



Investigation of the Psychopathological Aspects of Patients Suffering from Self-Reported Bad Breath

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Abstract

Purpose: Bad breath as one of the problems of human societies can affect people's personal life and social relationships. In severe cases it may lead to depression, decreased self-confidence and sensitivity in interpersonal relationships. As a result, bad breath as a physical and psychological illness should be considered in both medical and psychologic fields. Therefore, this study aimed to investigate the psychopathological aspects related to self-expression of halitosis.

Materials and methods: In this cross-sectional descriptive study, a 25-question SCL-25 questionnaire was used to investigate the consequences of halitosis. The Questionnaire was distributed between 222 patients referred to Dental Clinic of Golestan University of Medical Sciences with the entry criteria of 15 year old patients with self-reported of bad breath. The simple sampling method was performed and the data was analyzed using statistical software STATA version 14.

Findings: Among 222 participants, 60.8% were women and 39.2% were men. Average overall index of disabling symptoms (GSI) was found to be 1.02 ± 0.55 in the participants, according to which 90.5% were healthy and 9.5% were suspected of having psychological disorders. Paranoid thoughts, sensitivity in interpersonal relationships, obsession and compulsion were in the highest frequency. They showed psychological problems in the studied statistical population according to the determined cut-off point. Moreover, psychological disorders in all dimensions (except obsession, compulsion and depression) were significantly higher among women than men ($p < 0.05$).

Conclusion: In the present research, 9.5% of people showed the possibility of suffering from some degree of psychological disorders and apart from the physiological treatment, the psychological status of patients with halitosis should be carefully evaluated. In addition, psychological intervention should be considered as well.

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Keywords: halitosis, self-report, bad breath, psychopathological aspects

Introduction

Bad breath is a global problem which can affect people emotionally and socially. This condition is defined as a bad or unpleasant smell that is emitted from the oral cavity (1, 2). Halitosis is composed of two words "halitus" (breath) and osis; (pathological process) in Latin (3, 4). "Bad breath", "oral malodor", "Fetorori" etc are the other words which are used for bad breath (5, 6). Halitosis is one of the biggest and oldest taboos in many societies. It affects different cultures and societies regardless of gender, age and social status (7, 8). Although complaints about halitosis have existed since ancient times, it has been recognized as "psychosocial stigma" in susceptible developing communities recently (9, 10). Bad breath has been affected many people's lives as a medical-social problem. It has been mentioned that halitosis is a symptom which is related to the both physical and emotional state of a person (11).

People who complain about halitosis may experience psychological consequences which lead to social, occupational and emotional limitations (12, 13). These problems include low self-confidence, social isolation, and sensitivity in interpersonal relationships, obsessive behaviors such as talking less or avoiding talking with people who are close to. Eighteen reported frequent changes in behavior, thoughts and feelings of these patients have been mentioned including: talking less specially in elevators and crowded places, avoiding turning their face toward people who are talking to, wearing masks, covering the mouth and locking up Breathing while speaking, social, occupational and emotional limitations, performing oral and tongue hygiene frequently during the day, social isolation, feelings of inferiority, misinterpreting the actions of those who cover their noses or giving them a chewing gum, moving back a little while they are talking, this is called "social disability" which leads to having problem in making relation and dealing with others (14-17).

These concerns cause the body images which people have about their body health and being disturbed. In dealing with others, they consider themselves having flaws and problems. People with good body image pay more attention to their mouth. The result of such attitudes is the reduction of their self-confidence, which leads to unfavorable outcomes in social relations with others and fears of society (Social Phobia) and in relationships with others. Research has identified social anxiety disorder (SAD) as the most common psychopathology associated with halitosis which is more common in women than men and in younger ones than the older (18, 19). In fact, in some societies, halitosis has been identified as "the killer of the social life" (10).

55% of people who complain about bad breath are not either aware of it or are mostly aware by others, because taste and smell are sensory phenomena and adaptation occurs upon them during time. It is estimated that 50 percent of olfactory receptors will adapt after one second of stimulation. These people are usually more sensitive to their bad breath than the clinician and give a higher self-evaluation score than the organoleptic score (19).

Since the treatment of halitosis only focuses on its diagnosis and treatment than paying attention to the emotional changes, it does not include behavioral and cognitive characteristics of patients, so more studies are needed to determine the personality and psychological characteristics of these people which emphasize on the role of general dentists and psychological health professionals to provide more effective therapeutic interventions (20, 21). Over the years, the social and psychological consequences of halitosis have become more important and dentists are now more aware of the concerns and needs of their patients. Therefore, research in this field and its consequences has become relevant in recent years. According to above, the purpose of this research was to investigate the psychopathological aspects of patient's with Self-report of bad breath in the dental clinic of Golestan University of Medical Sciences in 2020. In patients who were illiterate, questionnaires were completed by the project manager. Before starting the study, necessary ethical permissions were obtained. The ethic code of this study was registered as IR.GOUMS.REC.1400.085. Explanations about the topic and purpose of the research were given to the patients by the project manager and the patients were informed that they were free to participate in this study and could leave the study whenever they wanted. All the information related to the patients and the names of the patients mentioned in the reports were kept confidential. Results of the study were exposed to them if it was desired and requested by the study patients. Doubtful and unreliable data and opinions that were not in line with the researcher's opinions were necessarily excluded. In this study, we used the shortened questionnaire, i.e. 25SCL, in which the number of questions were reduced from 90 to 25. Despite the reduction of 65 questions out of 90 questions in this questionnaire, it has mainly a very high correlation (0.95) with the main questionnaire. This questionnaire has been translated to different languages, including Persian, Arabic, Russian and English (22, 23).

Persian translation of this questionnaire has been validated in many studies and different statistical communities. It has been validated in Iran, too. The construction and validity of this questionnaire was done by Najarian and Davoudi in 2010. Its validity was measured by calculating internal consistency (Cronbach's alpha) and retest coefficients. The reliability calculated for the scale of psychological disorders based on Cronbach's alpha coefficient was equal to 0.93. It indicated a very intense internal similarity between the items planned in the mentioned scale. The correlation coefficient of SCL-25 has been reported as 0.69 based on general anxiety scale and 0.49 based on Beck depression scale.

Najarian and Davoudi evaluated the validity of this list through factor analysis, convergent and divergent validity, and its reliability through examination. Internal consistency and retest were examined and Cronbach's alpha was 0.97 for women and 0.98 for men and they also reported retest coefficients of 0.78 for the whole sample, 0.77 for women and 0.79 for men with an interval of 5 weeks. There was short and concise scale for measuring general psychopathology, not a long scale that measured multiple psychological injuries presented a specific form of the measurement. In addition, in 2014, Rashvanlu and Saadati once again investigated the validity and reliability of this questionnaire, and this research showed the list of 25 signs of validity, divergent validity and adequate reliability.

This questionnaire is short, multidimensional, and homogenous which have appropriate validity and relatively favorable reliability (24). Researchers had used this tool in studies on patients, students and the elderly (25, 26). This questionnaire was designed as a self-report tool to measure physical and psychological discomforts that respondents have experienced during the past seven days. The order to run this questionnaire was very easy and the questions were also very simple without any additional explanations which means that every person with primary education was able to answer. It was organized in a way that was not limited to a specific group, nationality and race.

To determine the psychological health of patients in the total index and each of the dimensions based on the cut point (in terms of average and standard deviation), samples were divided into normal and impaired levels in each of the subscales and overall score.

The cut-off point of this study was 1.75 based on the study of Faramarzi et al. and scores greater than and equal to 1.75 suspected disorder in that subscale and overall index was considered (26). It should be noted that this is an aspect test. It does not have a diagnosis and only identifies people who have a positive or suspicious result. A definitive diagnosis is required clinical interviews conducted by psychiatric and psychological specialists.

Questionnaire examined 8 different psychological dimensions including: physical problems, obsessions and compulsions, sensitivity in relationships with others, depression, panic, morbid fear, paranoid thoughts and psychosis. These 25 questions include: 6 physical dimension questions.

(questions 2, 6, 12, 16, 17 and 25), 4 questions about psychosis (questions 1, 19 and 23), 1 question about paranoid thoughts (question 24), 3 questions about anxiety (questions 3, 7 and 8), 3 questions about obsession and compulsion (questions 11, 21 and 22), 3 questions after fear and panic (questions 10, 14 and 15), 2 questions about depression (questions 4 and 13), 3 questions about sensitivity in relationships which were interpersonal (questions 5, 9 and 20) and 1 additional question (question 18). The additional question was not scored as a dimension but it was meant in the General index of Morbid Symptoms (GSI), which is a sign of the degree and depth of suffering from all psychological dimensions.

The general index of morbid symptoms was calculated for each patient with the collection of the raw scores of 8 dimensions divided into 25 questions. The range was 0-4 for each person.

The definition of the subscales presented below is taken from Bruce and Arnett's study:

Physical complaint: In this dimension, the dysfunction of the automatic nervous system and its constituent parts are expressed as complaints about the cardiovascular, digestive and respiratory system function. Recurrent headaches and muscular pains are the other physical complaints.

Obsessions and Compulsions: Unrelenting obsessions and uncontrollable repetitive behaviors

Sensitivity in interpersonal relationships: refers to a person's feeling of inadequacy and inferiority compared to others. Self-underestimation, feeling of lack of peace and discomfort in communicating with others are specific manifestations of this dimension.

Depression: feelings of helplessness, hopelessness, suicidal thoughts, depressed mood, and lack of interest in the pleasures of life, lack of Motivation and loss of vital energy are included in this dimension.

Anxiety: The anxiety dimension shows signs and symptoms that clinically reflect severe overt anxiety.

Symptoms such as nervousness, feeling of pressure and tremors in the limbs, sudden fears, panic, fear and so on. Being Worry about the future and some physical aspects of anxiety are given in this series.

Phobia: Intense and irrational fear of a specific stimulus (person, special object or situation)

Paranoid thoughts: This dimension presents paranoid behavior as a thought disorder. Its questions include the initial symptoms of this disorder, such as suspicion, self-conceit, self-centeredness and fear of losing autonomy, delusion and aggression.

Psychosis: loss of ability to distinguish reality from fantasy, withdrawal and isolation. Has two distinct characteristics of

1. Delusions (unintentional expression of misunderstanding of the facts)
2. Hallucination (unintentional watching or hearing something that was not and is not existed) (27).

Additional questions: used to prevent the subject from knowing the nature of the test. These questions from a clinical point of view are important and help the general indicators of the test.

Filling out the questionnaire took between 5-10 minutes. Each question was based on a Likert scale on a five-point scale. Score zero (no option), score one (a little), score two (somewhat), score three (a lot) and score four (severely).

The meaning and concept of the mentioned five degrees are as follows: 0=none: This means it was not a problem and it has never bothered me, 1=low: It means that this problem or issue has existed to a very small extent for me and it has caused me some minor discomfort (I've had it once or twice in the last two months), 2=To a certain extent: This means that this issue has come up for me on a moderate level and has upset me (for example, during several weeks I have had this problem three or four times in the past), 3 = a lot: it means this problem or problems have happened to me with great intensity and they have caused me great discomfort (for example, every two or three days once) and, 4 = severely: It means this issue or the problem has come up for me almost every day and with great intensity and it has upset me immensely. As a result, at least the score is 0 and the maximum score is 100 (26). Higher scores in each dimension indicate more severe disorder.

To determine the psychological health of patients in the overall index and each of the dimensions based on the cut-off point (in terms of mean and standard deviation) the individuals are divided into two normal and impaired levels in each of the following Scales and total scores. The cut-off point of this study is 1/75 based on the study of Faramarzi et al. and scores greater than and equal to 1.75 were considered to be suspicious of disorder in that subscale and overall index. Higher scores in each dimension indicate more severity of that disorder (26).

It should be noted that this test did not have a diagnostic aspect and only identified people with positive or suspicious results. A definitive diagnosis required a clinical interview by psychiatric and psychological specialists.

Information from the completed forms was extracted and entered into statistical software STATA version 14 and descriptive statistics (mean, standard deviation, percentage and frequency) were measured and analyzed by Man-Whitney, Kruskal-Wallis and K-squared statistical tests. The level of significance was considered 0.05.

Findings:

222 patients with self-reported bad breath participated in this study and were examined. 39.2% of the patients were male and 60.8% were female. The age range of patients varies from 15-62 and their average age is 34.6 ± 12.09 . About 45.5% of the participants were less than or equal to 30 years old and 54.5% were over 30 years old.

The average overall index was 1.02 ± 0.55 . Among the 8 dimensions, the highest average score of experienced psychological disorder was related to sensitivity in interpersonal relationships with an average of 1.32 ± 0.8 and the lowest was related to psychopathy with an average of 0.7 ± 0.62 .

The mean and standard deviation of the GSI and its subscales are presented in Table 1.

Table 1. The scores of the clinical subscales of the SCL-25 questionnaire

average± variance	Number	scale
Physical complaints	222	0.95±0.64
Obsession and compulsion	222	1.27± 0.85
psycopathy	222	0.7±0.62
anxiety	222	1.09±0.73
phobia	222	0.92±0.69
Depression	222	0.94±0.83
Interpersonal sensitivity	222	1.32±0.8
Paranoid thoughts	222	1.07± 0.93
General index of morbid symptoms (GSI)	222	1.02± 0.55

In Table 2, the mean and standard deviation of the general index of morbid symptoms and its subscales based on specifications has been showed.

The results presented in this table showed that at the age of less than 30 years, the most average related to the dimension was for sensitivity in interpersonal relationships and at ages older than 30 years, the highest average related to the dimension was for obsession and compulsion, and the lowest average in both age groups was related to psychopathy. Also, in terms of Statistics between two age groups less than 30 years old and more than 30 years old, in three dimensions of phobia, depression and sensitivity, there is a significant difference between individuals ($p < 0.05$) and people less than and equal to 30 years old in these three dimensions average score, obtained higher than people over 30 years old and as a result, they experience more severity of disorder.

The statistical comparison showed the difference between the mean of the subscales of the questionnaire and the general index of symptoms according to the gender of men and women that this difference was significant in all scales except the depression dimension ($p < 0.05$) and as a result, the average scores of women in all dimensions (except for depression) and the overall index was significantly higher than men.

Examining the average difference according to occupation showed that in 4 dimensions of psychosis, anxiety, Morbid fear, interpersonal sensitivity and general index of morbid symptoms there was a statistically significant difference ($p < 0.05$). Housekeepers in the dimension of anxiety and students in the three dimensions of morbid fear, sensitivity in Interpersonal relations, psychopathy, as well as the general index, had a higher average than other groups.

Examining the different dimensions according to education showed a significant difference in the two dimensions of psychopathy and interpersonal sensitivity ($p < 0.05$) and the average of two dimensions of psychopathy and sensitivity in interpersonal relationships was more in those with diploma than other education level. Also, there was no significant difference in different levels of education in overall index and other dimensions ($p < 0.05$).

Table 2. Scores of clinical scales of SCL-25 questionnaire based on age, gender, occupation and education

variables	Physical complaints mean and standard deviation	Obsession and compulsion mean and standard deviation	Psychosis mean and standard deviation	Anxiety mean and standard deviation	Morbid fear mean and standard deviation	Depression mean and standard deviation	Sensitivity in interpersonal relationships mean and standard deviation	Paranoid thoughts mean and standard deviation	Index number and morbid symptoms (percentage)	Total of
age										
30=>	0.99±0.74	1.31±0.96	0.72±0.62	1.05±0.76	1.05±0.77	1.16±0.95	1.59±0.84	0.97±1.1	1.09±0.62	
30<	0.92±0.53	1.24±0.76	0.68±0.62	1.13±0.7	0.82±0.6	0.75±0.66	1.1±0.68	0.9±1.05	0.95±0.47	
P value	0.991	0.898	0.496	0.288	0.026	0.001	0.001	0.663	0.219	
gender										
female	1.11±0.67	1.38±0.9	0.82±0.67	1.26±0.75	1.11±0.69	1.02±0.87	1.42±0.8	1.11±1.13	1.16±0.57	
male	0.71±0.49	1.11±0.74	0.5±0.46	0.84±0.6	0.64±0.6	0.81±0.76	1.17±0.77	0.64±0.9	0.8±0.42	
P value	0.001	0.029	0.001	0.001	0.001	0.081	0.016	0.001	0.001	
occupation										
unemployed	0.89±0.51	1.42±0.79	0.33±0.53	1.06±0.6	0.62±0.57	0.84±1	1.10±0.86	0.68±0.77	0.88±0.42	
housekeeper	1.07±0.55	1.36±0.9	0.86±0.68	1.37±0.68	1.01±0.64	0.85±0.73	1.29±0.73	1.15±1.17	1.13±0.51	

student	1.1±1	1.78±1.14	1.02±0.77	1.14±1.05	1.45±0.89	1.17±0.95	2.14±0.83	1.57±1.39	1.36±0.81
collegian	1.02±0.84	1.31±0.89	0.7±0.6	1.07±0.78	1.14±0.69	1.26±0.92	1.64±0.79	1.57±1.39	1.12±0.63
(employee	0.85±0.48	1.02±0.58	0.62±0.44	0.72±0.61	0.51±0.38	0.94±0.72	1.05±0.68	0.88±0.75	0.82±0.34
Freelance occupation	0.78±0.53	1.04±0.72	0.6±0.5	0.91±0.62	0.81±0.69	0.81±0.79	1.13±0.72	0.68±0.92	0.85±0.48
P value	0.072	0.056	0.001	0.001	0.001	0.062	0.001	0.059	0.002
education									
illiterate	0.92±0.44	1.64±0.83	0.58±0.65	1.12±0.68	0.62±0.5	0.67±0.72	0.98±0.68	0.79±1.01	0.94±0.43
Under diploma	0.89±0.77	1.26±0.86	0.66±0.74	1.1±0.72	0.96±0.74	0.79±0.85	1.24±0.91	0.92±1.19	0.98±0.64
diploma	1.04±0.65	1.22±0.89	0.81±0.61	1.17±0.76	1.04±0.72	1±0.8	1.45±0.74	1.05±1.12	1.1±0.56
college	0.84±0.59	1.22±0.8	0.6±0.39	0.93±0.76	0.84±0.62	1.04±0.89	1.28±0.9	0.81±0.85	0.94±0.52
Bachelor and over	0.77±0.5	1.1±0.66	0.46±0.43	0.83±0.56	0.78±0.59	1.18±0.97	1.34±0.77	0.63±0.78	0.87±0.42
P value	0.176	0.101	0.030	0.298	0.060	0.070	0.046	0.527	0.371

Table 3 shows the frequency of healthy and sick people in each subscale and overall index based on the determined cut-off point (the larger mean equal to 1.75 in each subscale and overall index was considered as disorder in that dimension). The highest frequency of the examined psychological disorder was related to the dimension of paranoid thoughts and the lowest frequency was related to the dimension of psychosis. Furthermore, based on GSI cut point, 201 people (90.5%) were healthy and 21 people (9.5%) were suspected of psychological disorders.

Table 3. The frequency of patients based on the cut-off point of the scales and the general index of morbid symptoms

Scale	Number /Percentage
Physical complaints	26 (11.7)
Obsession and compulsion	54(24.3)
Psychosis	14(6.2)
Anxiety	36(16.2)
Phobia	22(9.9)
Depression	36(16.2)
Interpersonal sensitivity	58 (26.1)
Paranoid thoughts	62(27.9)
General index of morbid symptoms	21 (9.5)

Table 4 presents the distribution of the frequency and percentage of patients in each subscale and GSI index based on demographic characteristics.

The results presented in Table 4 show that there is a significant relationship between age and the prevalence of psychological disorders in the dimensions of physical complaints, morbid fear, depression, sensitivity in interpersonal relationships and the general index of symptoms ($p < 0.05$). Most of the people who had physical complaints, morbid fear, depression and sensitivity in interpersonal relationships were people who were less than or equal to 30 years old.

Based on the general index of morbid symptoms, the number of suspected psychological disorders among women was 18 and among men was 3. About 85.7% of people suspected of psychological disorder were women and 14.3% were men, in which the difference was statistically significant ($P < 0.05$). There was a significant relationship between psychological symptoms and gender in all dimensions except obsession, compulsion and depression ($p < 0.05$). In general, the distribution of the frequency of psychological disorders in all dimensions (except the dimensions of obsession and compulsion and depression) among women was significantly higher than that of men.

The results of examining the difference in the frequency of psychological disorders in the subscales and the overall index showed that only in the scales of morbid fear and sensitivity in interpersonal relationships, there was a significant difference between occupations ($p < 0.05$) and the majority of people with psychological disorders had phobia and sensitivity in interpersonal relationships. They were students and housewives respectively. In general, frequency of different dimensions of psychological disorders according to education did not show a significant relationship ($p < 0.05$).

Table 4. Distribution of the frequency and percentage of sick people in the sub-scales and GSI index based on age, gender, occupation and education

variables	Physical complaints Number (percent)	Obsession and compulsion Number (percent)	Psychosis Number (percent)	Anxiety Number (percent)	Morbid fear Number (percent)	Depression Number (percent)	Sensitivity in interpersonal relationships Number (percent)	Paranoid thoughts Number (percent)	Index number of morbid symptoms (percentage)	Total
age										
30=>	18 (69.2)	26(48.1)	7 (50)	16 (44.4)	16 (72.2)	23 (63.9)	40 (69)	28 (45.2)	14 (66.7)	
30<	8 (30/8)	7 (50)	28 (51/9)	< ²⁰ (55.6)	6 (27/3)	13 (36.1)	18 (31)	34 (54.1)	7 (33.3)	
P value	0.01	0.653	0.727	0.89	0.007	0.015	0.001	0.950	0.041	
gender										
female	22 (84.6)	36 (66.7)	12 (85.7)	29 (80.6)	18 (81.1)	26 (72.2)	43 (74.1)	45 (72.6)	18 (85.7)	
male	4 (15.4)	18 (33.3)	2 (14.3)	7 (19.4)	4 (18.2)	10 (27.8)	15 (25.9)	17 (27.4)	3 (14.3)	
P value	0.008	0.311	0.049	0.008	0.033	0.125	0.016	0.025	0.014	
occupation										
unemployed	1 (8.3)	8 (14/8)	1 (7.1)	2 (6.5)	0 (0)	3 (8/3)	4 (9.6)	4 (6/5)	0 (0)	
housekeeper	10 (38.5)	18 (33.3)	8 (57.1)	16 (44.4)	5 (22.7)	10 (27.8)	17 (29.3)	25 (40.3)	9 (42.9)	
student	3 (11.5)	6 (11.1)	1 (7.1)	2 (6/5)	4 (18.2)	2 (6.5)	9 (15.5)	7 (11.3)	2 (9.5)	
collegian	7 (26.9)	9 (16.7)	2 (14.3)	8 (22.2)	8 (36.4)	9 (25)	16 (27.6)	9 (14.5)	6(28.6)	
(employee	2 (7/7)	3 (6.5)	0 (0)	2 (6.5)	0 (0)	3 (8.3)	2 (4.3)	4 (6.5)	0 (0)	
Freelance occupation	3 (11.5)	10 (18.5)	2 (14.3)	6 (16.7)	5 (22.7)	9 (25)	10 (17.2)	13 (21)	4 (19)	
P value	0.214	0.227	0.367	0.322	0.007	0.854	0.001	0.139	0.166	
education										
illiterate	1 (8.3)	11 (20.4)	2 (14.3)	5 (13.9)	0 (0)	3 (8.3)	3 (5.2)	7 (11.3)	1(8.4)	
Under diploma	6 (23.1)	10 (18.5)	3 (21.4)	4 (11.1)	4 (18.2)	6 (16.7)	9 (15.5)	12 (19.4)	4 (19)	
diploma	16 (61.5)	26 (48.1)	9 (64.3)	22 (61.1)	16 (72.7)	17 (47.2)	34 (58.6)	35 (56.5)	13 (61.9)	
college	2 (7/7)	4 (4/7)	0 (0)	4 (11.1)	1 (5/4)	5 (13.9)	6 (10.3)	4 (6.5)	3 (14.3)	
Bachelor and over	1 (8.3)	3 (6.5)	0 (0)	1 (8/2)	1 (4/5)	5 (13.9)	6 (10.3)	4 (6.5)	0 (0)	
P value	0.341	0.315	0.429	0.271	0.105	0.693	0.198	0.477	0.3	

Discussion:

This study was conducted with the aim of determining the psychological health status of patients with self-reported bad breath. According to the results, 90.5% of the participants were healthy and 9.5% were

suspected to psychological disorders. This amount compared to the study conducted by Talebian et al. reported the rate of people suspected of psychological disorders to be 37.2%. which was less (27).

The prevalence of disorder in social life and difficulty in communicating with others in patients with bad breath was 22.2% and 16.7% respectively. Some researchers reported and stated that the majority of people did not have psychological problems related to bad breath (28-30). Also, Suzuki et al.'s study showed that 22% of people with halitosis were experiencing psychological disorders (11, 31). Eli et al stated that each patient with bad breath may have the minimal psychological disorder to severe damage (32). He et al. stated that the severity of psychological conditions may have the from minimal to severe in comparison with healthy people (33). Difference in the results of research on the prevalence of psychological disorder may be due to the difference caused by the tools and methods used, different cut points and also due to the differences in cultures, other environmental characteristics, place of residence and people's unwillingness to openly express psychological problems. Although these figures show the exact prevalence of the problems, there is no psychological illness in these patients, but the presence of suspicious cases reveals the need to pay more attention to the psychological status of these patients.

In this study, the SCL-25 questionnaire was used to evaluate the psychopathological status of patients with complaints of bad breath. In recent studies such as the study of He et al. (33) Alzoubi et al. (29, 34) and Eli et al. (35) the 90question form of the questionnaire have been used to evaluate the psychological state of patients with halitosis. Questionnaire SCL25 has been translated into many languages in addition to Persian, which has good validity and reliability (28, 36). Determining in which patient the physical or psychological approach alone should be used and in which patient both approaches is required, is very important.

In the present study, patients' self-report about bad breath was used. Data from Self-report evaluations can add valuable information to clinical examinations and provide a broad understanding of health status (37, 38). Despite the shortcomings of the self-report method, this method is one of the most common methods for evaluating bad breath (39, 40). Since the aim of the present study was to evaluate the psychological aspects of these patients, self-expression was considered. In this regard, the study of Pham et al. and also Greenstein et al. showed that people's assessment of their bad breath corresponds well with the objective assessment of bad breath, and there is a positive and significant relationship between the two (38, 41).

It is also stated in the study of Faria et al. that when halitosis is severe and clinically detectable, self-report is a valuable tool and since clinical examinations are costly and time-consuming, Self-report of oral health status is a useful tool for assessment. Self-reporting is a suitable tool in the study about oral diseases especially in epidemiological studies (34).

In this study, the cut point was determined from the standard deviation and the mean in the general index of morbid symptoms and subscales. The cut point of a test means a point that can be used to separate some people from others.

In fact, the purpose, for what purpose the test is made and what people we need to separate, determines the place of cut-off point to be. In this study, the aim is to separate healthy and sick people in each subscale and in the general index of symptoms has been sick. In Talebian et al.'s study, standard deviation and average were used to determine the cut-off point (34). Various methods have been proposed to determine the cut-off point, especially in the case of clinical tests. Connors and Swanson suggest determining the cut point based on the mean and standard deviation. The cut-off point of 1.75 for the general index of psychological health and different psychological dimensions in this study is similar to the cut-off point of 1.75 in the studies of Rodríguez et al., Fröjdth et al., Faramerzi et al. and the original version of SCL-25 (16,20,36).

The most common psychiatric disorder in this study was paranoid thoughts (27.9%). A paranoid person feels that all his movements are constantly being monitored and people are intentionally trying to harm him.

People with bad breath also think that their bad breath causes others to exclude or intentionally cause they will be ashamed (33). In the second order of the prevalence of psychological disorders, there was interpersonal sensitivity with a prevalence of 26.1% which indicates that people complaining of halitosis experience as a sense of inadequacy and inferiority in comparison with others. That causes negative feelings in interpersonal relationships, which cause avoiding behavioral, and attributing the movement of others such as going back, covering the nose and face to their bad breath, but they should be explained that these avoidance behaviors may occur for other natural reasons as well (35, 43).

In the third order obsessive compulsive disorder had a prevalence of 24.3%, and the presence of obsessive thoughts causes these people to smell after treatment and psychologically imagine that there is still bad breath. All these disorders cause an invalidated cycle and sequence and can aggravate the condition of the patient's bad breath.

These results are almost consistent with the study of He et al. who found the most common problems in these patients are sensitivity in interpersonal relationships, anxiety, depression and paranoia (33). Eli and

colleagues also stated that bad breath causes negative manifestations of depression, sensitivity in interpersonal relationships, paranoid thoughts and psychosis (32)

Bad breath is common at all ages (39). There was a significant relationship between age and the prevalence of psychological disorders which confirmed physical complaints, morbid fear, depression, sensitivity in interpersonal relationships and the general index of morbid symptoms (GSI).

It was found that the prevalence of psychological disorders in the age group of 30 and under, was higher in these dimensions. While in the study of Melonset et al. significant relationship between age and psychological dimensions was not found (27). Young and middle-aged people are more alert regarding their health and show higher symptoms of anxiety and depression. Anxiety also causes the level of volatile sulfur compounds (VSCs) increases (35).

Based on the cut-off point, the prevalence of suspected psychological disorders was 13% in women and 3% in men. Also, the average scores of women in the overall score of the test and all subscales except for depression was significantly more than men ($p < 0.05$), but in He et al.'s study, the mean scores of women were only in obsession and compulsion more than men significantly. Frequency of psychological disorders in women (in all aspects except depression, obsession and compulsion) was significantly more than men ($p < 0.05$). In other studies conducted in Iran, the frequency of psychological disorders in women was higher than in men, so that in the study of Mohammadi et al. it was 14.34% in women and 7.34% in men (45). In the Noorbala et al. 's study with the aim of investigating psychological health in Iranian adult population, 25.9% of women and 14.9% of men were identified as affected (46).

In Noorbala et al. study with the aim of investigating psychological health in Iranian adult population, 25.9% of women and 14.9% of men were identified as affected (52). In the study Walter, who has studied the gender differences in psychological illnesses in adult men and women, the frequency of psychological illnesses is higher in women (47). Quiryne et al. also reported that two thirds of halitophobia cases are made up of women, which indicates that women in the context of psychopathological problems are more susceptible (48). Wang and colleagues also reported that the parameters of psychological disorders in women are more than men (49). In the study by Deolia et al. the social impact of halitosis includes: embarrassment, failure to reach successful goals and relationships which were observed in women more than men, and 31.5% of women had a constant fear of halitosis. In the present study, 13% of women had phobia disorder.

Deolia et al.'s study found a significant psychological effect of halitosis in both sexes in terms of confidence breath, performance at work was not observed (10). Students were more susceptible than others. In addition, the average scores of the three dimensions of morbid fear, sensitivity in Interpersonal relationships and psychopathy in students were significantly higher than other occupational groups ($P > 0.05$).

The academic education in university is a stressful period. Entering the university for People under special pressures may cause psychological harm (50). Students are the most sensitive groups of every country as future builders and psychological health is the most important factor in the growth and development of their talent and progress in the future. On the other hand, having psychological problems lead to disruption in doing homework, decrease in motivation, increase anxiety and may cause the students spend a significant part of their intellectual energy on such problems, as a result, the self-expression of bad breath should be considered as a factor involved in their psychological state (51).

In the present research, the prevalence of psychological disorders based on education did not show a statistically significant difference ($p < 0.05$) like other studies that did not reveal such a this difference according to education (5).

Conclusion:

By using the SCL-25 questionnaire, it is possible to evaluate the severity and dimensions of psychological illnesses in this type of patients. The results of this study showed that 9.5% of the participants have some degree of psychological problems. The most experienced problems were paranoid thoughts, sensitivity in interpersonal relationships, and obsessions and compulsions, as a result, halitosis, in turn, may have a negative effect on the psychological state of patients, apart from physiological treatment. For halitosis, the psychological status of affected patients should be carefully evaluated and psychological intervention should be considered. And in this way, by taking action to prevent, treat and rehabilitate these disorders from the heavy and countless consequences of this avoid disruptions.

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