



Assessment of Trismus among Patients with Head and Neck Cancer

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ABSTRACT	
<p>CORRESPONDING AUTHOR: Ameer Talib Abd-Zaid, Faculty of Nursing, University of Kufa, Najaf, Iraq. Email: sujgsbyw@gmail.com</p>	<p>Background: Trismus means the inability to open the mouth more than 35 mm, it is also called restriction of the mouth opening, and negatively affects eating, drinking, and speech, as well as the difficulty of the mouth cleaning. In addition, the Trismus in patients with head and neck cancer may be caused by an increase in the size of the tumor that affects the chewing muscles or tissue fibrosis as a result of surgery or radiation.</p> <p>Objectives: The present study aims to determine the incidence of trismus among patients with head and neck cancer.</p> <p>Methodology: A descriptive, cross-sectional study design was conducted national teaching hospital of oncology in Al-Najaf Al-Ashraf City. Anon-probability (purpose sampling technique was used to select 91 patients with head and neck carcinoma. Descriptive statistics like frequency, mean, standard deviation, percentage and inferential statistics, were used to analyze the study data.</p> <p>Results: The study found the patient-related trismus suffering from mild to severe trismus (16.5 %, vs. 11.0 %).</p> <p>Conclusion: Our study results showed that the most of participant patients had been jaw movement problems that can have affected by location, duration, and treatment of cancer.</p>
<p>Keywords: Assessment, Jaw Movement, Trismus, Head and Neck Cancer.</p>	

INTRODUCTION

Head and neck cancer is one of the types of malignant cancers and it can be divided into a group of cancers according to the location of the tumor, which are as following: oral cavity, salivary glands, nasal cavity, paranasal sinuses, oropharynx, nasopharynx, larynx, and pharynx (1,2,3). Head and neck cancer (HNC) is considered the sixth most frequent cancer in the world. It is accounting for

890,000 new cases and 450,000 deaths in 2018. Its prevalence is expected to increase by 30% (1.08 million new cases yearly) by 2030. In addition, worldwide there are 600,000 of people are newly diagnosed with HNC yearly. HNC represent approximate 6% of all CA and 5% of mortality rate due to CA. Moreover, there are 500,000 newly diagnosed cases worldwide and more than 380,000

fatalities per year. About 50% and more of all HNCs are diagnosed at an advanced stage at primary diagnosis, (4, 5, and 6).

Globally, statistics indicate that the incidence of head and neck cancer is about 6% of all cancers and 5% of deaths due to cancer. The incidence of head and neck cancer increases with age. There are three factors that contribute to the occurrence of head and neck cancer, including environmental factors, lifestyle (tobacco and alcohol), and human papillomavirus. In addition, 80% of infections are caused by tobacco, and 60% to 70% of oropharyngeal cancers are caused by HPV infection (6, 7, and 8). Therefore, Langmore mentioned that there are several methods used to treat head and neck cancer, including chemotherapy, radiotherapy and surgery. As a result of the progress in treatment methods, it has contributed to a percentage of the disease's control, although it leads to persistent problems in jaw movement that may last for years, which suffers from about two thirds of patients with head and neck cancer (9).

Furthermore, Trismus means the inability to open the mouth more than 35 mm, it is also called restriction of the mouth opening, and negatively affects eating, drinking, and speech, as well as the difficulty of the mouth cleaning. In addition, the Trismus in patients with head and neck cancer may be caused by increase in the size of the tumor that affects the chewing muscles or tissue fibrosis as a result of surgery or radiation. there are Many methods that used to prevent or relieve trismus in patients with

head and neck cancer such as some types of programs that refers to use of a jaw stretching devices (e.g. TheraBite device, tongue depressor, and dynasplint), special exercises that improve the jaw movement, or both devices and exercises (10, 11, 12, and 13).

AIMS OF THE STUDY

The present study aimed to assess trismus in patients with head and neck cancer using Gothenburg trismus questionnaire. Therefore, the aim of this study was to determine the incidence of trismus among patients with head and neck cancer.

METHODOLOGY

Design of the Study:

A cross-sectional descriptive design was used in this study to explore degree of trismus among patients with head and neck cancer. This study starts from 1st December 2022, to 1st June 2023.

Sample and Sampling of the Study:

A non-probability purpose sampling technique was used to include 91 patient's diagnosis with head and neck cancer who attending to out patient's clinic of oncology in the national teaching hospital of Oncology in Al-Najaf Al-Ashraf City for follow-up, treating, or both.

Estimating of Sample Size:

The study employs the power analysis method to determine the sample size in the present study. Based on the G power analysis the researcher set up the value of the effect size = 0.43, power = 95 %, and $\alpha = 5$ %. Therefore, the study sample is equal to (54). After that, the researcher increases the sample size to (91) to achieve higher power (99 %), and reducing the possibility of error in the results at a confident interval 95 %.

Ethical Considerations:

Ethical approval was obtained from the Scientific and Research Committee at the faculty of Nursing where the researchers work, and from the

selected hospital ethical boards before data collection began. Participation was completely voluntary and patients were assured that their responses would be confidential. The anonymity of the participants was ensured throughout the study.

The Study Instrument:

The self-administered questionnaire was used which was adapted from the previous different studies to address both dependent and independent variables. The tools consisted consists of three parts, are Socio-Demographic Characteristics, Clinical Characteristics, Gothenburg Trismus Questionnaire (GTQ).

The GTQ scale is used to assessment jaw movement for patients with head and neck carcinoma, and consists of three domains as the following:

- First domain (Facial pain impact): it is consisting of two questions to assess the impact of facial pain on the patient's activities or employment.
- Second domain (Jaw limitation):it is consisting of one question that determine the limitation during mouth opening.
- Third domain (Jaw limitation impact): it is consisting of two questions to assess the impact of open mouth limitation on the patient's activities or employment.

The answer for each question within this scale according to the flowing rating and scoring: (very often =5, often=4, Neutral=3, rare=2, and very rare=1).

Validity:

The researcher selects 18 experts from a both nursing and medical specialties, where the average years of experience was (15.5) years. Those experts suggest some modifications on the demographic and clinical data sheet, and some of suggestions are taking into considerations.

Reliability:

Previous studies estimated that the reliability of the instrument (Gothenburg Trismus Questionnaire) by using Cronbach's alpha, where alpha is greater than 0.70, which support the internal consistency reliability. Additionally, a test and re-test of reliability were used on 17 patients and the relationship was found by using Intra-class Correlation Coefficients (ICC). Considering the value of ICC was from 0.4 to 0.75, which represents equivalent reliability to good, and the value greater than 0.75 is considered excellent reliability ⁽¹⁴⁾.

Methods and Measurement of Data Collection:

Data were collected using a self-administered questionnaire which contained a cover sheet that provided the participants with information about the study purpose, data collection procedure, and rights of the participants followed by a consent form that was to be signed if the participant agreed to participate in the study. The participants were instructed to submit the questionnaire in a provided sealed envelope and to put it in a designated box in the unit.

Statistical Analysis:

The descriptive and inferential statistics employ for data analysis using the Statistical Package of the Social Sciences (SPSS), version (IBM 22).

RESULTS

Table (1): Study Sample Demographic Data

Variables	Groups	Frequency	Percent
Age / Years	<= 19	2	2.2
	20 – 29	14	15.4
	30 – 39	12	13.2
	40 – 49	14	15.4
	50+	49	53.8
Gender	Male	49	53.8
	Female	42	46.2
Marital Status	Single	6	6.6
	Married	70	76.9
	Widowed	12	13.2
	Divorced	3	3.3
Levels of Education	illiterate	23	25.3
	Read and write	14	15.4
	Primary school	23	25.3
	Intermediate school	5	5.5
	Secondary school	12	13.2
	Institute	6	6.6
	College	8	8.8
	Economic Status	Sufficient	8
	Sufficient with some extent	20	22.0
	Insufficient	63	69.2

This table revealed that This table revealed Majority of the participants were male (53.8%) and (46.2%) were females, and most of them were age group (50) years old. About (76.9%) were married, a high percentage of them were illiterate (25.3%), and graduated from primary school (25.3 %); and their economic status is insufficient (69.2 %).

Table (2): Study Sample Clinical Data

Clinical Data	Groups	Frequency	Percent
Duration of Cancer / months	<= 12	47	51.6
	13 – 24	20	22.0
	25 – 36	2	2.2
	37 – 48	8	8.8
	49+	14	15.4
Type of Treatment	None	6	6.6
	Chemotherapy	52	57.1
	Radiotherapy	18	19.8
	Combined	15	16.5
Types of Radiotherapy	None	58	63.7
	IMRT	20	22.0
	3d	13	14.3

Number of Session / months	None	58	63.7
	1 – 3	5	5.5
	4 – 6	1	1.1
	10+	27	29.7
Type of Chemotherapy	None	24	26.4
	5-f-u	4	4.4
	Avastin	6	6.6
	Avastin/irinotecan	3	3.3
	Bendamustin	4	4.4
	Bendamustin/Mabthera	2	2.2
	Carboplatin	4	4.4
	Carboplatin/Paclitaxel	3	3.3
	Cisplatin	2	2.2
	Cisplatin/5-f-u	1	1.1
	Cisplatin/Paclitaxel	3	3.3
	Dacogen	3	3.3
	Gemzar	1	1.1
	Gemzqr/Calyx	1	1.1
	Gemzqr/Cisplatin	1	1.1
	Taxoter	3	3.3
	Taxoter/5-f-u	3	3.3
	Taxoter/Carboplatin	1	1.1
	Taxoter/Carboplatin/5-f-u	6	6.6
	Taxoter/Cisplatin/5-f-u	4	4.4
Vinblastin/Cytosar	2	2.2	
Vinblastin/Dacarbazin	10	11.0	
Number of Session / months	None	24	26.4
	1	31	34.1
	2	28	30.8
	4	8	8.8
Previous Surgery	Yes	47	51.6
	No	44	48.4

This table presents the clinical characteristics of the study sample. The study results indicate that the majority of the study subjects are diagnosed with cancer since one year and more (51.6 %); are treated with a chemotherapy (57.1 %); and they receive Intensity Modulated Radiation Therapy (IMRT), (22.0 %). Additionally, the number of treatment session is 10 and more in each month (29.7 %); the type of chemotherapy is vinblastine/dacarbazine (11.0 %); the number of chemotherapy sessions is one time each month (34.1 %); and (51.6 %) of the study sample are having previous surgeries.

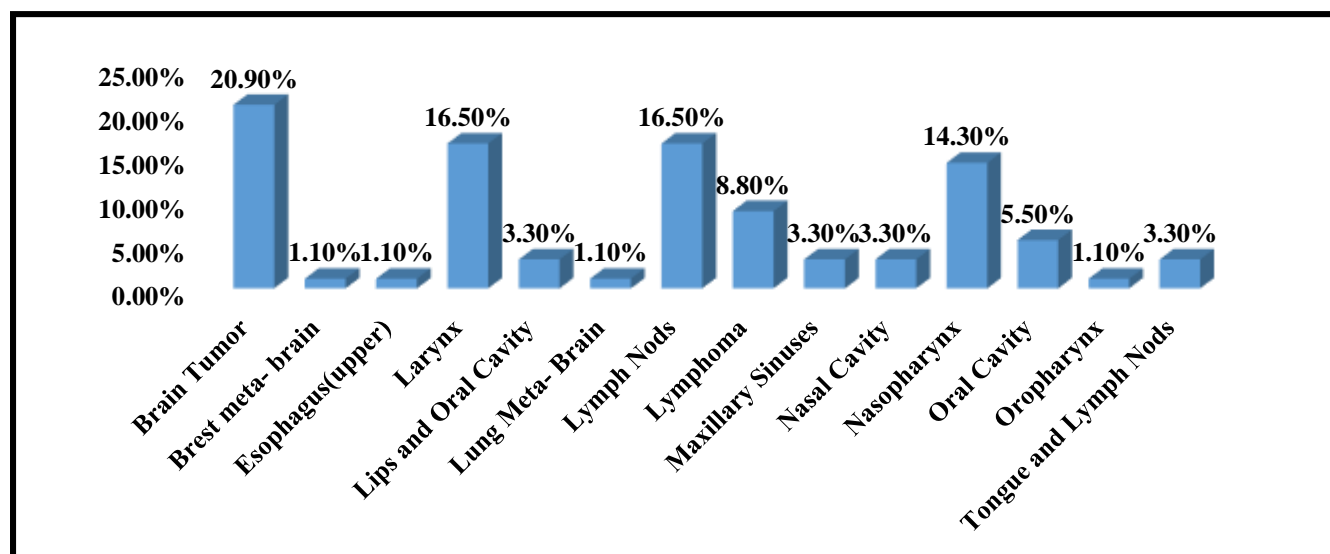


Figure (1): Study Sample Medical Diagnosis

Table (3): Assessment of Trismus among the Study Sample

Trismus Levels	Frequency	Percent	Overall Mean	Overall Assessment
Normal	52	57.1	3.9451	Mild trismus
Mild	15	16.5		
Moderate	14	15.4		
Sever	10	11.0		

This table show that (57.1%) of the study sample exhibit normal jaw movement, and (42.9 %) of the study sample are suffer from trismus ranging from mild trismus (16.5 %) to sever trismus (11.0 %).

Table (4): The Association between trismus among patients with head and neck cancer and the Demographic Characteristics

Demographic Data	Rating and Intervals	Trismus Levels				Chi-square value	d.f.	P-value
		Sever	Moderate	Mild	Normal			
Age / Years	<= 19	2	0	0	0	28.299	12	.005
	20 - 29	0	0	4	10			
	30 - 39	0	2	2	8			
	40 - 49	1	4	0	9			
	50+	7	8	9	25			
Gender	Male	6	9	7	27	1.155	3	.764
	Female	4	5	8	25			
Marital Status	Single	2	0	1	3	9.861	9	.362
	Married	6	13	9	42			
	Widowed	2	1	4	5			
	Divorced	0	0	1	2			
Levels of Education	Doesn't read and write	1	4	2	16	23.272	18	.180
	Read and write	0	0	3	11			
	Primary school	4	6	5	8			
	Intermediate school	0	0	1	4			
	Preparatory school	3	1	2	6			

	Institute	0	2	2	2			
	College	2	1	0	5			
Economic Status	Sufficient	3	0	1	4	18.649	6	.005
	Sufficient with some extent	4	1	0	15			
	Insufficient	3	13	14	33			

This table shows that there is a significant relationship between the trismus and the patient's age, and economic status at $p\text{-value} \leq 0.05$. While there is a non-significant relationship with the other demographic characteristics.

Table (5): Relationship between Trismus and the Patients' Clinical Data

Clinical Data	Rating and Intervals	Trismus Levels				Chi-square value	d.f.	p-value
		Sever	Moderate	Mild	Normal			
Medical Diagnosis	Brain Tumor	0	0	3	16	101.241	39	.001
	Brest Meta- Brain	0	1	0	0			
	Esophagus(Upper)	0	0	0	1			
	Larynx	0	4	3	8			
	Lips And Oral Cavity	2	0	0	1			
	Lung Meta- Brain	0	1	0	0			
	Lymph Nods	0	0	2	13			
	Lymphoma	0	0	2	6			
	Maxillary Sinuses	0	1	2	0			
	Nasal Cavity	0	0	0	3			
	Nasopharynx	2	4	3	4			
	Oral Cavity	3	2	0	0			
	Oropharynx	0	1	0	0			
Tongue And Lymph Nods	3	0	0	0				
Duration of Cancer / months	<= 12	1	4	9	33	21.822	12	.040
	13 - 24	5	4	3	8			
	25 - 36	0	0	0	2			
	37 - 48	0	3	1	4			
	49+	4	3	2	5			
Type of Treatment	None	0	1	1	4	19.575	9	.021
	Chemotherapy	4	6	14	28			
	Radiotherapy	2	2	0	14			
	Combined	4	5	0	6			
Types of Radiotherapy	None	4	7	15	32	34.057	6	.001
	IMRT	0	3	0	17			
	3d	6	4	0	3			
Number of Session / months	None	4	7	15	32	20.999	9	.013
	1 - 3	0	2	0	3			
	4 - 6	0	1	0	0			
	10+	6	4	0	17			
Type Of Chemotherapy	0	2	3	1	18	151.042	63	.001
	5-F-U	0	1	2	1			
	Avastin	0	0	1	5			

	Avastin/Irinotican	0	0	2	1			
	Bendamustin	0	0	0	4			
	Bendamustine/Mabthera	0	0	0	2			
	Carboplatin	0	2	2	0			
	Carboplatin/Paclitaxel	2	0	0	1			
	Cisplatin	2	0	0	0			
	Cisplatin/5-F-U	1	0	0	0			
	Cisplatin/Paclitaxel	3	0	0	0			
	Dacogen	0	3	0	0			
	Gemzar	0	0	1	0			
	Gemzqr/Calyx	0	1	0	0			
	Gemzqr/Cisplatin	0	1	0	0			
	Taxoter	0	0	0	3			
	Taxoter/5-F-U	0	0	3	0			
	Taxoter/Carboplatin	0	0	0	1			
	Taxoter/Carboplatin/5-F-U	0	3	0	3			
	Taxoter/Cisplatin/5-F-U	0	0	1	3			
	Vinblastin/Cytosar	0	0	0	2			
	Vinblastin/Dacarbazine	0	0	2	8			
Number of Session / months	None	2	3	1	18	19.211	9	.023
	1	5	8	3	15			
	2	3	3	10	12			
	4	0	0	1	7			
Previous Surgery	Yes	5	6	8	28	.562	3	.905
	No	5	8	7	24			

This table shows that there is a significant relationship between the trismus and the medical diagnosis, duration of cancer, type of treatment, type of radiotherapy, number of radiotherapy sessions, type of chemotherapy, and the number of chemotherapy sessions at p-value less than 0.05. While there is a non-significant relationship with the other clinical characteristics.

DISCUSSION:

Trismus is one of the complications that occur among patients with HNC (i.e. trismus means there is a difficulty to open mouth), and had a negative effect on the patient's quality of life (15). The results of the present study indicated that the study participants exhibit different levels of trismus ranging from mild, to severe trismus.

Wang, studied the "Effect of Oral Exercise on Trismus after Oral Cancer Radiotherapy" their results estimated that the occurrence of trismus among patients with HNC following treatment ranging from (31% to 87%), (16). Moreover, trismus among patients with HNC is caused by cancer itself directly interfere

with jaw movement, and/or radiation that produces fibrosis of the masticatory muscle (17).

Regarding the relationship between the trismus and the demographic and clinical data of patients with HNC. The study results indicated that there is a significant relationship between trismus and the age, economic status, medical diagnosis (site of cancer within head and neck region), duration of cancer, type of treatment, type of radiotherapy, number of radiotherapy sessions, type of chemotherapy, and number of chemotherapy sessions. Trismus is an undesirable condition that is produced due to cancer itself, and/or its treatment (18). These conditions may be affected by the patient's demographic and clinical data.

Van der Geer and others they studied the trismus in patients with head and neck cancer, their results indicated that there is a significant relationship between open mouth problem and patients' age, site of cancer, type of treatment, and previous surgery ⁽¹⁹⁾. Furthermore, some of previous studies mentioned that the economic status can effect on trismus incidence among patients with HNC; due to the economic factor effect on treatment of cancer, and rehabilitation of trismus ⁽²⁰⁾. Van der and others they studied the "Prognostic factors associated with a restricted mouth opening (trismus) in patients with head and neck cancer: Systematic review" their results indicated that there is a significant relationship among open mouth problem and duration of cancer (i.e. the incidence of trismus increased with advanced stage of cancer) ⁽¹¹⁾.

Additionally, Watters and others, estimated the incidence of trismus among patients with HNC and their study results indicated that there is a significant relationship between the trismus and tumor location, type of treatment, type of radiotherapy and number of doses ⁽²¹⁾. Moreover, Faravel, studied the "Trismus Occurrence and Link With Radiotherapy Doses in Head and Neck Cancer Patients Treated With Chemo-radiotherapy" mentioned that there is a relationship between the trismus incidence and type of treatment, type of chemotherapy, doses of chemotherapy "number of session", type of radiation, number of radiotherapy session ⁽²²⁾.

CONCLUSIONS:

The present study concluded that the Head and Neck Cancer (HNC) can cause jaw movement problems that can be effected by location and duration of cancer, and type of radiation.

RECOMMENDATIONS:

The present study recommended to use the study findings as a guide line to conducts further studies to find out possible methods in reducing the incidence of trismus among patients with HNC. Also,

it is recommended to designing a rehabilitation program in relieving trismus among those patients.

Limitations:

Because the study data are not normally distributed, the statistical analysis done through use of non-parametric statistics. Furthermore, non-cooperation of the patients made it not possible to measure trismus objectively in completely. In addition to the inability to take the study sample randomly.

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