
QUALITY OF ORAL HEALTH IN PATIENTS ON STANDARD HEMODIALYSIS AND PATIENTS ON HEMODIAFILTRATION

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Abstract: Oral hygiene in patients undergoing hemodialysis is inadequate, as indicated by the large number of data from the literature. Every dentist working with these patients should focus on raising patients' self-awareness of the importance of their oral health and maintaining oral hygiene. The aim of this research is to make a comparison of oral health in patients with terminal chronic kidney disease who are on a standard hemodialysis program and on hemodiafiltration. The examined sample includes a total of 75 adult patients with Chronic Kidney Disease stage 5, on a chronic hemodialysis program. The patients are divided into two groups: standard hemodialysis patients and hemodiafiltration patients. A questionnaire was used for the preparation of this research. From the obtained results we can conclude: the patients treated with hemodiafiltration visited the dentist insignificantly more often. The state of oral health is associated with the state of the kidneys insignificantly more often by patients on hemodiafiltration treatment and patients on HD treatment. Patients from both groups usually brush their teeth with fluoride paste. Patients treated with hemodiafiltration rated their oral health as good and had pain in the mouth or teeth significantly more often than patients treated with standard hemodialysis. Patients treated with HDF had dry mouth, chewing difficulties and impaired taste significantly more often. The difference between smokers in the groups was at the border of statistical significance, and the difference in alcohol consumption once a week or more between patients with hemodiafiltration and patients treated with classical hemodialysis treatment did not show a statistically significant difference. Patients from both groups did not differ significantly in terms of the quality of oral health, that is, the type of hemodialysis modality has no significant impact on the quality of life in terms of oral health.

Keywords: oral health, hemodialysis, hemodiafiltration.

1. INTRODUCTION

Chronic kidney disease (CKD) causes a spectrum of oral manifestations, like most other systemic diseases. To maintain oral health, a holistic approach is necessary in the treatment of patients with complex medical problems. The approach and treatment should be in accordance with the achieved medical progress and the application of new technology. (Mainali A, Chettri PK, 2020).

Oral hygiene in patients who are on hemodialysis is inadequate as a result of which is noted: accumulation of tartar deposits, dental plaque, inflammation of the gingiva, increased prevalence of caries and advanced periodontal disease. The role of every dentist should be aimed at raising self-awareness to patients about the importance of their oral health and maintenance of oral hygiene.

Despite significant advances in the field of nephrology with the introduction of hemodialysis as a treatment modality, there is still a high percentage of hospitalizations and a high mortality rate among hemodialysis patients. Limitation of technological performance of dialysis membranes to eliminate all uremic toxins that accumulate in the body is considered as the leading reason (Almeras C, Argilés À. 2009). New research identifies a whole spectrum of uremic toxins, some of them known and associated with uremia, but also a series of newly defined uremic toxins. Small water-soluble molecules (typical representatives of this group are urea and creatinine) are effectively eliminated by standard hemodialysis membranes and standard hemodialysis. However, most of the medium molecules and molecules bound to proteins are impossible to be eliminated by standard membranes and dialysis (Rosner MH et al. 2021). To increase the elimination of medium and large uremic toxins, a combination of convection processes and diffusion, in a hemodialysis modality known as on-line hemodiafiltration (HDF). HDF showed better quality of life and less representation of depressive states, better cleaning of medium molecules, phosphates and better correction of anemia, lower percentage of inflammation. The main disadvantage of this

modality is the high cost and the necessity of special equipment for performing dialysis (Guillaume Jean и соp. 2015).

2. OBJECTIVES OF THE RESEARCH

- The purpose of this research is to compare the quality of oral health in patients with terminal chronic kidney disease who are on a standard hemodialysis program and on hemodiafiltration.
- To determine whether the different therapeutic modalities applied to patients with end-stage renal failure (chronic program of hemodialysis and hemodiafiltration) reflect on the quality of oral health.

3. MATERIAL AND METHOD

The examined sample includes a total of 75 adult patients with Chronic Kidney Disease stage 5, on a chronic hemodialysis program.

Patients are divided into two groups:

- Patients on standard hemodialysis,
- Hemodiafiltration patients.

A questionnaire was used for the preparation of this research.

The questionnaire was taken from the study conducted by Ruokonen (2018), and it refers to the quality of oral health in kidney patients.

The questionnaire covers three segments: oral health of the patient; symptoms and risk factors. Calculation: each "b" answer is valued with 1 point. Maximum 10 points.

4. RESULTS

Table 1. Distribution of Oral Health Quality (OHQS) / Oral health of the patient in the Dialysis Type group

Oral Health Quality (OHQS) /Patient Oral Health				
variable	group			p – value
	n	HDF n(%)	HD n(%)	
1. When was the last time you went to the dentist?				
more than 1 year	50	18 (58.06)	32 (72.73)	X ² =1.7 p=0.185
less than 1 year	25	13 (41.94)	12 (27.27)	
2. Do you associate the importance of oral health with the condition of your kidneys?				
it is not very important	23	8 (25.81)	15 (34.09)	X ² =0.6 p=0.44
it is very important	52	23(74.19)	29 (65.91)	
3. How do you brush your teeth?				
fluoride paste	64	28 (90.32)	36 (81.82)	X ² =1.0 p=0.3
dental floss, interdental brushes, or both	11	3 (9.68)	8 (18.18)	

HDF (hemodiafiltration), HD (standard hemodialysis)
X² (Pearson Chi-square)

Table 2. Distribution of Oral Health Quality (OHQS) / Symptoms of patients in Dialysis Type Group

Oral Health Quality (OHQS) / Symptoms				
variable	group			p – value
	n	HDF n(%)	HD n(%)	
4. What do you think about your oral health?				
it's not good	31	11 (35.48)	20 (45.45)	X ² =0.75 p=0.39
it's good	44	20(64.52)	24(54.55)	
5. Have you had pain in your mouth or teeth?				
yes	36	19 (61.29)	17 (38.64)	X ² =3.7 p=0.053
no	39	12(38.71)	27(61.36)	
6. Have you had dry mouth?				
yes	27	12 (38.71)	15 (34.09)	X ² =0.17

no	48	19 (61.29)	27 (65.91)	p=0.68
7. Have you had difficulty chewing?				
yes	14	7 (22.58)	7 (15.91)	X ² =0.53
no	61	24 (77.42)	37 (84.09)	p=0.465
8. Was your taste impaired?				
yes	13	7 (22.58)	6 (13.64)	X ² =1.0
no	62	24 (77.42)	38 (86.36)	p=0.31

HDF (hemodiafiltration), HD (standard hemodialysis)
X² (Pearson Chi-square)

Table 3. Distribution of Oral Health Quality (OHQS) / Risk Factors of Patients in Dialysis Type Group

Квалитет на орално здравје (OHQS) / Ризик фактори				
variable	group			p – value
	n	HDF n(%)	HD n(%)	
9. Are you a smoker?				
yes	18	11 (35.48)	7 (15.91)	X ² =3.8
no	57	20 (64.52)	37 (84.09)	p=0.051
10. Do you drink alcohol once a week or more?				
yes	3	1 (3.23)	2 (4.55)	X ² =0.08
no	72	30 (96.77)	42 (95.45)	p=0.77

HDF (hemodiafiltration), HD (standard hemodialysis)
X² (Pearson Chi-square)

Table 4. Average Total Score (OHQS) of patients in the Dialysis Type group

Total score (OHQS) (statistical parameter)	group		p – value
	HDF	HD	
mean ± SD	6.06 ± 1.7	6.43 ± 1.4	t=1.02 p=0.312
min – max	3 – 8	3 – 9	

HDF (hemodiafiltration), HD (standard hemodialysis)
t (Student t-test)
X² (Pearson Chi-square)

Patients treated with hemodiafiltration visited a physician significantly more often, 13 (41.94%) patients treated with HDF and 12 (27.27%) treated with standard HD by a physician less than 1 year ago (p=0.185).

The state of oral health is associated with the state of the kidneys insignificantly more often by patients on hemodiafiltration treatment, p=0.44; 23 (74.19%) patients on HDF treatment, 29 (65.91%) patients on HD treatment believe that the state of oral health is very important for the state of the kidneys.

Patients from both groups usually brush their teeth with fluoride paste – 28 (90.32%) and 36 (81.82%) patients, respectively treated with HDF and classical hemodialysis treatment (p=0.3).

Patients treated with hemodiafiltration rated their oral health as good significantly more often than patients treated with standard hemodialysis – 20(64.52%) vs 24(54.55%), p=0.39.

Patients on HDF treatment insignificantly more often than patients on standard HD had pain in the mouth or teeth – 19 (61.29%) vs 17 (38.64%), p=0.053; insignificantly more often had dry mouth – 12 (38.71%) vs 15 (34.09 %), p=0.68; insignificantly more often they had difficulty chewing – 7 (22.58%) vs 7 (15.91%), p=0.53; and insignificantly more often they had impaired taste – 7 (22.58%) vs 6 (13.64%), p=0.31.

Smokers were 11 (35.48%) patients treated with hemodiafiltration and 7 (15.91%) patients treated with classic hemodialysis treatment, the difference was at the limit of statistical significance (p=0.051).

Alcohol was consumed once a week or more by 1 (3.23%) patients treated with hemodiafiltration and 2 (4.55%) patients treated with classic hemodialysis treatment, the difference was statistically insignificant (p=0.77).

5. DISCUSSION

From the study, we can conclude that the patients on hemodiafiltration treatment visited the dentist insignificantly more often. The state of oral health is associated with the state of the kidneys insignificantly more often by patients

on hemodiafiltration treatment, and patients on HD treatment believe that the state of oral health is very important for the state of the kidneys. The study by (Ruospo Marinellai et al. 2013) shows that the quality of oral health in adults with chronic kidney disease according to WHO is poor, that is, dental services are used less by these patients. Patients from both groups usually brush their teeth with fluoride paste.

Patients on hemodiafiltration treatment rated their oral health as good significantly more often than patients on standard hemodialysis. According to the study by (Fett KD) the oral hygiene index is correlated with the age of the patients, and the study by (A. Tabesh et al. 2022) indicates that chronic kidney disease has a major impact on oral health and can cause multiple oral changes.

Patients on HDF treatment were slightly more likely than patients on standard HD to have mouth or tooth pain. The study by (A. Kaushik et al. 2013) showed that the KEP index is increased, that is, there is an increased presence of caries in dialysis patients due to poor oral hygiene and reduced saliva secretion. The increased presence of caries is one of the causes of pain in these patients.

Patients treated with HDF had dry mouth, chewing difficulties and impaired taste slightly more often. Xerostomia or dry mouth is one of the most common subjective symptoms in patients with chronic kidney disease (A. Kaushik 2013).

Literary data confirm that xerostomia occurs in patients who have been diagnosed with end-stage renal disease and are on hemodialysis, which may be due to reduced function of the salivary glands, or from the drugs used in the treatment of the disease. (Guggenheimer & Moore, 2003). Patients with renal failure and uremia also complain of a bad smell and a metallic taste in the mouth. This is due to the high content of urea in saliva and its decomposition into ammonia. (De Rossi & Glick, 1996). Присутството на уреа доведува до пореметување на вкусот.

According to the study by (Elzbieta Dembowska, 2023), the most common oral change in dialysis patients is xerostomia, followed by a change in taste and inflammation in the mouth.

The difference between smokers in the groups was at the limit of statistical significance. Likewise, the difference in alcohol consumption once a week or more between patients with hemodiafiltration and patients treated with classical hemodialysis treatment did not show a statistically significant difference. The total OHQS score has a similar value in both groups.

6. CONCLUSIONS

According to these statistical results, we conclude that: patients from both groups did not differ significantly in terms of the quality of oral health, that is, the type of hemodialysis modality has no significant impact on the quality of life in terms of oral health.

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