

RESEARCH ARTICLE

Oral Health Status among a Group of Population with Chronic Kidney Disease in Iraq

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ABSTRACT

Background: Chronic kidney disease (CKD) has been identified as one of the irreversible deteriorations in renal function that naturally progresses over years. This disease has been considered as one of the worldwide public health problems that have reverse consequences of kidney failure, cardio-vascular diseases as well as premature mortality. The present study was conducted to assess the seriousness of dental caries in association with the oral cleanliness among patients suffering from CKD compared to the controls according to age groups and gender.

Materials and Methods: This research employed thirty patients with CKD in ages from (24–72) years (male, female) attending kidney center centers in Medical City Teaching Hospital in Baghdad province, Iraq, were selected for the study compared to 30 healthy people matching in age and genders with the study group. Decayed, missing and filled surfaces (DMFS), Gingival (GI), calculus (CI) indices as well as plaque (PII) have been applied for measuring oral health status for these two study groups. The data of current study was analyzed using SPSS version 26.

Result: The (CKD) group has been caries-active. The greater DMFS-values have been registered for the study in comparison with the control group and highly statistical difference has been observed, concerning DMFS ($p < 0.01$). (DS, MS, FS) higher in CKD patients than control with highly significant difference between them regarding to (DS, MS) only. PII, GI, indices have been greater in the study group than that of the controls and differences were not observed to be significant. The CI index has been greater in the study group than that of the controls and significant differences have been observed ($p < 0.01$). Significant correlation has been not found between PII, GI, CI indices and DMFS indices in study group.

Conclusion: Participants suffering from (CKD) experienced greater caries severity than the normal participants.

Keywords: Chronic kidney disease, Oral hygiene status, Severity of dental caries.

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INTRODUCTION

Kidneys have been introduced as the crucial organs for retaining a stable internal environment (homeostasis).¹ Function of the kidney is to excrete wastes, concentrate urine, and regulate electrolytes.² Kidney or renal disease and failure causes the kidneys to stop effectively removing metabolic end products from the blood and be unable to regulate the fluid level, electrolyte balance, and pH balance of the extracellular fluid.³ Persistent failures of the kidneys for accomplishing its function has been known as the chronic kidney disease (CKD) and failure for sustaining life has been referred to as the end stage renal disease (ESRD).^{4,5} CKD has been often reported in the elderly with the possible enhancement in the entire population.⁶ The CKD characterized by hydro electrolytic, metabolic, and immune disorders as a result of progressive and irreversible renal function loss.⁷ Patients could complain

of pallor (paleness) of the oral mucosa, which is due to the decrease in the number of red blood cells present and could complain of a metallic taste in their mouths due to the higher concentrations of urea in saliva.⁸ The higher concentrations of urea, however, inhibits the lactobacilli growth, which in turn decreases the caries rate.⁹ Xerostomia and candida infections are also prevalent. A lack of vitamin C gives the gingiva an abnormal red appearance; the gingiva is also spongy and bleeds easily.^{10,11} From the few studies regarding dental caries among patients with CDK some investigators revealed lower dental caries index in adults and children suffering from CKD compared with the healthy people.¹²⁻¹⁵ On the other hand some confirmed pervasiveness of periodontitis with the higher level of caries in patients with dialysis; however, the present research did not include the controls.¹⁶ Other studies reported no significant differences between the control group and HD

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Table 1: DMFS in study and control group

Group	DS			MS			FS			DMFS		
	No.	Mean	± SD	No.	Mean	± SD	No.	Mean	± SD	No.	Mean	± SD
Study	26	11.58**	9.78	26	38.19**	28.51	14	11.21	18.22	30	48.5**	34.46
Control	30	4.41	2.88	21	10.62	8.78	20	8.95	6.1	30	18.1	13.12

**highly significant at the level $p < 0.01$

Table 2: Illustrates the mean values of gingival and plaque indices amongst the study group and controls.

Group	PII			GI			CI		
	No.	Mean	± SD	No.	Mean	± SD	No.	Mean	± SD
Study	30	4.74	1.69	30	2.69	2.71	30	1.58**	1.72
Control	30	4.57	2.33	30	1.55	2.42	30	0.62	0.52

**highly significant at the level $p < 0.01$

Table 3: Correlation coefficient between caries-experience of permanent teeth and gingival, plaque, as well as calculus indices amongst the study group and controls.

Group		DS		DMFS	
		r	P	r	P
Study	PII	0.149	0.466	0.079	0.678
	GI	0.178	0.386	0.18	0.341
	CI	-0.18	0.379	0.008	0.967
Control	PII	0.016	0.933	-0.036	0.849
	GI	-0.266	0.155	0.039	0.836
	CI	0.201	0.287	-0.158	0.405

cases for the caries variables.^{17,18} Some authors have reported that the calculus index of CRF patients has been considerably higher than the healthy control group.¹⁹⁻²²

There are a limited number of studies in Iraq regarding the seriousness of dental caries in conjunction with the oral health status among CKD patients. However, the present research aimed at the assessment of seriousness of dental caries and oral health condition among CKD patients. Hence, we designed the present research.

MATERIAL AND METHODS

A total of 30 patients, with an age range of (24–72) years have been participated in the research; they were already diagnosed with CKD, attending the kidney center in Medical City Teaching Hospital in Baghdad province for a regular checkup and treatment. Moreover, control group included 30 healthy individuals matching in age and genders with the study group. Approval was achieved from the Ministry of Health and Environment for examining CDK patients and approval of the patients. Clinical examination, using dental mirror and sharp dental explorer, has been used to diagnose dental caries. Assessment and recording of caries experience were by applying DMFT and DMFS for permanent teeth according to criteria of WHO.²³ Oral health status evaluated by PII of Silness and Løe²⁴ as well as CI of Ramfjord.²⁵ In addition, we evaluated the gingival inflammation with the Gingival Index (GI) of Løe and Silness.²⁶ SPSS version 26 has been employed for analyzing statistical data. Descriptive measurement (mean and standard deviation) and inferential statistic involved

(Student’s t-test and Person’s correlation coefficient) were applied. Finally, confidence level equaled 95%.

RESULTS

Caries Experience of Permanent Teeth (DMFS)

Table 1 shows caries-experience (mean values of DS, MS, FS and DMFS) amongst the study group and controls. In addition, mean value of all components of DMFS have been greater in the study group in comparison to that in the controls with a highly significant difference regarding (DS, MS, DMFS) as seen in Table 1.

Table 2 illustrates the mean value of gingival, plaque, as well as calculus indices amongst the study group and controls. Moreover, total mean value of plaque (4.74 ± 1.69) in the study group have been greater than that of the controls (4.57 ± 2.33) with no statistically significant differences. The total mean values of gingival index (2.69 ± 2.71) in the study group have been greater than that of the controls (1.55 ± 2.42) with no statistically significant differences. The total mean values of calculus (1.58 ± 1.72) in the study group have been greater than that of the controls (0.62 ± 0.52) with highly statistically significant differences.

According to the results, correlation coefficient between the caries experience of permanent teeth with GI and PII, CI amongst the study group and controls is seen in Table 3. Concerning permanent teeth, no significant correlation was seen in both study and control group, all of them were positively correlated except (DS) with (CI) in study group (DS) with (GI) and (DMFS) with (CI) in control group which were negatively correlated with no significant correlation as seen in Table 3.

DISCUSSION

Kidney-related diseases have been found to be complex as the organ itself. These diseases may be categorized into acquired or inherited diseases and developmental anomalies. Considering additional period of illnesses, we may group them into chronic and acute diseases. CKDs have been found to be the outcome of the progressive deterioration of the kidneys’ nephrons as well as dysfunctions of glomerular filtration. Consequently, the kidneys experience impaired functions and then higher loss of fluid from the body because of the greater excretion of

urine (polyuria).⁷ Patient with CKD requires special attention a diverse clinical problem by involving numerous systems. Practitioner must know possible contemporary treatments and repercussion on the patients' lives, in particular, chronic renal failures. Therefore, quality of the patients' life gets better.¹ Not much information is available regarding the association of the dental caries in conjunction with the oral cleanliness in chronic kidney disease, thus the present study was designed. This study recorded an increasing in the severity of dental caries DMFS for the permanent teeth were higher amongst the study group than that of the controls with highly significant differences as well as (DS, MS, FS) higher in CKD patients than control with highly significant difference between them regarding to (DS, MS) only. The increasing in the severity of dental caries DMFS which can be related to poor maintenance and oral hygiene, food impaction because of periodontitis, lower production level of saliva, and the increased number of the cariogenic *Streptococcus mutans* which provided an ideal environment for caries formation.²⁷⁻²⁹ In the present study, the total mean values of GI, CI and PII indices in the study group have been greater than that of the controls, showing a highly statistically significant difference regarding CI. This finding could be related to CKD is laborious and frequently creates lower self-esteem in the people.¹³ Frustration, fatigue, and stress due to dietary and drinking restrictions have been found to be responsible for anxiety reactions and or depression and consequently patients on renal dialysis may ignore their oral health (Naylor *et al.*, 1988).¹⁴⁻¹⁶ Results revealed the greater CI indices in the study group in comparison to the controls with a highly statistically significant difference the dental calculus, which is probably caused by higher salivary urea, level of phosphate and, lower salivary flow rate. Many patients reported less frequent brushing and flossing, and dental visits were also insufficient.³¹ This led to indication that the oral health cannot be a preference for those cases experiencing CKD.¹⁷⁻¹⁴

CONCLUSION

The present study showed that the study group were affected by dental caries and the severity of caries-experience has been greater among the study group than that of the controls. Moreover, plaque and gingival indices has been greater in the study group than that of the controls and differences were statistically not significant. The calculus index has been greater in the study group than that of the controls with the greater statistical differences. In addition, cases who suffer from kidney disease have been considered to be one of the highly delicate group. Therefore, dental care planners must design preventing strategies for avoiding caries; procedures for oral care as well as educational programs for oral care and promotion for addressing diverse challenges facing the oral care in CKD.

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