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## Investigating the Quality of Life in Adult Patients with Self-reported Halitosis

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### ABSTRACT

Halitosis is a symptom in which a noticeably unpleasant breath odor is present. Most adults suffer from it. It is one of the reasons to refer to dental clinics. Since bad breath makes individuals stressed, recognizing and evaluating its causes to decrease or remove this symptom is of high importance. When bad breath is severe it causes depression, reducing self-confidence, and sociality in individuals. Furthermore, it causes academic failure in children. Thus it can affect individuals' quality of life. The current study aimed at investigating the quality of life in patients with self-reported halitosis. In this descriptive cross-sectional study the quality of life in patients with self-reported halitosis was investigated using the HALT-18 questionnaire. 189 patients referred to the dental clinic of Golestan University of Medical Sciences aged 15 and above with self-reported halitosis were selected via convenience sampling. Participants were investigated using a questionnaire. Data were entered in STATA version 14 and were analyzed via descriptive statistics (mean, standard deviation, percentage, and frequency), analysis of variance, and independent T-test. The level of significance was set at  $P=0/05$ . Overall average quality of life in patients was  $38/65 \pm 10/23$ ,  $38/77 \pm 10/49$  for women, and  $38/9 \pm 45/84$  for men. There was not a significant relation between the quality of life and age, occupation, and education. The score of the quality of life in patients is average. Since it has some negative effects on daily life, and social and individual relationships, recognition and therapeutic interventions should be done to improve patients' quality of life.

**Keywords:** Oral health, Bad breath, Questionnaires, Quality of life, Halitosis, and Self-reporting.

### INTRODUCTION:

The word halitosis is derived from the Latin word halitus, meaning "breath". It is also called FETOR ORIS or FETOR EXORE (Khorshidi and Raoufi, 2017). Bad breath and oral malodor are other words to refer to (Scully and Greenman, 2012). Caused gases include sulfur gases such as methyl sulfide, dimethyl sulfide, and hydrogen sulfide and non-sulfur gases include aromatic components, organic acids, and

amines (Porter and Scully, 2006). Halitosis is caused by the oral cavity in %90 of patients, non-oral causes include the respiratory system, digestive system, or urinary system in %9, and consuming some nutrition or medicine in %1 (Aylıkçı and Halitosis, 2013).

There is not an exact estimation of bad-smelling breath but the prevalence estimate of halitosis was reported %2/4-%50. Mild halitosis occurs in %33 of the popula-

tion and only extreme halitosis occurs in only %5 of the population. Generally, patients usually do not feel that their breath smells bad which has been called the “bad breath paradox”, that is has bad consequences. Individuals who cannot feel their bad breath encounter professional and social rejection without knowing the reason.

Halitosis can be physiological or systemic (including releasing malodorous molecule components via microbial activity in infections or caused by pathologic causes such as diabetes and renal failure (Deolia and Bhatia, 2018; Eli *et al.*, 2001). In general, it can be said that oral problems can lead to disorders in physical, mental, and social dimensions. Halitosis is one of possible effects of oral disease on quality of life. Halitosis occurs in %50 of population. %25 of them suffers severe problems that affect their social performance.

For instance, such individuals may feel embarrassed or shame in the presence of others and they may avoid intimate relationships. Oral diseases can affect the quality of life. The oral health condition can have mental and physical effect on individuals’ life (Hebling & Pereira, 2007). Halitosis is expected to have a negative effect on the quality of life (Elias & Ferriani, 2006). Many studies have been done on quality of life in dental and medical sciences; oral health affects the quality of life directly. Questionnaires on the quality of life have a significant role in evaluating factors related to oral health. Epidemiologic studies show that factors such as age, gender, tooth loss, socio-economic condition, communities culture, fear of dental treatment, smoking can be effective on quality of life (Slade, 1997; McGrath & Bedi, 2004).

The Oral Health Impact Profile (OHIP) questionnaire is utilized in most countries to evaluate oral health-related quality of life. Due to problems caused by a high number of questions in OHIP, a shorter version that is, OHIP-14 was introduced by Slade in 1997. Since the effect of oral health on individuals’ quality of life and their daily activities is one of the considerable cases in dentistry, the current study aimed at investigating the quality of life in patients with self-reported halitosis (Halder *et al.*, 2023).

## **MATERIALS AND METHODS:**

In this descriptive cross-sectional study, among patients with self-reported halitosis referred to the dental clinic in the Golestan University of Medical Sciences participants were selected via convenience sampling in 2021. Based on Ghazanfari *et al.* (Kizhner and Krespi, 2011) and considering the confidence level of %95, standard deviation of 21, and accepted error value of 3, 189 participants were selected. Before starting the research, a code of research ethics was received (IR.GOUMS.REC1400.089). Patients were explained the research and its method, they were informed that participation is voluntary and they can exclude from the research whenever they want.

### **Inclusion criteria**

- Individuals aged 15 and above
- Patients with self-reported halitosis

### **Exclusion criteria**

- Not willing to participate in all phases
- Not responding to all questionnaire questions

The questionnaires were distributed among participants in a quiet and comfortable environment by project executor. They were asked to answer all the questions. Data were collected using questionnaire by the project executor. Patients were informed on the project and participants’ possible ambiguities were removed. After collecting the data, they were entered STATA version 14. The studied variables were evaluated via descriptive statistics (mean, standard deviation, percentage, and frequency), analysis of variance, and independent-T.

## **RESULTS:**

In the study, 189 patients with self-reported halitosis were investigated. Their demographic data are shown in **Table 1 - 2**. The mean age of participants was  $34/62 \pm 12/36$ . %70/4 of them was 40 or less. Among 189 participants of the study, 118 (%62/4) were female and 71 (%37/6) were male. In the studied sample, 52 individuals were self-employed, 16 were employees, 32 were university students, 13 were students, 62 were housewives, and 14 participants were unemployed. In terms of education, %11/6 of the participants were illiterate, %18, %49/7, %10/1, %9/5, and %1/1 of participants were with no diploma, a diploma, an

associate degree, B.A, and M.A, respectively. The following Table shows the descriptive findings of the study. **Table 1** shows the mean and standard deviation of oral health-related quality of life in adults with self-reported halitosis considering age, gender, occupation, and education. The overall mean of patients' quality of life was 38/65±10/23, it was 38/77±10/49 for women

and 38/45±9/84 for men. Investigating the score of quality of life based on age, gender, occupation, and education level indicated that there is no significant difference between the quality of life and the above-mentioned variables (P>0/05). **Table 2** shows the frequency distribution of questions.

**Table 1:** Average and standard deviation of quality of life considering age, gender, occupation, and education level.

Variables		Average and Standard deviation	P value
Age	40≥	39/13 ±10/91	0/274
	40 or more	37/52±8/36	
Gender	Female	38/77±10/49	0/835
	Male	38/45±9/84	
Occupation	Unemployed	36/5±9/54	0/38
	Housewife	37/65±9/8	
	Student	43/46±7/26	
	University Student	39/50±11/06	
	Employee	36/44±12/50	
	Self-employed	39/38±10/21	
Education	No diploma	36/73±6/72	0/075
	Diploma	40/26±7/14	
	Associate degree	38/60±11/27	
	B.A	41/37±11/05	
	M.A	33/94±9/57	
Quality of life ( N=189)		51/50±0/70	

**Table 2:** Frequency of the answers to the questionnaire.

Questions	Never	Rarely	Sometimes	Often	Always
Mouth breathing	80(%42/3)	52(%27/5)	39(%20/6)	13(%20/6)	5(%2/6)
Recurrent infection of the tonsils	113(%59/8)	59(%31/2)	15(%7/9)	2(%1/1)	0
Frequent sinus infections	81 (%42/9)	45(%23/8)	29(%15/3)	20(%10/6)	14(%7/4)
Worried about bad breath, anxiety because of bad breath	22(%11/6)	49(%25/9)	85(%45)	26(%13/8)	7(%3/7)
Difficulty in chewing or limiting certain foods because of bad breath	66(%34/9)	48(%25/4)	56(%29/6)	17(%9)	2(%1/1)
Change in the taste of food and beverages due to bad breath	70(%37)	77(%40/7)	38(%20/1)	3(%1/6)	1(%0/5)
Difficulty speaking (or covering the mouth) because of bad breath	27(%14/3)	51(%27)	77(%40/7)	23(%12/2)	11(%5/8)
Affecting the appearance because of halitosis	88(%46/6)	79(%41/8)	19(%10/1)	3(%1/6)	0
Depression and isolation because of bad mouth	74(%39/2)	80 (%42/3)	28(%14/8)	6(%3/2)	1(%0/5)
Problem concentrating due to halitosis	56(%29/6)	70(%37)	43(%22/8)	16(%8/5)	4(%2/1)
Embarrassment for halitosis	26(%13/8)	47(%24/9)	76(%40/2)	30(%15/9)	10(%5/3)
Loss of time (waste of time) to halitosis	78(%41/3)	85(%45)	21(%11/1)	5(%2/6)	0
Speaking from a distance because of bad breath	35(%18/5)	57(%30/2)	61(%32/3)	27(%14/3)	9(%4/8)
Not wanting to go out because of halitosis	54(%28/6)	84(%44/4)	39(%20/6)	10(%5/3)	2(%1/1)
Communication problems due to bad breath	48(%25/4)	88(%46/6)	45 (%23/8)	8(%4/2)	0

The pain of losing money because of bad breath	37(%19/6)	86(%45/5)	48(%25/4)	13 (%9/6)	5(%2/6)
Suffering due to loss of a social character/job because of bad breath	50(%26/5)	97(%51/3)	35(%18/5)	5(%2/6)	2(%1/1)
Reduced life satisfaction due to halitosis	32(%16/9)	63(%33/9)	79(%41/8)	10(%5/3)	4(%2/1)

## DISCUSSION:

Today each bad smelling caused by oral and nasal cavities is called halitosis but in the past, mouth bad smelling and bad breath were considered as two different symptoms and halitosis was just used to bad breath caused by a systemic reason and bad breath from lungs. Halitosis affects the quality of life in two ways: 1. It acts as an obstacle in social interactions, and it reduces individuals' efficiency. 2. Patients' with self-perceived halitosis may be obsessive-compulsive (al Ne, 2011). The current study aimed at investigating the oral health-related quality of life in patients with halitosis using the HALT questionnaire. This questionnaire has been used in studies by (Ghazanfari *et al.*, 2017; Agostinho *et al.*, 2019; He SL and Wang, 2012; Silveria *et al.*, 2020). Ghazanfari *et al.* expressed that validity and reliability of the questionnaire were desirable. It is also a valid tool for evaluating the quality of life, especially for halitosis. Findings are compatible with other studies. The HALT questionnaire has several advantages including:

- 1) A simple scale makes it easy and quick to use.
- 2) The summation of this questionnaire can be in percentage so it could be easier to grade and quicker to understand the patient
- 3) Results before and after treatment can be compared via this tool and diagnostic indexes.
- 4) This tool is easy to read as well as to fill out. It can be used in clinical and research studies (Kizhner and Krespi, 2011).

Halitosis is a prevalent problem that affects social and professional life. There are a few done studies on halitosis effect on quality of life. In this study, the mean of patients' quality of life was average. Alade *et al.* study showed that self-reported halitosis disturbs oral health-related quality of life considerably. In line with this study, in their study, Nascimento *et al.* showed that patients with self-reported halitosis with higher HALT scores had a lower quality of life (Nascimento and Goettems, 2021). Colussi *et al.* stated that self-reporting halitosis affects the quality of life considerably (Broughton *et al.*, 2012). Miotto *et al.*

also stated that among different variables, bad breath has the most effect on the quality of life (Miotto *et al.*, 2020). In a study by Lu *et al.* individuals with halitosis had a lower oral health-related quality of life than those without halitosis. Patients with halitosis experience mental disturbs (Lu HX *et al.*, 2017). The organoleptic testing and the amount of Volatile Sulphur Components (VSC) are used to measure halitosis. In Silva *et al.* study there was not a significant difference between these two methods (Carmela *et al.*, 2021). Silveira *et al.* (Iwakura *et al.*, 1994) concluded that both self-reporting and clinical measurement are effective to recognize halitosis. According to these results, it seems clinical measurement does not affect the findings thus only self-reporting was used in the current study. In this study, the quality of life was observed to be more in women than men. Statistically this difference was not significant ( $P > 0/05$ ). There was not a significant difference between the quality of life in individuals younger and older than 40 years ( $P > 0/05$ ). These findings were compatible with Agostinho *et al.* study in which statistically there was not a significant difference between average level of quality of life in different age groups and genders (Agostinho *et al.*, 2019). In this study, there was not a significant difference between the quality of life and different occupations and educational levels ( $P > 0/05$ ). Since the number of male and female participants was not equal and there was not a significant relationship between the quality of life and age, gender, occupation, and education level the sub-groups were not compared. Findings also showed that %59/8 of participants never had a recurrent infection of the tonsils, %7/4 always had frequent sinus infections, %45 were worried about bad breath, and %15/9 felt embarrassed about halitosis.

## CONCLUSION:

As an appropriate tool for evaluating the effect of halitosis on the quality of life in patients with self-reported halitosis, the HALT questionnaire showed that the score of patients' quality of life is average. Due to some negative effects of halitosis on daily life

and social relationships, some therapeutic interventions are suggested to improve patients' quality of life.

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#### CONFLICTS OF INTEREST:

The authors of this manuscript declare their agreement with the statements. Conflicts of interest are declared obviously in the manuscript. Authors also state separately that they have all read the manuscript and have no conflict of interest. We confirm that neither the manuscript nor any parts of its content are currently under consideration or published in another journal.

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