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Oral Home Care and the Reasons for Seeking Dental Care by Individuals on Renal Dialysis

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Abstract

A cross-sectional study of 90 patients on renal dialysis was conducted to assess oral home care practices and the reasons for seeking dental care among these patients. Participants were divided into three groups based on the time they have been on renal dialysis. The groups were: (1) dialysis for less than one year, (2) dialysis for 1 to 3 years, and (3) dialysis for more than 3 years. Information regarding oral home care such as frequency of brushing, oral hygiene aids, and reasons for seeking dental care was obtained through a personal interview with the patients. Their oral health status was assessed using a plaque index and a gingival index. The means of plaque index were 1.716 (S.D 0.64), 2.161 (S.D 0.36), and 2.255 (S.D 0.42) respectively for the groups. The means of gingival index were 1.4278 (S.D 0.67), 1.9667 (S.D 0.38), and 2.0556 (S.D 0.35) for the three groups respectively. Tukey's post hoc test showed significant difference in both the indices between first and second groups and between the first and third groups, no significant difference was found between the second and third groups. The results indicate that oral home care practices were inadequate due to the presence of an unacceptable level of oral hygiene among the patients. Miswak (a wooden, Salvadora persica, chewing stick that is popular in the middle east to mechanically clean the teeth) has been found to be popular among the subjects. The primary purpose of dental clinic visits was for treatment of a dental problem rather than for the prevention of dental disease. There is a need for oral health promotion and especially prevention programs among the patients on renal dialysis.

Keywords: Oral home care, renal dialysis, dental treatment, dental clinic, Miswak

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Introduction

Progressive loss of renal function causes retention of excretory products.[1] Uremia along with malnutrition resulting from a protein restricted diet leads to an immuno-deficient state resulting in a significant impaired host deficiency and a higher susceptibility to infection.[2] Azetomia, an increase in blood urea nitrogen (BUN) may be associated with adverse clinical signs and symptoms to produce uremia.

Infections in the oral cavity may act as a foci for disease or injury in other sites of the body.[3] The tooth surface provides a unique site in the human body for bacterial colonization. The relationship between the accumulation of bacterial plaque on tooth surfaces and the development of periodontal disease has been established.[4] Periodontal disease occurs as a result of a complex interaction between the host and the local bacterial plaque.[5] Clinical and experimental evidence indicates that prevention of plaque formation and frequent plaque removal can control the progression of gingival inflammation.[6] A wide variety of plaque removal devices has been suggested to achieve plaque control.[7] Tooth brushing is universally accepted as a standard method to control plaque and calculus formation.[8] However a toothbrush, regardless of the brushing technique, does not completely remove the interdental plaque.[9]

It has been shown that combined tooth brushing and flossing results in less gingivitis and plaque accumulation than tooth brushing alone.[10] Dialysis patients may form calculus more rapidly than healthy individuals possibly due to high salivary urea and phosphate levels.[11] Calculus is always covered with a non-mineralized layer of plaque.[12] Thus, more frequent periodontal recall visits may be needed for calculus removal. Regular dental care is indicated in these patients to reduce the risk for oral infections or transient bacteremia.[13] Previous studies[14,15] have reported a significant correlation between plaque scores and gingival inflammation in renal dialysis subjects.

The objective of the study was to assess oral home care practice and reasons for seeking dental care among individuals on renal dialysis.

Materials and Methods

A cross-sectional study of patients on renal dialysis was conducted. Individuals on renal dialysis received complete information on the purpose of the study. Ninety individuals consented to participate. Patients were divided into three groups based on the time period for which they have been on renal dialysis: the first group less than 1 year, the second group 1 to 3 years, and third group longer than 3 years.

The oral hygiene status of all subjects was examined using a plaque index[16] and a gingival index.[17] (Table 1) One examiner performed the clinical examination. The subjects were interviewed for oral home care practices and reasons for seeking dental care.

Intra-examiner Reliability

Ten subjects who volunteered to participate were examined on two occasions to establish intra-examiner reliability. Intra-examiner reliability scores were .91 for the plaque index and 1.0 for the gingival index.

Table 1. Description of indices used

Plaque Index
0- No plaque in the gingival area
1- A film of plaque adhering to the free gingival margin and adjacent area of the tooth. The plaque may be recognized only by running a probe across the tooth surface.
2- Moderate accumulation of soft deposits within the gingival pocket and on the gingival margin and/or adjacent tooth surface that can be seen by the naked eye.
3- Abundance of soft matter within the gingival pocket and/or on the gingival margin and adjacent tooth surface.
Gingival Index
0- Normal gingiva
1- Mild inflammation, slight change in color, slight edema; no bleeding on palpation.
2- Moderate inflammation, redness, edema, and glazing, bleeding on palpation.
3- Severe inflammation, marked redness and edema, ulceration, tendency to spontaneous bleeding.

Table 2. Descriptive statistics for plaque index scores for individuals on renal dialysis (N=90)

				95% confidences Interval for Mean		Range	
Patient's Category	N	Mean	SD	Lower Bound	Upper Bound	Min	Max
< 1	30	1.7167	.6435	1.4764	1.9570	.50	2.83
1-3	30	2.1611	.3622	2.0259	2.2964	1.67	3.00
> 3	30	2.2556	.4215	2.0982	2.4129	1.33	3.00
Total	90	2.0444	.5398	1.9314	2.1575	.50	3.00

Table 3. Descriptive statistics for gingival index scores for individuals on renal dialysis (N=90)

				95% confidences Interval for Mean		Range	
Patient's Category	N	Mean	SD	Lower Bound	Upper Bound	Min	Max
< 1	30	1.4278	.6776	1.1748	1.6808	.00	2.50
1-3	30	2.9667	.3801	1.8248	2.1086	1.33	2.83
> 3	30	2.0556	.3565	1.9224	2.1887	1.33	2.67
Total	90	1.8167	.5620	1.6990	1.9344	.00	2.83

Results

Of the ninety participants, 53 (58.9%) were female and 37 males (41.1%). The mean ages were 42.9, 46.7, and 47.2 years for the first, second, and third groups respectively. The means of PI were 1.716, 2.161, and 2.255 for the first, second, and third groups respectively. (Table 2) The means of GI were 1.427, 1.966, and 2.055 for the first, second, and third groups respectively. (Table 3)

One way analysis of variance (ANOVA) was used to determine significant differences in the indices among the three groups at a 5% level. Tukey's post hoc test was used to compare the difference between groups. (Table 4)

There was significant difference between Group 1 and Group 2 where p-values were 0.02 and 0.02 for PI and GI respectively. There was significant difference between Group 1 and Group 3 where p-values were 0.001 and 0.02 for PI and GI respectively. No significant difference was found between Group 2 and Group 3 where p-values were .737 and .830 for PI and GI respectively. (Table 4)

Oral Home Care Practice

Table 5 describes the frequency of tooth brushing per day. About half of the patients do not brush their teeth. ANOVA showed no significant difference (p=0.691) between frequency of brushing per day and patient's dialysis grouping.

The results about brushing technique are presented in Table 6. The majority of the patients used a combined technique of horizontal and vertical brush strokes.

Other Oral Hygiene Aids

Miswak (a wooden, Salvadora persica, chewing stick that is popular in the middle east to mechani-

Table 4. Tukey's post hoc test to compare between groups

	Plaque Index	Gingival Index
Group 1 vs. 2	0.02	0.02
Group 1 vs. 3	< 0.001	0.02
Group 2 vs. 3	.737	.830

Table 5. Frequency of brushing/day

	Frequency	Percent	Valid Percent	Cumulative e-Percent
1/Day	16	17.8	17.8	17.8
2/Day	17	18.9	18.9	36.7
3/Day	11	12.2	12.2	48.9
Never	46	51.1	51.1	100
Total	90	100	100	

Table 6. Frequency of brushing technique

	Frequency	Percent	Valid Percent	Cumulative e-Percent
Horizontal	6	6.7	13.6	13.6
Vertical	1	1.1	2.3	15.9
Hor. & Ver.	36	40	81.8	97.7
Others	1	1.1	2.3	100
Total	44	48.9	100	
Missing Systems	46	51.1		
Total	90	100		

Table 7. Other oral hygiene aids

	Frequency	Percent	Valid Percent	Cumulative e-Percent
Dental Floss	7	7.8	7.8	20
Miswak	72	80	80	100
Never	11	12.2	12.2	12.2
Total	90	100	100	

Table 8. Plaque scores between brushing and non-brushing group (Miswak user only)

	Plaque score			Total
	1	2	3	
Brushing Group	7	27	8	42
	87.5%	69.2%	19.5%	47.7%
Non-brushing Group	1	12	33	46
	12.5%	30.8%	80.5%	52.3%
Total	8	39	41	88
	100%	100%	100%	100%
$x^2 = 25.384^a$; $P = .000$				

Table 9. Reasons for attending dental clinic during the last year

Dental Treatment	Frequency	Percentage
Restorative Dentistry	12	13.3
Removable Prosthodontics	5	5.6
Fixed Prosthodontics	2	2.2
Extraction	9	10
Endodontic Therapy	6	6.6
Hygiene Services	8	8.9
None	48	53.3
Total	90	100

cally clean the teeth) was found to be popular among individuals on renal dialysis. (Table 7) All patients who never used a toothbrush were Miswak users. ANOVA showed no significant difference between other oral hygiene aids and patient's dialysis group. However, non-brushing group (Miswak user only) had significantly higher plaque scores than brushing group. (Table 8)

Dental Visits

Table 9 summarizes the reasons for seeking dental care during the last year. Less than half (46.6%) of the subjects visited the dentist during the last year, while 48 (53.4%) reported not visiting the dentist for more than one year. Neither of the patients reported receiving regular dental care or oral hygiene instructions.

Discussion

This cross-sectional study was carried out to assess oral practices and the reason for seeking dental care among individuals on renal dialysis. The study did not include any control group, because selection of a control group will not be free from bias, as the selected population may not be representative of the whole population. Age and sex matched subjects are also difficult to select from the general population having no systemic disease with a similar level of periodontal status or oral hygiene. The study did not utilize any invasive technique that could result in contamination. These patients require special consideration, most importantly with regard to excessive bleeding, risk of infection, and medication used.[18] Bleeding can be a significant problem in patients receiving dialysis due to their low hematocrit level and platelet disorders involving abnormal platelet aggregation.[19] The reason for dividing patients into three groups based on the period for being on dialysis was to see if the various time periods had any effect on oral health.

The results have indicated the oral home care practices and regular dental visits were inadequate among the sample. About half of the renal dialysis patients never brushed their teeth and never visited a dentist regularly.

Furthermore, the findings suggest the individuals on renal dialysis had unacceptable levels of oral hygiene. This is in agreement with previous findings[20] that suggested a dental care program should be established for these patients. There was a significant difference in relation to plaque and gingival score indices between the first and second groups and between the first and third groups, while no significant difference was found between the second and third groups. This may be explained on the basis of the chronic nature of the illness. Patients are preoccupied with their renal disease and tend to neglect preventive measures. Renal dysfunction has been associated with psychological implications due to toxic, metabolic, and degenerative changes.[21] Patients may also experience the stress of complying with frustrating dietary restrictions that have been found to contribute to anxiety reactions or depression.[22]

Only a few patients (7.8%) of the subjects practiced inter-dental cleaning using dental floss. It has previously been established that plaque removal by ordinary tooth brushing is incomplete.[23] The majority of the subjects claimed to brush twice daily, however, the high plaque score among the subjects is an indicator of poor brushing technique. The interview results showed the patients had never been motivated. This is in agreement with previous findings[20] which suggested periodontal care should be established to prevent periodontal disease from progressing. It has been recommended[24] that demonstration of brushing and flossing are necessary in conjunction with periodontal professional care.

No significant difference was found among the three groups in relation to brushing practice, which could be due to a small number of individuals reporting tooth brushing.

A great majority (80%) of subjects were Miswak users. A survey in Saudi Arabia[25] reported that Miswak is considered to be the second most frequently used oral hygiene device after the toothbrush.

The World Health Organization has recommended and encouraged the use of Miswak as an effective tool for oral hygiene.[26] The beneficial effects of Miswak on oral hygiene and dental health is due to the mechanical action as well as the various chemical components in the wooden chewing stick. Miswak users only had a significantly higher level plaque score. This concurs with a previous study[27] that also reported higher plaque scores in chewing stick users as compared with toothbrush users. However, in comparing Miswak use with that of a conventional toothbrush, Miswak was found to be as effective as a toothbrush in removing oral deposits when properly used.[28]

The results of this study show that none of these individuals seek regular dental care. It is, therefore, not surprising that dental visits apparently were prompted by the experience of a dental problem rather than oriented towards prevention of disease. None of the participants claimed receiving oral hygiene instruction or specialized periodontal treatment.

The present study also indicated that oral home care practices tended to be less frequent in individuals who do not seek dental care on a regular basis. This is in agreement with other studies[30-31], and also supports the findings that general dentists provide little or no periodontal service beyond routine prophylaxis.

Subjects on renal dialysis are expected to have psychological implications due to toxic, metabolic, and degenerative changes.[34] This could be one of the factors of their behavior.[35] The constant life-threatening state may have reduced their concern for oral health.[36]

Conclusions & Recommendations

The results have indicated oral home care practices were inadequate as demonstrated by the unacceptable level of oral hygiene among the patients in the study. Visits to dental clinics were primarily made due to a dental problem rather than oriented towards prevention of dental disease. Miswak was found to be popular among those subjects; however, Miswak users should receive proper instructions on their use. There is a need for oral health promotion and especially preventive programs among the patients on renal dialysis. These patients should receive periodic dental examinations to detect early signs of oral disease. There is a need for an increased collaboration between the medical and dental professions to improve the dental health of these patients.

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