis and Oral hygiene instructions)	%TN 3 complex treatment (deep scaling, root planning and complex surgical procedures), scaling and prophylaxis and Oral hygiene instructions
Stage 3	10	90	40	0
Stage 4	9.1	90.9	90.9	0
Stage 5	0	100	93.1	0

Table 2 shows that the highest percentage of patients who required no treatment (TN<sub>0</sub>) were stage 3 patients while none of stage 5 patients fell in this category. Majority of the stage 5 patients required scaling, prophylaxis and oral hygiene instruction (TN<sub>2</sub>) followed by stage 4 and stage 3 respectively. None of the patients required complex treatment, scaling, prophylaxis and oral hygiene instructions (TN<sub>3</sub>) as shown in table 2.

**DISCUSSION**

Periodontitis is caused by pathogenic microflora in the biofilm or dental plaque that forms adjacent to the teeth on a daily basis<sup>17</sup>. Inflammation confined to the gingival tissue is known as gingivitis, and inflammation that extends deep into the tissues causing loss of supporting connective tissue and alveolar bone is known as periodontitis<sup>18</sup>. Plaque-induced inflammatory lesions make up vast majority of periodontal diseases and have traditionally been divided into two categories: gingivitis or periodontitis<sup>19</sup>. Studies suggest <sup>3</sup> that ESRD patients on hemodialysis have significantly higher plaque and calculus indices and lower salivary secretion.

The management of chronic kidney disease patients with periodontitis is medically complex and presents the dental practitioner with several challenges<sup>20</sup>. Among the factors which may complicate the treatment include high prevalence of anaemia, clotting deficiencies, hypertension, diabetes and renal osteodystrophy in such patients<sup>21</sup>. Accordingly, close communication between the dentist and nephrologist is essential to optimize periodontal health<sup>22</sup>.

Daily brushing and flossing along with regular professional dental cleanings greatly reduce the chance of developing periodontitis by decreasing the levels of pathogenic microflora in the biofilm<sup>23</sup>. Treatment of periodontal diseases begins with the removal of subgingival calculus by nonsurgical procedure known as scaling and root planning<sup>24</sup>. According to our study The highest percentage of patients with healthy periodontium were stage 3 patients. Stage 5 chronic kidney disease patients reported calculus deposition as their major periodontal problem followed by stage 4. Periodontal pocket depths 4-5 mm were found to be in stage 4 patients the most followed by stage 5 and then stage 3. None of the patients had pocket depths of 6mm or more.

Dental calculus, most commonly known as tartar, represents mineralized bacterial plaque and is comprised almost entirely of calcium phosphate<sup>25</sup>. Clinically, calculus tenaciously adheres to tooth surface and requires mechanical scraping for removal<sup>25</sup>. Extensive surgical treatments include flap surgery (pocket reduction surgery), soft tissue grafting, bone grafting, and guided tissue regeneration. Our study reported that the highest percentage of patients who required no treatment (TN<sub>0</sub>) were stage 3 patients. Majority of the stage 5 patients required scaling, prophylaxis and oral hygiene instruction (TN<sub>2</sub>) followed by stage 4

and stage 3 respectively. None of the patients required complex treatment, scaling, prophylaxis and oral hygiene instructions (TN<sub>3</sub>).

The supplemental use of local as well as systemic antibiotics along with local antiseptics has shown to be more beneficial as compared with debridement alone. However, this benefit is clinically small compared with the effects of local mechanical therapy alone<sup>26</sup>.

There are innumerable studies that have been conducted on deterioration of periodontal health of chronic kidney disease patients but there are very few studies that have studied the periodontal treatment needs of the chronic kidney disease patients across different stages of the disease. The finding of our study will help the dental clinicians to understand the periodontal treatment needs that differ with the change in the stage of kidney disease and will help dentists and physicians to work in liaison with each other to render effective treatment to these patients.

**Limitation:** A larger sample size would have unravel more findings.

**CONCLUSION**

The highest percentage of patients with healthy periodontium were stage 3 patients. Stage 5 chronic kidney disease patients reported calculus deposition as their major periodontal problem followed by stage 4. Periodontal pocket depths 4-5 mm were found to be in stage 4 patients the most followed by stage 5 and then stage 3. None of the patients had pocket depths of 6mm or more. The highest percentage of patients who required no treatment (TN<sub>0</sub>) were stage 3 patients. Majority of the stage 5 patients required scaling, prophylaxis and oral hygiene instruction (TN<sub>2</sub>) followed by stage 4 and stage 3 respectively. None of the patients required complex treatment, scaling, prophylaxis and oral hygiene instructions (TN<sub>3</sub>).

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