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Halitosis in Patients with End-Stage Chronic Kidney Disease Undergoing Chronic Dialysis Treatment

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Abstract: ***The authors' objective was to explore the presence and extent of fetor oris in patients with end-stage chronic kidney disease (CKD) undergoing chronic dialysis treatment. The target of the study were 70 patients. The objective findings of halitosis were verified with a device. Uremic breath was detected as well a discrepancy between the subjective perceptions of patients and the objective findings. This evokes the need for an instrumental study of this group of patients due to their inability of self-assessment and an in-depth research of the problem in order to enhance the quality of life of such patients.***

Keywords: halitosis, CKD, hemodialysis

1. Introduction

Halitosis is widespread oral health disorder. It can lead to low self-esteem and a lack of confidence in people affected by the condition [1]. Its multifactorial etiology includes poor oral health, xerostomia or oral microorganisms, metabolizing urea [2, 3]. Specific foods and spices, alcohol and tobacco are numbered among the external factors [4]. The internal causes of bad breath may be associated with systemic diseases such as diabetes, liver disease, kidney failure, etc. Uremic breath is an easily recognizable symptom in patients with chronic kidney disease (CKD). Decreased renal function leads to elevated levels of urea in the blood and in the saliva where it is converted into ammonia. Urea is emitted in the oral cavity where it is hydrolyzed releasing ammonia, resulting in a bitter taste in the mouth (uremic fetor - foetor uraemicus) and a higher pH of the saliva. 1/3 of the patients on dialysis reported of this typically uremic breath [5].

CKD is one of the most common chronic diseases, accounting for a lasting and significant decrease in the quality of life. It represents a clinical-laboratory syndrome, which according to data collected worldwide in 2012, is spread in approximately 8% of human population, constituting over 50 million people, with a tendency to increase its incidence across most countries [6, 7, 8]. It is characteristic of the condition to manifest a reduced glomerular filtration rate (GFR) and elevated levels of serum urea and creatinine [9, 10]. The terminal stage of CKD requires renal replacement therapy - peritoneal dialysis, hemodialysis or kidney transplantation. CKD patients are at high risk of developing oral health complications, linked to the underlying disease or the result of its treatment, as is the case with halitosis.

2. Aim

To explore the presence and extent of fetor oris in patients with end-stage chronic kidney disease (CKD) undergoing chronic dialysis treatment.

3. Material and Methodology

The target of the study were 70 patients (37 female and 33 male patients) undergoing chronic dialysis treatment, aged 60±28.5 years, with the youngest participant being 32 years old and the oldest - 89 years old. All patients had extraoral and intraoral examinations performed. Using a tailor-made questionnaire, subjective information was gathered on the patients' complaints about unpleasant breath in the oral cavity. The survey consisted of the following question: "Do you have any complaints about dryness and unpleasant breath in the mouth?". The possible answers that patients had to choose from were Yes or No.

The objective findings were gathered using FitScan Breath Checker (HC-212SF, Tanita Corporation, USA). It measured the content of volatile sulfur compounds (VSCs), hydrogen sulphide (H2S), methyl mercaptan (CH3SH), dimethyl sulphide (CH 3-S-CH 3), and hydrocarbons in the oral cavity, taking readings in 5 levels: 0 - no odor, 1 - slight odor, 2 - moderate odor, 3 - heavy odor, 4 - strong odor, 5 - intense odor. **Operation of the device**: After switching on the breath checker, the clinician waited a countdown of 5 seconds to clean the sensor until the device was ready for use. The patient then breathed into the designated openings at 1 cm away from the mouth until it beeped (Figure 1).

Figure 1: FitScan Breath Checker: the device in operational mode, ojectively determining the degree of bad breath

The statistical analysis was performed using SPSS Statistics software package for epidemiological and clinical research (V.16.00, November 2007). The following statistical methods were applied: frequency and percentage distribution of data, graphical representation of data, etc.

4. Results

The results obtained showed the two groups mostly affected by the condition, according to a WHO classification by age: middle-aged patients (32.86%) and adult patients (32.86%). Interestingly enough, the observations revealed halitosis was not present in any patients in childhood (up to 14 years of age) or in long-living patients (over 90 years of age) (Figure 2).

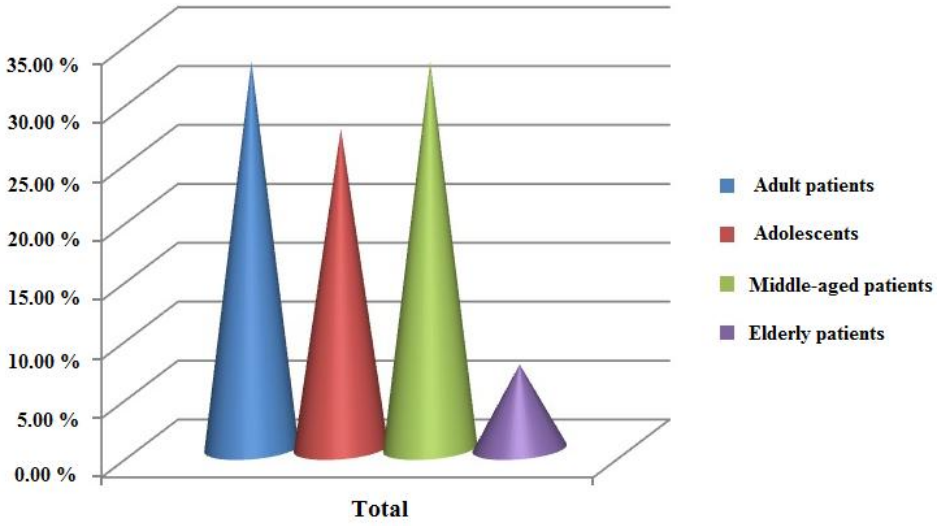

Figure 2: Percentage distribution of patients in groups according to a WHO classification by age

Table 1: Frequency and percentage distribution of patients according to the readings from the FitScan Breath Checker and the subjective data collected from the patients

		Distribution according to the Breath Checker readings									
		1		2		3		4		5	
Distribution by gender		Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
	men	0	0	8	47.06	6	35.29	16	55.17	3	75
	women	3	100	9	52.94	11	64.71	13	44.83	1	25
	Total	3	100	17	100	17	100	29	100	4	100
	Distribution according to patients'perceptions										
		Yes				No					
		Frequency	%			Frequency	%	Total			
	men	19	54.28			14	40	33	47.14%		
	women	16	45.72			21	60	37	52.86%		
	Total	35	100			35	100	70			

The findings in Table 1 showed that there was a considerable discrepancy between the subjective perceptions of patients and the objective findings. The examination of 70 patients showed the presence of bad breath in varying degrees in all patients. The answers to the questionnaire revealed that 50% (35 patients - 21 women and 14 men) believed that they had bad odor in the mouth. The distribution by gender displayed higher percentage of women (60%) as compared to men (40%) who reported no real presence of uremic breath.

The most common result obtained in the objective study of fetor oris was level 4 - strong odor (41.43% - 29 patients) (Table 1). These findings exceed the socially acceptable threshold level of bad breath and is a prerequisite for considerable deterioration in the quality of life of the patients concerned.

Xerostomia is commonly established in CKD patients, which is one of the etiological factors for fetor oris.

Figure 2 reflects the high percentage of patients, experiencing mouth dryness (62.86 % of all patients surveyed). 12.86% of them did not admit to having a problem with unpleasant breath.

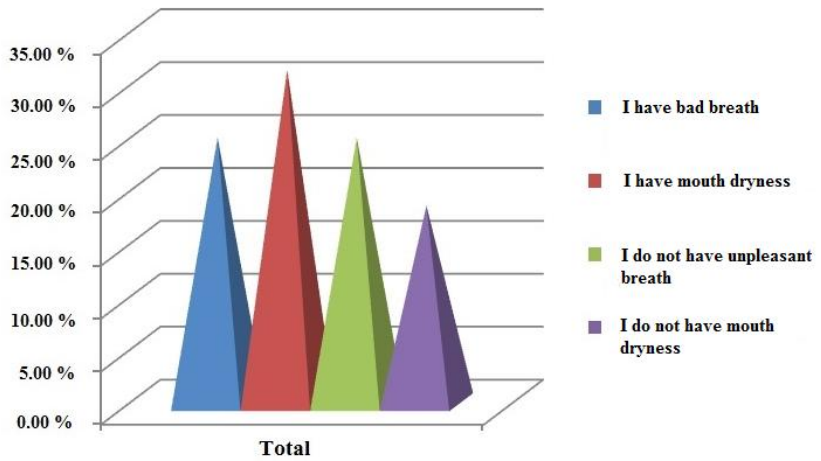

Figure 2: Percentage distribution of patients according to their subjective perception of the presence of bad odor and mouth dryness

The distribution by gender showed that 64.87% of women (24 patients) and 60.61% of men (20 patients) suffered from dry mouth.

5. Discussion

The correlation between bad breath and social discomfort in patients has long been recognized [1]. Halitosis can be classified into the following categories: true halitosis, pseudo-halitosis and halitophobia [11]. True halitosis is diagnosed when bad breath exceeds the socially acceptable level (level 2 - 5). If bad odor is not perceived by others, even though the patient persistently complains about it, it is diagnosed as pseudo-halitosis. In the cases of successful treatment of fetor oris or pseudo-halitosis, and where there is no obvious odor, yet the patients still believe they have bad breath, the diagnosis is likely to be halitophobia [12]. 100% of the patients in the present study showed evidence of true halitosis.

Xerostomia in CKD patients is largely a consequence of chronic dialysis treatment [13, 14, 15]. The data on the presence of this symptom reveal an alarming trend.

6. Conclusions

The study confirmed the presence of uremic breath in CKD patients and also reported a discrepancy between the subjective perception of patients and the objective results. These findings evoke the need for instrumental study of bad breath in this group of patients due to their inability of realistic self-assessment of the condition. The patients concerned proved to be representatives of all age groups except for children and long-living patients. The distribution by gender did not reveal a statistically significant correlation.

The relationship between mouth dryness and bad odor in CKD patients with end-stage chronic kidney disease undergoing chronic dialysis treatment calls for an in-depth study of the problem in order to improve the quality of life of such patients.

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