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# The Effect of Dialysis Duration on Oral Conditions Among Moroccan Hemodialysis Patients

Bagui M[*1], Zajjari Y[2], Aatif T[3], ELKabbaj D[1] and Sakout M
*1 Department of Dentistry, Military Hospital Mohammed V Rabat, Morocco*
*2 Department of Nephrology-Dialysis, Military Hospital Mohammed V Rabat, Morocco*
*3Department of Nephrology-Dialysis, Military Hospital Mohammed V Rabat, Morocco*
*4Department of Dentistry, Military Hospital Mohammed V Rabat, Morocco*
**Corresponding author: Bagui M*, Department of Dentistry, Military Hospital Mohammed V, Hay Ryad BP*

***Abstract***
*The aim of this study was to determine the influence of dialysis duration on oral conditions among Moroccan hemodialysis (HD) patients. A cross-sectional study based on data collected from HD patients treated at two different dialysis centers in Morocco. The medical file of each patient was reviewed. The cause of renal failure was recorded and the oral cavity was examined for plaque deposit, gingivitis, periodontitis and dental caries using plaque index (PI) and gingival index (GI) of Silliness and Löe, and decayed, missing or filled teeth (DMFT), respectively.*

*The condition of the oral mucosa and other oral lesion was recorded. In order to determine the effect of the duration of HD on oral conditions, patients were divided into two groups: (1) those that have been on dialysis for less than 5 years, (2) those that have been on dialysis for more than 5 years.*

*In total, 56 HD patients [32 males (57, 1%) and 24 females (42, 9%)] were studied. The mean age of the patients was 54, 05 ±16,01years. The mean PI, GI and DMFT in the studied patients were 1,6 ± 0,74, 1,36± 0,68 and 11,9 ± 7,29, respectively. Significant negative correlations were noted between dialysis duration and PI (r= - 0,339; p=0.026) and GI (r= - 0,413; p=0,006), however the correlations between dialysis duration and DFMT were not significant (r= - 0,138; p=0,371). A larger series of patients and longitudinal studies are needed to confirm our findings and validate the hypothesis.*

***Key Words:*** *Dialysis duration, oral health, chronic kidney disease*

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## I. Introduction:

Chronic renal failure is the progressive and irreversible decline in the number of functioning nephrons. Once the damage is past the point of compensation, patients develop end-stage renal disease. Dialysis treatment and kidney transplantation are thus life saving medical procedures in these patients [1].

End-stage renal disease is a world-wide health issue [2]. In Morocco, the prevalence of dialysis patients is presumed to have increased from 162 per million population (pmp) in 2004 to about 335, 79 pmp in 2010 [3].

Oral health in dialysis patients has been proposed to be poor, with a potential impact on patient's morbidity, mortality, and quality of life.[4] Specific effects of chronic renal disease on dental conditions such as periodontal disease, premature tooth loss , dry mouth , dental calculus and xerostomia seems greater among dialysis patients.[5,6] These problems may be related to a variety of factors, such as a relative state of immunosuppression, medications, renal osteodystrophy, bone loss, and restriction of oral fluid intake.

The duration of dialysis can influence the prevalence of oral abnormalities and may be related to worsening oral health. [7,8]

The aim of this study was to determine the influence of dialysis duration on oral conditions among Moroccan hemodialysis (HD) patients.

## II. Materials And Methods

This cross-sectional study was based on data collected from HD patients treated at two different dialysis centers in Morocco: (1) Department of Nephrology-Dialysis, Military Hospital Rabat; and (2) Department of Nephrology-Dialysis, Military Hospital Guelmim Morocco, and carried out from September 2015 to January 2016. Informed consent forms were obtained from all patients.

Exclusion criteria were: patients with early stages of kidney diseases not requiring HD, patients with kidney transplantation, age less than 18 years old, the duration of HD less than one year; those suffering from drug dependency, having had seizures or nervous disorders; logistic impossibility of investigation.

The medical files of each patient were reviewed, the demographic informations, the data about the cause of chronic kidney disease, duration of dialysis, the data about oral health status ( such as frequency of the brushing, time of the last dentist visit, experiencing a sensation of xerostomia and change in taste) were recorded.

Intraoral examination was done by two experienced dentist with a mouth mirror and light at bedside while the patients attended the HD.

The oral hygiene was evaluated using plaque index (PI) of Silness and Löe, [9]. The gingivae was evaluated using gingival index (GI) Löe and Silness. [10]

The study did not include any invasive technique leading to contamination such as probing of periodontal pockets. Radiography was not performed.

The prevalence of caries was analyzed using the decayed, missing, filled teeth (DMFT) index recommended by the World Health Organization.

In order to determine the effect of the duration of HD on oral conditions, patients were divided into two groups: (1) those that have been on dialysis for less than 5 years, (2) those that have been on dialysis for more than 5 years.

**Statistical analysis**

Data were analyzed by Statistical Package for the Social Sciences software version 20.0 (SPSS Inc. Chicago, IL, USA). Comparison of the quantitative data was made using the Student t-test .Correlation between quantitative data was determined by Pearson's correlation coefficient. A chi-square test and the Fisher exact test were performed for the comparison of the qualitative data. A P-value of $< 0.05$ was considered statistically significant.

## III. Results

In total, 56 HD patients [32 males (57, 1%) and 24 females (42, 9%)] were studied. The mean age of the patients was 54, 05 ±16,01years (ranged 19-80years). The main reasons for terminal renal failure were diabetic nephropathy (32,1 % of the patients), followed by Interstitial nephritis (19,6 % of the patients), glomerulonephritis ( 16,1 % of the patients), vascular nephropathy ( 10,7% of the patients), polycystic kidney( 1,8 % of the patients), and unknown in ( 19,6 % of the patients).

All patients were dialysed three times a week. The mean of parathormon (PTH) and Kt/V was 394, 64 ± 261, 57 pg/ml and 1, 36 ± 0, 32, respectively.

Thirteen (23, 2%) were completely edentulous.

Past dental history indicated that 75 % of HD patients brushed their teeth regularly and only 23, 2% of the participants reported to have visited the dentist in the previous year.

The oral clinical finding was coated tongue (3, 6 %), which is generally associated with inadequate hygiene. Other changes observed were gingival ulceration (16,1%), candidiasis (3,6%), bleeding of the gums (23,2%), taste change (28,6%), dental calculus (58,1% ) , halitosis (42,9%) and xerostomia (39,3%).

The mean PI, GI and DMFT in the studied patients were 1,6 ± 0,74, 1,36± 0,68 and 11,9 ± 7,29, respectively.

Significant differences were found among the groups of dialysis durations suggesting decreased values of PI and GI with the increased treatment times. However no significant association of dialysis duration and the others oral conditions of HD patients such as number of toothless patients, coated tongue, gingival ulceration, candidiasis, bleeding of the gums, taste change, dental calculus, halitosis, xerostomia, visits to the dentist, brushing the teeth and DFMT. (Table 1)

Significant negative correlations were noted between the dialysis duration and PI (r= - 0,339; p=0.026) and GI (r= - 0,413; p=0,006), however correlations between dialysis duration and DFMT were not significant (r= - 0,138; p=0,371).

## IV. Discussion

To our knowledge, this investigation is the first to examine the influence of dialysis duration on oral conditions among Moroccan HD adults.

Earlier studies in the literature have reported a wide variation in the occurrence of oral lesions in HD patients. [1, 6, 7, 11].

Results from the present study showed a high prevalence of xerostomia (39, 3%), a finding that might be related to the restricted intake of fluids by patients undergoing dialysis or the use of some medications. [12]. Similar results have been reported by Malekmaken et al [13].

Halitosis and altered taste can be the result of xerostomia and the presence of oral microorganisms that metabolize urea (found at high levels in the saliva of these patients) and produce ammonia. [14-15] About one-

third of patients undergoing dialysis complain of a bad taste in their mouth[14-15], in agreement with the present study which 42,9% of patients complained of halitosis and 28,6% complained of altered taste .

The mean PI and GI scores for all patients were around 1,5 indicating mild to moderate gingivitis.

The DMFT index in adults with chronic kidney disease Stage 5D varied by geographical region, with lowest index in the Eastern Mediterranean reports, and increasing index in studies from Europe, the Western Pacific and America.[16] Results from the present study showed that the DMFT score in HD patients was 11,9 ± 7.29, which is lower than results from Iran and Germany ( DMFT score as higher as 18,6± 9,9 and 22,1± 6,5 respectively).[13,17]

Analysis of the effect of the duration of dialysis on the oral conditions of HD patients such as number of toothless patients, coated tongue, gingival ulceration, candidiasis , bleeding of the gums, taste change, dental calculus , halitosis, xerostomia, visits to the dentist and brushing the teeth showed no difference among the groups. These results agree with other investigators who suggested that the duration of dialysis exerts no additional effect on dental or periodontal conditions in patients with chronic kidney disease.[18] In contrast, some studies reported a higher accumulation of biofilm and calculus and a high degree of gingival bleeding in long-term patients undergoing dialysis.[1,7]

The conflicting data from the oral health and the duration of dialysis have been reported in the literature. Cengiz et al showed a high positive correlation between time on dialysis and indices for PI ( r=0,46; p<0,01 ), GI ( r=0,46 , p< 0,01 ), But, there was not any statistically significant correlation between dialysis duration and DMFT index values (r = 0,037; P > 0.05). This finding is supported by other studies. [1, 19, 20]. In contrast, some studies found no effect of the duration of dialysis treatment to oral health. [21, 22]. In this study, a significant negative correlations were noted between dialysis duration and PI (r= - 0,339; p=0.026) and GI (r= - 0,413; p=0,006), however the correlations between dialysis duration and DFMT were not significant (r= - 0,138; p=0,371).

Our study was limited by study setting; intraoral examination was done only at bedside. Also we did not have the status of dentition and oral hygiene prior to the HD for the detection of the actual severity of oral hygiene and DMFT during the HD.

## V. Conclusion :

The present results periodontal and dental diseases are prevalent among the renal dialysis patients. In this study, the significant negative correlations were noted between the dialysis duration and PI and GI. However, the correlations between dialysis duration and DFMT were not significant. A larger series of patients and longitudinal studies are needed to confirm our findings and validate the hypothesis. The awareness of oral care should be raised among dialysis patients, their nephrologists, and dentists in our centers.

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**Tables**

**Table 1**: Comparison of dental and oral health between patients undergoing dialysis for < 5 years and ≥5 years

| variables | Time of dialysis<5 years | Time of dialysis≥5 years | P value |
|---|---|---|---|
| bleeding of the gums | 8(61,5%) | 5(38,5%) | 0,827[2] |
| gingival ulceration | 7(77,8%) | 2(22,2%) | 0,282 [3] |
| patients brushed their teeth regularly | 24(57,1%) | 18(42,9%) | 0,638[2] |
| patients who have not visited the dentist last year | 27(62,8%) | 16(37,2%) | 0,285[2] |
| edentulous | 8(61,5) | 5(38,5%) | 0,827[2] |
| xerostomia | 14 (63,6%) | 8(36,4%) | 0,565[2] |
| halitosis | 12(50%) | 12(50%) | 0,240[2] |
| candidiasis | 1(50%) | 1(50%) | 1 [3] |
| coated tongue | 1(50%) | 1(50%) | 1 [2] |
| taste change | 11(68,8%) | 5(31,2%) | 0,345[2] |
| Dental calculus | 15(60%) | 10(40%) | 0,771[2] |
| plaque index | 1,80 ±0,72 | 1,33±0,69 | 0,038[1] |
| gingival index | 1,60±0,63 | 1,04±0,61 | 0,006[1] |
| DMFT | 13,16± 8,05 | 10,16±5,88 | 0,188[1] |

[1] p value of Student t
[2] p value of chi-square
[3] p value of Fisher's exact test

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