

# Psychological Status in Head and Neck Cancer Patients with Xerostomia due to Radiotherapy

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## Abstract

**Background and Objective:** Psychological status is one of the quality of life (QOL) domains which can be affected by hyposalivation caused by head and neck radiotherapy. This study aimed to evaluate the psychological status of head and neck cancer (HNC) patients who were suffering from hyposalivation after at least one week of receiving radiotherapy.

**Material and Methods:** This descriptive-analytic study was performed on 44 HNC patients with history of hyposalivation caused by radiotherapy, in 5 Azar hospital from 1397-1398. General Health Questionnaire (GHQ-28) was used for data collection. Shapiro-Wilk test, parametric and nonparametric tests and SPSS 18 software were used for statistical analysis.

**Results:** The average psychological status of patients was 27.50 out of 84 (lower score indicated better psychological status). The mean score of physical health was 7.39, social functioning was 6.16, anxiety/insomnia were 12.64 and depression was 1.33 with the maximum being 21. Psychological status was not significantly different between genders. Ageing caused all subscales to increase except depression. A direct relationship between social functionality and psychological status was reported.

**Conclusion:** Hyposalivation due to radiotherapy affects psychological status and its components in patients. Also, various factors such as ageing and lower education level can be effective in reducing psychological status in the patients with head and neck cancer who were suffering from hyposalivation due to receiving radiotherapy.

**Keywords:** Psychological status; Head and neck cancer; Radiotherapy; Xerostomia

## Introduction

Head and Neck Cancer (HNC) is the seventh most common cancer in the world with an estimation of more than 550,000 occurrences and 380,000 deaths annually. It consists of malignancies originating from the skin, nasal cavity, paranasal sinuses, oral cavity, salivary glands, throat and larynx which includes squamous cell carcinoma, malignant salivary gland tumors, malignant lesions of the jaw, nasopharyngeal carcinoma, basal cell carcinoma, malignant melanoma, Non-Hodgkin's lymphoma, and soft tissue sarcomas (1, 2).

Treatment methods for HNC patients include surgery, chemotherapy and radiotherapy. Radiotherapy is a reliable way to treat HNC patients. Salivary glands would be more protected in advanced types of radiotherapy; however, it can lead to complications such as mucositis, difficulty in swallowing, trismus, tooth decay, and hyposalivation. When salivary flow below than 0.1-1.2 ml/min, it is defined as hyposalivation in such these cases (radiotherapy induced hyposalivation) which is the most suffering complication for patients (3-5).

The prevalence of hyposalivation has been estimated about 20%, mostly induced by medication and it tends to be more common among women (5). Preventing the occurrence of hyposalivation is an important subject since there is no effective treatment for it and as a result patient's quality of life is affected negatively by impairment of their physical function, social life and cognitive abilities. Based on previous studies, patients' QOL scores have decreased at least 25% after radiotherapy (6-8).

Psychological status as one of the QOL indices can be reduced by hyposalivation. (9).

Poor prognosis makes HNC patients suffer from psychological imbalance more than any other cancer patients and hyposalivation exacerbates their psychological disorders including depression, anxiety, and behavioural disorders. Therefore, diagnosis and treatment of these complications improve QOL and life expectancy in HNC patients (10, 11).

Few articles have studied the subject of HNC-related psychological status and also most of the studies are conducted on physical side effects of cancer treatment and their impact on the quality of life while mental side effects were disregarded (12-15) accordingly, this study aimed to assess the psychological status of the HNC patients after at least one week of receiving radiotherapy.

## Materials and Methods

This cross-sectional study with the aim of assessing the psychological status of patients with hyposalivation due to radiotherapy was performed in 5 Azar hospital from 1397 to 1398. Inclusion criteria were as follows: patients with no history of mental illness, at least one week after radiotherapy and no medical record of using medication including analgesics, anticholinergics, antidepressants, antihistamines, antihypertensive, anti-Parkinson, antipsychotics, anticonvulsants, cytotoxic, diuretics, muscle relaxants, sedatives and antidepressants (2).

This study was conducted on 44 patients and oral informed consent was obtained (ethical code: IR.GOUMS.1397.205).

Patients were asked to fill out the GHQ-28 questionnaire. General Health Questionnaire-28 (GHQ-28) is a 28-item measure for psychological status. The first part of the questionnaire includes demographic and clinical information, and the second part

includes several questions about psychological status. It was developed by Goldberg, and its validity and reliability was confirmed in 1978. The GHQ-28 is divided into 4 subscales and each subscale has 7 questions. These subscales are Somatic symptoms (question 1-7), anxiety/insomnia (question 8-14), social dysfunction (question 15-21), and severe depression (question 22-28). All the questions of GHQ-28 have 4 options. In this study the Likert scoring

method was used. According to this method, the scoring of each question is (0.1.2.3); therefore the total score of an individual varies from 0 to 84. Lower score indicates a better psychological status (16, 17). Questions number 1, 15, 17, 21 are scored inversely in the final scoring since they are reverse questions.

Descriptive statistics including frequency, percentage, mean, standard deviation and plotting of frequency distribution tables were used to describe the data. Parametric and non-parametric inferential tests and Spss18 software were used to analyse the data. Shapiro-Wilk test was used to evaluate the normality of data distribution. The significance level was considered 0.05 in all tests.

## Result

A total of 44 patients participated in this study, of whom 26 (59.9%) were men and 18

(40.91) were women. A comparison between the mean components of psychological status revealed that depression was in the best and anxiety/insomnia in the worst condition (Table 1).

**Table 1:** Interaction between hyposalivation and psychological status on GHQ-28 scores

Subscales	Mean $\pm$ SD score
Physical health	7.39 $\pm$ 3.75
Social functioning	6.16 $\pm$ 3.25
Anxiety/insomnia	12.64 $\pm$ 2.99
depression	1.33 $\pm$ 1.54
Total	27.50 $\pm$ 8.21

Aging caused an increase in the overall score of both general psychological status and its components except for depression; but there was no significant relationship between patients' age and psychological status, physical health, social functioning, anxiety/insomnia and depression. The mean psychological status was 26.38 $\pm$ 8.71 in men and 29.11 $\pm$ 7.36 in women and the difference between genders was not statistically significant (Table 2).

There was no statistical significant difference between the 4 components of psychological status and gender (Table 3).

**Table 2:** Spearman's correlation coefficient between subscales of GHQ-28 and age

	Physical health	Social functioning	Anxiety/ insomnia	Depression	Age
Total	0.866	0.874	0.551	0.464	0.224
Physical health		0.727	0.261	0.382	0.225
Social functioning			0.335	0.320	0.212
Anxiety/insomnia				0.018	0.233
Depression					-0.018

**Table 3:** Relation between GHQ-28 subscales and female and male patients

	Gender	Mean (SD)	P-Value
Physical health	Male	7.30 (3.82)	0.869
	Female	7.50 (3.74)	
Social functioning	Male	5.53 (3.64)	0.128
	Female	7.05 (2.73)	
Anxiety/insomnia	Male	12.53 (3.00)	0.798
	Female	12.77 (3.05)	
Depression	Male	1.00 (1.13)	0.136
	Female	1.77 (1.92)	
Total	Male	26.38 (8.71)	0.28
	Female	29.11 (7.36)	

According to the Spearman test, a significant direct correlation was observed between physical health status and social functioning ( $P < 0.001$ ), physical health status and depression ( $P = 0.011$ ), anxiety/insomnia status and social functioning ( $P = 0.026$ ) and also depression and social functioning ( $P = 0.034$ ) (Table 2).

Among participants, there were 4 illiterate people, 9 primary educated, 11 middle school educated, 12 diploma graduated and 7 higher level educated. The highest scores of psychological status, physical condition, anxiety/insomnia and social functioning status were related to illiterate people, while depression had a higher score among people with diploma.

## Discussion

This study aimed to evaluate the psychological status of HNC patients with hyposalivation due to radiotherapy. In this study, the average psychological status was reported to be 27.50. According to Ebrahimi et al.'s study, the clinical cut-off point for the GHQ-28 questionnaire in Iran was 24, so cancer and its complications overshadowed

the psychological status of the subjects in this study(16).

In different studies, different questionnaires such as mental component summary (MCS), Hospital anxiety and depression scale, PSQI, ESS, hospital anxiety and depression scale (HADS), Taiwanese depression questionnaire (THQ) and also clinical interview has been used for assessing the psychological status of HNC patients (5, 18-22).

In a study conducted by Nielson et al., the prevalence of depression was initially 15%, increased to 29% by 3 weeks after treatment, and decreased to 8% at the end of 18 months. The prevalence of anxiety was 20% at the beginning and reached 17% 3 weeks after treatment and 22% at the end of 18 months (19). In the Lopez-Jornet study, hyposalivation was significantly associated with depression (5). In the study of Pelland et al., 345 patients (25.6%) had moderate to severe anxiety and 120 patients (8.9%) had moderate to severe depression (20). In the study conducted by Lee et al., 13 patients (14%) had depression after 6 months, which had increased compared to the beginning of treatment (8.5%) (21). In the study of Wu et al., Pre-treatment anxiety rate was high which

decreased over time (from 27.3% to 6.4% and then 3.3%) and the rate of pre-treatment depression was 8.5% and then decreased to 24.5% and 14%, respectively, and hyposalivation was significantly associated with depression (22). In the study of Astrup GL et al., mental health status in HNC patients decreased and after 6 months, returned to the previous state (18). In the study of Nikoloudi et al., Depression and anxiety in HNC patients significantly increased after radiotherapy (23).

This significant increase between radiation-induced hyposalivation and depression was also observed in the present study. Comparison between that study and ours showed that cancer individually makes no significant effect on psychological, but the side effects of cancer and radiotherapy such as hyposalivation can result in depression and mental illness. In most studies, the rate of hyposalivation was closely related to the psychological status, however after a long period and partial return for saliva production ability, psychological status and its components have been improved after 1 year of radiotherapy and approached to primary state (5, 19, 21, 22).

In the present study, as age increased, psychological status and its components such as anxiety, insomnia, physical health problems and social functioning issues increased. These results were in contrast to Nielson et al.'s study, in which younger patients were more anxious (19).

In Malekian et al.'s study, depression rate was higher in 50-65 years old patients in comparison with other age groups (24). In the study of Rajabizadeh et al., the prevalence of depression was significantly associated with ages over 45 years (25).

It is very difficult to diagnose depressive mood indicators in the elderly; since the symptoms of depression in the elderly vary from those in adolescence. These differences can be originated from depressing experiences such as heartburn, painful illness, or cognitive impairment such as memory loss. Depression in the elderly is the second disability after physical causes. People who have had a history of depression during their lifetime show more depression in older ages (26).

In this study, the psychological status average among men and women was not statistically significant. Other components (depression, social functioning, anxiety/insomnia, and physical health) were not statistically significant despite being lower in men. In the study of Malekian et al., despite the higher prevalence of anxiety and depression in women, no statistically significant differences were observed between the two groups (24). In the study of Rajabizadeh et al., No significant relationship was observed between gender, severity and prevalence of depression (25).

Also in the study of Astrup GL et al., There was no significant difference between mental health and gender ( $P = 0.348$ ) (18). In the study conducted by Linden et al., the prevalence of anxiety in women was significantly higher ( $P < 0.001$ ) that can be explained by women's higher tendency to express emotions (27). The study by Pelland et al. did not agree with the results of our study in this regard (20).

Social anxiety is the clinically significant anxiety due to social or functional situations that often leads to avoidant behavior. Epidemiological reports have estimated that women more likely develop social anxiety disorders, like other anxiety disorders; but few studies equate this ratio. The reason for

this discrepancy may be the difference in diagnostic characteristics and examination indexes. In other words, this heterogeneity in the relationship between social anxiety and gender is always seen in the articles. Researchers have found that masculinity is negatively related to anxiety. Masculinity is negatively related to general levels of fear and panic such as fear of failure and criticism and fear of the unknown and medical fear; while there is a direct relationship between femininity and anxiety as well as sensitivity to anxiety symptoms. As a result, gender role is a mediator between femininity and sensitivity to anxiety symptoms (28).

Among the patients of this study, the highest scores of psychological status, physical condition, anxiety/insomnia and social functioning were in illiterate individuals, while the highest scores of depression were in those with diploma degree. In the study of Naseri et al, patients with higher education had higher rates of depression (29).

In the study of Rajabizadeh et al., a significant relationship was observed between the level of education and depression of oncology patients, so with increasing education, the severity of depression decreased ( $P < 0.001$ ) (25). There was a significant relationship between the rate of depression in women with breast cancer and the level of education ( $P = 0.001$ ) (28). In the study of WU et al., no significant relationship between anxiety and depression and education level and other demographic characteristics was found (22).

## Conclusion

To justify the results of this study, it can be stated that an increase in a person's level of education increases access to information resources and raises the level of knowledge

and awareness about cancer and ways to treat it, and despite positive results, this can also make an individual sad and depressed.

The limitation of the present study was difficulty in assessing patients due to their poor physical condition. In this study, only the mental status of HNC patients was evaluated. It is recommended to consider the psychological status of patients with various head and neck cancers treatment.

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