

**How to Cite:**

Elkader, R. M. A., Morsy, N. S. E., El- Naby, A. G. A., & Mashhour, K. N. (2022). Impact of nursing instructions on selected outcomes among patients with head and neck cancer. *International Journal of Health Sciences*, 6(S3), 1798–1813.  
<https://doi.org/10.53730/ijhs.v6nS3.5806>

## **Impact of nursing instructions on selected outcomes among patients with head and neck cancer**

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**Abstract**---Treatment of head and neck cancer with radiotherapy becoming increasingly effective but may result in several undesired complications as oral mucositis, xerostomia, dysphagia, trismus, mucosal infections, and pain. These complications can lead to marked weight loss and nutrient deficiencies because of decreased oral intake rate. So, it is important to provide patients with nursing instructions through patient education and dietary modifications to prevent or decrease these complications. Was to evaluate the impact of nursing instructions on selected patients' outcomes (oral mucositis, oral pain, weight loss and the results of laboratory studies (hemoglobin and albumin) among patients with head and neck cancer receiving radiotherapy. Non-equivalent control group time series quasi-experimental design was used. The study was carried out at the oncology unit in kaser El -Aini Hospital. Cairo University. A convenient sample of 80 patients with head and neck cancer was recruited for this study from the selected oncology unit. Four tools were used to collect data: Demographic and Medical Background Information Form, National Cancer Institute Scoring for Mucositis (NCI-CTC V4), The Pain Numeric Rating Scale (NRS-11) and weight

scale. Results supported the stated research hypotheses. As regards total mean scores of oral mucositis and oral pain after implementing nursing instructions, there were statistically significant differences among both groups at three weeks ( $t = 3.7$   $P = 0.0001$ ), ( $t = 3.7$   $P = 0.0001$ ) respectively, and at six weeks ( $t = 3.3$   $P = 0.0001$ ), ( $t = 3.3$   $P = 0.0001$ ) respectively, while there was no statistically significant difference between the study and control groups before implementing nursing instructions. Concerning hemoglobin level, there were statistically significant difference among the study and control groups at six weeks ( $t = 1.9$   $P = 0.05$ ) after implementing nursing instructions. Conclusion: Providing of nursing instructions were of great value in reducing treatment-induced complications such as oral mucositis and pain, also improving hemoglobin level. Recommendations: Endorse the nursing instructions before starting radiotherapy sessions for those patients to ensure positive patients outcomes.

**Keywords**---head and neck cancer, radiotherapy induced oral mucositis, nursing instructions.

## Introduction

Head and neck cancer (HNC) is a group of malignances that arise from the mucosa of the upper aerodigestive tract which include the oral cavity, pharynx, nasopharynx, oropharynx, hypopharynx and larynx it, also includes the para nasal sinuses and the salivary glands (Parahoo, Semple, Killough & McCaughan, 2019). Kabzinski, Maczynska & Majsterek (2021) mentioned that HNC is the sixth most common cancer worldwide, with 890,000 new cases and 450,000 deaths in 2018, the incidence of HNC continues to rise and is anticipated to rise by 30% (1.08 million new cases annually) by 2030. Exposure to carcinogens, poor oral hygiene and infectious agents, individually and in combination may influence the risk of developing HNC. Surgery, chemotherapy, and radiotherapy are the main treatment modalities for head and neck cancer (Saeidzadeh et al., 2021).

Radiotherapy (RT) plays a pivotal role in the treatment of patients with HNC. However, RT can damage blood vessels that nourish muscles, nerves, and bones, which causes a variety of adverse effects such as oral mucositis, xerostomia, taste disturbances, oral candidiasis, radiation-related dental caries, and pain. Oral mucositis (OM) can progress to an acute life-threatening stage as a result of severe physical obstruction of food and water intake with subsequent weight loss and septic complication due to lost protective epithelial and basement membrane barriers. These lead to limitations of local tumor control due to cancer treatment interruption and alterations in radiation dose fractionation (Soutome et al., 2021).

Nursing instructions are healthcare intervention designated to address the various barriers that patients may encounter as they move through the healthcare system. Nursing instructions include adequate nursing assessment and providing nursing instructions about oral care, dietary modifications and pain management. It has been found that maintenance of oral hygiene is one of the most effective ways to lower the risk of OM and minimize its progression

(Maria, Eliopoulos & Muanza, 2017). Instructions about dietary modification as avoiding foods that irritate the mouth or throat and choose soft, eat small frequent meals, bland foods, focusing on non-acidic drinks, eating a soft diet with low sugar content foods and avoid hot food and drinks. Following these instructions can halt OM progression and enhance oral mucosal resistance, reduce the chance of infection and promote the repair of OM, consequently oral mucositis associated pain will be reduced (Liu et al., 2021). In addition, instructions about smoke and alcohol cessation limit any injury to the oral mucosa. Oncology nurses are at the forefront of preventing and managing radiotherapy-related complications. therefore, the purpose of the current study is to evaluate the impact of nursing instructions on selected patients' outcomes (oral mucositis, oral pain, weight loss and the results of laboratory studies (hemoglobin and albumin) among patients with head and neck cancer receiving radiotherapy.

### **Significance of the study**

Radiation-induced oral mucositis occurs in up to 80% of head and neck cancer irradiated patients and reaches up to 100% in patients with altered fractionation head and neck cancer (Nirban et al., 2021). Also, up to 80% of patients reporting pain during their RT treatment. As result of these adverse effect of RT, Up to 51% HNC of patients lose more than 5% of their body weight (BW) during a course of curative, weight loss could reach up to 88% by the end of RT(Lee, Wang & Chu, 2019). The cumulative effect of radiation and the extent of related morbidities on oral tissues are enormous and increase over time. The numerous radiation-related side effects have a strong, negative influence on the oral functions and are responsible for a drastic reduction in the oral-health-related quality of life of the cancer survivors. Mucositis and the associated pain are the most important factors that can lead to unplanned treatment interruptions and/or dose reductions of radiotherapy (Bossi et al., 2019).

Patients are usually most bothered by the early effects of RT. Mucositis and the associated pain are the most causative factors that can lead to marked swallowing function loss that may result in unintentional weight loss and nutrient deficiencies because of decreased oral intake (Bossi et al., 2019). The patient's knowledge of the radiation side effects can allow their early detection and proper management. Oncology nurses are considered as one of multidisciplinary team who play a significant role in reducing oral mucositis, oral pain and weight loss by using nursing instructions that may improve patient's outcomes. Consequently, the finding of this study may be contributing some useful knowledge and evidence-based data that can promote nursing practice and improve the quality of care provided to patients with head and neck cancer and generate motivation for further research in this field.

### **Aim of the study**

The aim of the study was to evaluate the impact of nursing instructions on selected patients' outcomes (oral mucositis, oral pain, weight loss and the results of laboratory studies (hemoglobin and albumin) among patients with head and neck cancer receiving radiotherapy.

## Research hypothesis

- H<sub>1</sub>: Patients who received nursing instructions would have significant lower mean severity scores of oral mucositis compared to those who received routine hospital care.
- H<sub>2</sub>: patients who received nursing instructions would have significant lower mean severity scores of oral pain compared to those who received routine hospital care.
- H<sub>3</sub>: patients who received nursing instructions would have significant lower mean scores of weight loss compared to those who received routine hospital care.
- H<sub>4</sub>: patients who received nursing instructions would have significant higher mean scores of hemoglobin level compared to those who received routine hospital care.
- H<sub>5</sub>: patients who received nursing instructions would have significant higher mean scores of albumin level compared to those who received routine hospital care.

## Materials and Methods

### Research design

Non-Equivalent control group time series quasi-experimental design was applied in the current research. This design is an empirical study used to estimate the causal impact of an intervention on its target population. Time series analysis is characterized by repeated measurements of the dependent variable (oral mucositis, oral pain, weight loss and the results of laboratory studies: Hemoglobin and albumin) over time with an introduction of independent variable (nursing instructions) at different points in time. Patterns of improvement are observed after introduction of independent variable (Handley, Lyles, McCulloch & Cattamanchi, 2018).

### Sample

A convenient nonprobability sample of 80 patients with head and neck cancer were chosen and divided into two groups, study group (I) received nursing instructions, and the control group (II) received the routine hospital care. According to the following criteria: (a) Inclusion criteria: Adult male and female conscious patients newly diagnosed with head and neck cancer and will undergo fractionated radiation therapy (external beam radiation therapy) received at least 30 sessions over 6 weeks. (b) Exclusion criteria: Patients who already have oral mucositis, had history of previous radiotherapy/chemotherapy, patients with chronic debilitated diseases as cardiac, renal etc. and patient with tongue or/and palate cancer. The study sample was calculated using a Power analysis of .95 ( $\beta = 1 - .95 = .5$ ) at alpha .05 (one-sided) with large effect size (0.5) was used as the significance level because this level has been suggested for use in the most areas of behavioural science research with confident level 95% (Ellis, 2010).

## Setting

This study was conducted at the Oncology Unit in El Kaser Al Ainy. It is a university governmental hospital in Cairo, Egypt, which located at basement floor. The place consists of simulator, linear acceleration (1, 2, 3), physics Lab, masking room, brachytherapy room, X-ray and waiting area.

## Data collection tools

Four tools were used to collect data as follows:

- Tool I: Demographic and Medical Background Information Form: It was developed by the researcher after reviewing related literature, and it was composed of two parts: (a): Demographic data as age, gender, marital status, level of education and occupation. (b) Medical data: It includes data related to patients' medical diagnosis and previous history of taking radiation therapy in addition to body weight and results of laboratory studies (hemoglobin and albumin).
- Tool II: National Cancer Institute Scoring for mucositis (NCI-CTC V4): It was adopted from American National Cancer Institute (2009): It includes five grades for assessing oral mucositis, ranged from (0-4), grade 0 indicate no oral mucositis, grade 1(mild) indicate mild symptoms, intervention not indicated, grade 2 (moderate) indicate moderate pain, not interfering with oral intake, modified diet indicated, grade 3 (severe) indicate severe pain, interfering with oral intake, grade 4 (life threatening) indicate life-threatening consequences, urgent intervention indicated. Reliability was done using Cronbach's alpha test which yielded 0.85.
- Tool III: The Pain Numeric Rating Scale (NRS-11): It was adopted from McCaffery & Beebe (1989). It is 10–point scale for patient self-reporting of pain. It is for adults as 0 indicates no pain, 1-3 mild pain, 4-6 moderate pain, 7-10 severe pain. Reliability was done using Cronbach's alpha test which yielded 0.84.
- Tool IV: Foot scale: Used to measure patient's weight, each three months the researcher checked the calibration of foot scale within specialized company in order to insure the validity of foot scale.

## Procedure

Once official permission from the Ethics and Research Committee of the Faculty of Nursing - Cairo University and hospital/oncology unit administrator was obtained to conduct the proposed study. The study was carried out through the following phases:

### Preparatory phase

The researcher prepared the study tools and nursing instructions after extensive review of literature. The researcher contacted with radiotherapy technicians weekly in accelerator room to take the list of patients who will start taking radiotherapy sessions, the study participants were interviewed individually at waiting room to explain the nature and purpose of the current study. Then the

researcher obtained written consent from the patients who are meet the inclusion criteria and willing to participate in the study. Eighty patients were recruited (40 for each group), the researcher started to collect data from the control group then the study group to avoid contamination. The study and control groups received the same hospital regimen regarding oral mucositis which was therapeutic oral gel or therapeutic oral rinsing.

During the initial interview and after the consent had been signed, the researcher completed filling in the Demographic and Medical Background Information Form (DMBIF), assessed the oral mucositis using National Cancer Institute Scoring for Mucositis (NCI-CTC V4) using adequate light and tongue depressor in order to examine oral mucosa and identify which grade that the participant complain, assessed the oral pain level using The pain Numeric Rating Scale (NRS-11) was filled by asking participants to describe the degree of pain and the researcher measured the weight using weight scale. The researcher informed the patients with expected follow up meetings; as well as answering any question and clarifying any information regarding it.

### **Implementation phase**

During this phase, the researcher provided nursing instructions for the study group and their relatives for two consecutive sessions. Each session lasted from 30 to 45 minutes. It was provided in the form of a tutorial that affords information whilst continually ensuring that the patient have comprehended the instructional content which was adapted to patients' needs, lifestyle, level of education and expectations. The first session concerning radiotherapy and its side effects (oral mucositis, pain, taste loss, trismus, dysphagia, candidiasis, nausea, radiation caries, and xerostomia), nursing instructions to the patients about preventive measures to avoid oral complications, preparation of mouth care solutions ( $\frac{1}{2}$  a teaspoon of baking soda and/or  $\frac{1}{4}$  or  $\frac{1}{2}$  a teaspoon of table salt) in 1 cup of warm water several times a day, demonstration of oral care procedures which included tooth brushing and dental flossing, at the end of each session the researcher allowed patients and their relatives to ask questions for more explanation.

At the beginning of the second session, the researcher reviewed the knowledge and practical parts of the previous session to ensure patient's understanding and implementing nursing instructions. Patients and their relatives were given the opportunity to ask questions which need to be answered or clarified. The second session included instructions about pain management, instructions about dietary modification as eating small frequent meals and snacks easier than three large meals. Foods should be high in protein and calories. Soft, bland, and moist foods are easier to swallow, these would include cream soups, cooked cereals, mashed potatoes, scrambled eggs, custards, yogurts, instant breakfast shakes, and high protein supplements. At the end the second session a booklet was given containing. All nursing instructions and supplemented by illustrated photos was provided to the study group and discussion was opened for any questions or concerns. The researcher was followed patients by the telephone twice /week for 6 weeks to reinforce implementation of nursing instructions. Data collection phase was conducted over a period of one year started from December 2020 to

December 2021 in the oncology unit. Finally control group was informed with the nursing instructions at the end of their assessment to maintain justice.

### Evaluation phase

Assessment of selected patients' outcomes was done for the control group as well as the study group after providing the nursing instructions through two times at 3 weeks and 6 weeks during radiotherapy sessions.

### Ethical consideration

A written initial approval was obtained from the Ethics and Research Committee of the Faculty of Nursing - Cairo University. Also, an official permission was obtained from hospital/units administrator to conduct the study. Each participant was informed about the purpose of the study and its significance. The subjects were also informed that the participation in the study was entirely voluntary, and anonymity and confidentiality were guaranteed through coding the data. As well participants were informed that they have the right to withdraw from the study at any point of time without any penalty. Moreover, the data were not reused in another research without their permission. A signed consent form was obtained from each participant before proceeding the study. Also, a written final approval was obtained from the Ethics and Research Committee of the Faculty of Nursing - Cairo University.

### Data analysis

The collected data were scored, tabulated and analyzed by personal computer using the statistical package for the social science (SPSS) program, version 20. Descriptive statistics (frequency distribution, percentage, means, and standard deviations) as well as inferential statistics (t-test and Chi square) were utilized to analyze data pertinent to the study. Level of significance was adopted at  $p \leq 0.05$ , while highly significant level was set at  $p \leq 0.001$ .

### Results

Table 1  
Frequency and Percentage distribution of demographic characteristics among the study and control groups patients (N=80)

variable	Study group (n= 40)		Control group (n= 40)		Test	P- value
	No	%	No	%		
Age						
20 <30	1	2.5 %	1	2.5 %	T= 0.12	0.9 NS
30<45	8	20%	7	17.5 %		
46<60	17	42.5 %	20	50 %		
≥ 60	14	35 %	12	30 %		
<u>Mean± SD</u>	51.5± 10.9		51.8± 10.6			

<b>Gender</b>						
Male	30	75%	27	67.5%	$X^2 = 0.54$	0.45 NS
Female	10	25%	13	32.5%		
<b>Marital status</b>						
Single	0	0%	1	2.5%	$X^2 = 1$	0.6 NS
Married	38	95%	37	92.5%		
Widow	2	5%	2	5%		
<b>Level of education</b>						
Can't read and write	33	82.5 %	32	80%	$X^2 = 4.9$	0.17 NS
Primary education	3	7.5 %	4	10 %		
Secondary education	3	7.5 %	0	0 %		
Bachelor	1	2.5 %	4	10%		
<b>Occupation</b>						
Employee	2	5 %	3	7.5%	$X^2 = 11.5$	0.06 NS
Hand craft	23	57.5 %	16	40%		
Housewife	3	7.5 %	5	12.5%		
Not working	0	0 %	1	2.5%		
Farmer	9	22.5 %	13	32.5%		
Retired	3	7.5%	2	5%		

NS = Not Significant.

\* Significant at  $p \leq 0.05$ \*\* Highly Significant at  $p \leq 0.01$ 

Table (1) presented that 42.5% of the study group and 50% of the control group their age ranged between 46 to 60 years, with the mean age of  $51.5 \pm 10.9$  and  $51.8 \pm 10.6$  years respectively. Concerning gender 75% of the study group and 67.5 % of the control group were male. In relation to the occupation 57.5% of the study group and 40% of the control group were hand craft. Regarding education 82.5% of the study group and 80 % of the control group were illiterate. There were no statistically significant differences among the two groups regarding all demographic characteristics.

### Medical background data

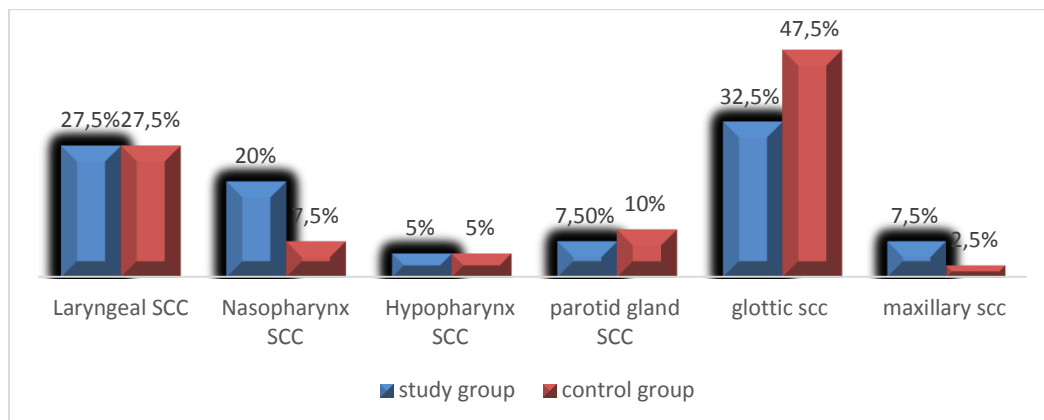


Figure 1. Percentage distribution of medical diagnosis among the study and control groups (N=80)

Figure (1) showed that 32.5% of the study group and 47.5% of the control group diagnosed with glottic squamous cell carcinoma (LSCC) followed by 27.5% of both groups diagnosed with laryngeal squamous cell carcinoma (SCC) In addition, there was no statistically significant difference between both groups as ( $X^2 = 4.5$ ,  $P = 0.47$ ).

Table 2  
Comparison between the study and control groups regarding total mean scores of oral mucositis and pain severity scores along the study period (N=80)

	Before nursing instructions		t-test	p	At 3 <sup>rd</sup> week of nursing instructions		t-test	P	At 6 <sup>th</sup> week of nursing instructions		t-test	p
	Study (n=40) Mean ± SD	control (n=40) Mean ± SD			Study (n=40) Mean ± SD	Control (n=40) Mean ± SD			study (n=40) Mean ± SD	Control (n=40) Mean ± SD		
Oral mucositis	0 ± 0	0 ± 0	0	1	0.63 ± 0.59	1.15 ± 0.66	3.7	0.0001**	1.48 ± 0.72	2.08 ± 0.86	3.3	0.001**
Pain	0 ± 0	0 ± 0	0	1	0.63 ± 0.59	1.15 ± 0.66	3.7	0.0001**	1.48 ± 0.72	2.05 ± 0.81	3.3	0.001**

NS = Not Significant.

\* Significant at  $p \leq 0.05$

\*\* Highly Significant at  $p \leq 0.01$

Table (2) illustrated that there were no statistically significant differences in oral mucositis as well as pain severity between the study and control groups before implementing nursing instructions ( $t = 0$   $P = 1$ ), ( $t = 0$   $P = 1$ ) respectively. After implementing nursing instructions there were highly statistically significant differences in oral mucositis as well as pain severity between the study and control groups ( $t = 3.7$   $P = 0.0001$ ), ( $t = 3.7$   $P = 0.0001$ ) respectively at the 3<sup>rd</sup> week. Also, there were highly statistically significant differences in oral mucositis as well as pain between the control and study groups at the 6<sup>th</sup> week ( $t = 3.3$   $P = 0.0001$ ), ( $t = 3.3$   $P = 0.0001$ ) respectively.

Table 3  
Comparison of body weight among the study and control groups along the study period (N=80)

Assessment	Body weight / Kg		
	Mean ± SD	t-test	(p-value)
Before nursing instructions			
Study group	77.31 ± 10.63	0.47	0.63 NS
Control group	76.21 ± 10.12		
At 3 <sup>rd</sup> week of nursing instructions			
Study group	75.29 ± 10.53	0.68	0.49 NS
Control group	73.7 ± 10.07		
At 6 <sup>th</sup> week of nursing instructions			
Study group	72.17 ± 10.41	1.2	0.2 NS

Control group

69.29 ± 9.87

NS = Not Significant.

\* Significant at  $p \leq 0.05$ \*\* Highly Significant at  $p \leq 0.01$ 

Table (3) illustrated that, there were no statistically significant differences in body weight between the study and control groups before implementing nursing instructions ( $t = 0.47$   $P = 0.63$ ), ( $t = 0.68$   $P = 0.49$ ), ( $t = 1.2$   $P = 0.2$ ) respectively.

Table 4

Comparison of hemoglobin (HB) and albumin (ALB) results among study and the control groups along the study period (N=80)

Assessment	HB			ALB		
	Mean ± SD	t-test	(p-value)	Mean ± SD	t-test	(p-value)
Before nursing instructions						
Study group	13.07 ± 1.62	0.5	0.61 NS	4.01 ± 0.31	0.85	0.39 NS
Control group	13.26 ± 1.69			4.06 ± 0.29		
At 3 <sup>rd</sup> week of nursing instructions						
Study group	12.82 ± 1.55	0.73	0.46 NS	3.98 ± 0.32	0.4	0.68 NS
Control group	12.55 ± 1.74			4.01 ± 0.29		
At 6 <sup>th</sup> week of nursing instructions						
Study group	12.1 ± 1.52	1.9	0.05 *	3.82 ± 0.31	1	0.28 NS
Control group	11.74 ± 1.82			3.75 ± 0.30		

NS = Not Significant.

\* Significant at  $p \leq 0.05$ \*\* Highly Significant at  $p \leq 0.01$ 

Table (4) showed that there were no statistically significant differences in hemoglobin (HB) value as well as albumin (ALB) value between the study and control groups before implementing nursing instructions ( $t = 0.5$   $P = 0.61$ ), ( $t = 0.85$   $P = 0.39$ ) respectively, also there was no statistically significant differences in HB value as well as ALB value between the study and control groups at the 3<sup>rd</sup> and the 6<sup>th</sup> week after implementing nursing instructions ( $t = 0.73$   $p = 0.46$ ), ( $t = 0.4$   $P = 0.68$ ) respectively. While there were statistically significant differences between the study and control groups regarding HB value ( $t = 1.9$   $P = 0.05$ ) at 6<sup>th</sup> week of implementing nursing instructions.

## Discussion

Radiotherapy, whether alone or combined with surgery and / or chemotherapy treatment has a vital role in the treatment of head and neck cancer. However, radiotherapy has many side effects; radiation induced oral mucositis and related oral pain remain the most common side effects of radiotherapy, which has negative impact on patient's life, as it leads to pain which causes functional difficulties in eating, drinking, swallowing. Therefore, the management of oral mucositis is crucial for patients' survival (Kusiak, Jereczek-Fossa, Cichońska & Alterio, 2020). The discussion of the study results is explained in the following three sections: Section I: Explanation of the study results pertinent to

demographic characteristics and medical related data. Section II: Explanation of the results regarding the research hypotheses.

### **Section I: Explanation of the demographic characteristics and medical related data**

Concerning the demographic characteristics, the current study results showed that, more than one third of the study group and almost half the control group, their age was ranging from 46 to 60 years with a mean age ( $51.5 \pm 10.9$ ) and ( $51.8 \pm 10.6$ ) years respectively. Relatively, the most of patients were males, married, cannot read or write and more than one third of control group and more than half of study group were hand craft. Moreover, the highest percentage of them were diagnosed as glottic squamous cell carcinoma. Additionally, there were no statistically significant differences between study and control groups in relation to demographic and medical variables; this means that the two groups were homogenous which clarified the homogeneity of the studied patients.

The findings of the present study were consistent with an Egyptian study done by Abdel Gawad et, al (2020) who carried a study entitled" Effect of designed nursing education on awareness of patients receiving head and neck radiation therapy" they reported that the highest percentages of their studied sample were male, married, illiterate and workers. In this respect, Duzova & Can (2021) who carried a study entitled" The effect of navigation program on the management of symptoms related to head and neck radiotherapy" the authors mentioned that the highest percentages of the sample were male with mean age was  $58.68 \pm 10.67$  years. On the same line, Emadzadeh et, al (2017) who reported that more than one third of study participants were laryngeal cancer.

### **Section II: The results regarding to the study hypotheses**

Concerning oral mucositis grade, before implementing nursing instructions the current study revealed that neither the study group nor the control group had oral mucositis. This finding may be due to the first sign of mucositis becomes visible at around the second week of the treatment and progress further toward the end of the treatment (Singh & Singh, 2020). This result was consistent with Duzova & Can (2021) who reported that there was no statistically significant difference regarding the levels of oral mucositis, at the first week of radiotherapy treatment. While there were highly statistically significant differences in oral mucositis between the study and control groups at the 3<sup>rd</sup> and the 6<sup>th</sup> week after implementation of nursing instructions. Based on the current research finding; the first hypothesis was supported. This could be interpreted in the light of the fact of the given nursing instructions provided information regarding oral care, dental flossing steps and the use of mouthwashes to reduce bacterial aggregation, as well as hydration and lubrication of the oral mucosal surface, preparation of mouth care solutions (  $\frac{1}{2}$  a teaspoon of baking soda and/or  $\frac{1}{4}$  or  $\frac{1}{2}$  a teaspoon of table salt in 1 cup of warm water) to rinse the mouth with several times per day to clean and lubricate the oral tissues and to buffer the oral environment and to sip water as needed to alleviate mouth dryness, also avoid mouthwashes that contain alcohol. Good oral hygiene has been found to be one of the most effective ways to lower the risk of OM and minimize its progression.

Moreover, nursing instructions included dietary modification as it is integral part in the management of oral mucositis. The researcher gave instructions for patient and their relatives about preparing food at home e.g., avoid foods that irritate the mouth or throat and choose soft, eat small frequent meals, bland foods, focusing on non-acidic drinks and eating a soft diet with low sugar content foods. also, the researcher informed the studied patients about lifestyle changes, such as avoiding alcohol and tobacco, which may be necessary to minimize oral complications. On the other hand, the control group didn't receive nursing instructions and there were no nurses in radiation unit to give routine hospital care. These findings were congruent with Duzova & Can (2021) they reported that there was a statistically significant change was determined at the 2nd, 3rd, 4th, 5th, 6th week. Also, Fang & Heckman (2016) who conducted study entitled "Informational and support needs of patients with head and neck cancer: current status and emerging issues" reported many patients desire additional information and support, particularly with respect to managing treatment-related side effects, maintaining one's health and healthy lifestyle behaviors during and after treatment.

Moreover. Morais et, al (2020) who conducted study entitled " A prospective study on oral adverse effects in head and neck cancer patients submitted to a preventive oral care protocol" who mentioned that the incidence and severity of oral symptoms associated with RT and chemotherapy (CT) can be reduced by effective preventive oral care measures. Also, Nirban et, la (2021) demonstrated that maintenance of good oral hygiene can reduce the severity of OM. Furthermore, oral decontamination can reduce infection of the oral cavity by opportunistic pathogens. The mucositis study group of the multinational association for supportive care in cancer and the international society of oral oncology guidelines recommended use of a standardized oral care protocol, including brushing with a soft toothbrush, flossing, and the use of nonmedicated rinses (for example, saline or sodium bicarbonate rinses). Patients and caregivers should be educated regarding the importance of effective oral hygiene.

Furthermore, Vesty et, la (2020) who conducted a study entitled " Oral microbial influences on oral mucositis during radiotherapy treatment of head and neck cancer" mentioned that there were associations between oral health and the pathogenesis of OM, highlighting the importance of oral health interventions for head and neck cancer patients, as poor oral health may leave patients more susceptible to developing OM. Another study conducted by (Liu et al.,2021) who conducted a study entitled "Status of treatment and prophylaxis for radiation-induced oral mucositis in patients with head and neck cancer" they mentioned that positive nutritional support will enhance oral mucosal resistance, reduce the chance of infection, and promote the repair of OM. Singh and Singh (2020) mentioned that the oral cavity is the most complex environment in the body. The course of mucositis might be influenced by the local environment change in saliva or microflora are significance in primary etiology of oral mucositis

In relation to oral pain the present study results revealed that almost all studied patients had pain with different degree along the study period, it was found that neither study group nor control group had oral pain before implementing nursing instructions. While there were highly statistically significant differences in oral pain between the study and control groups at the 3<sup>rd</sup> and the 6<sup>th</sup> week after

implementation of nursing instructions. Based on the current research finding; the second hypothesis was supported. This result may be due to oral pain is associated with oral mucositis which becomes visible at around the second week of the treatment (Singh & Singh, 2020). Decreased oral mucositis consequently decrease oral pain severity as result of previously mentioned nursing instructions.

These findings were congruent with Duzova & Can (2021) reported that that there was no difference between the levels of [oral pain](#), at the first week of all patients. While there was a statistically significant change was determined at the 2nd, 3rd, 4th, 5th, 6th week. Moreover, Kubota et, al (2015) who conducted a study entitled " Professional oral health care reduces oral mucositis pain in patients treated by super selective intra-arterial chemotherapy concurrent with radiotherapy for oral cancer" mentioned that professional oral health care may reduce opioid use and shorten the hospital stay. In addition, Huang et, al (2018). who conducted a study entitled "The effectiveness of a saline mouth rinse regimen and education program on radiation-induced oral mucositis and quality of life in oral cavity cancer patients: a randomized controlled trial who conducted a study entitled" revealed that using saline mouth rinses decreases pain, improves xerostomia and promotes oral comfort.

In relation to body weight, there was no statistically significant difference in body weight between the study and control groups before and after implementing nursing instructions. The current study finding reject the third hypothesis. This finding might be interpreted as weight loss in patients undergoing RT is a multifactorial process that involves tumor itself, and nutrition-related factors and radiotherapy-related acute toxicities, such as dysphagia, trismus, altered taste, dry mouth, pain, nausea, and vomiting. These symptoms can affect individuals' food intake and contribute to weight loss. These findings were consistent with Brown et, al (2017) who conducted study entitled " Randomized controlled trial of early prophylactic feeding vs standard care in patients with head and neck cancer" reported that there was no statistically significant difference in body weight between the study and control groups. In addition, Lopez-Vaquero, Gutierrez-Bayard, Rodriguez-Ruiz, Saldaña-Valderas & Infante-Cossio (2017) and Wei et, al (2020) reported that there was no statistically significant difference in body weight between the study and control groups. While this finding does not agree with Pathak, Soni, Sharma, Patni & Gupta (2019) reported that study group had less weight loss than control group.

Regarding hemoglobin (HB) value, the current study revealed that there were no statistically significant differences between the study and control groups in hemoglobin value b before and at the 3<sup>rd</sup> week after implementing nursing instructions, while at 6<sup>th</sup> week there was statistically significant difference between the study and control groups. Based on the current research finding; the fourth hypothesis was supported. These findings could be explained as the researcher gave the study group instructions related dietary modification and pain management which reflected on dietary intake and hemoglobin level that indicated improvement of patients' nutritional status. These findings were consistent with Duzova & Can (2021) who pointed out that hemoglobin measurements of the patients who received a nurse navigation program were significantly higher compared to the patients who did not receive a nurse

navigation program. While this finding does not agree with Wei et, al (2020). reported that there was no statistically significant difference between study and control group in hemoglobin value.

Concerning albumin value, the current study revealed that there were no statistically significant differences in albumin value before and after implementing nursing instructions. So, the current study finding reject the fifth hypothesis. This result might be referred as malnutrition develops in a short time, albumin is not a clinically relevant nutritional marker. While measurement of prealbumin is a good marker of visceral protein status and prealbumin is affected earlier by acute variations in protein balance. Therefore, prealbumin is a more sensitive marker than albumin or transferrin to assess the nutritional status (Unal, Orhan, Eroglu & Kaplan, 2013). On the contrary recent study conducted by Evans et, al (2021) where their study revealed that serum albumin and prealbumin do not serve as valid proxy measures of total body protein or total muscle mass and should not be used as nutrition markers. These findings were consistent with Wei et, al (2020) who reported that there was no statistically significant difference between the study and control groups in albumin value. While this finding does not agree with Duzova & Can (2021) reported that albumin measurements of the patients who received a nurse navigation program were significantly higher compared to the patients who did not receive a nurse navigation program.

### **Conclusion**

In light of the present study findings, the provision of nursing instructions for HNC patients undergoing radiotherapy may be of great value in improving patients' oral mucositis and oral pain severity, in addition preserving hemoglobin value.

### **Recommendations**

Replication of the study on a larger probability sample selected from different geographical areas in Egypt to obtain more generalized results and the nursing instructions should be carried out in integration with mobile applications.

### **References**

1. Abdel Gawad, D. A. H., Fareed, M. E. S., El-Bary, A., Mohammed, N., & Attallah, H. R. (2020). Effect of Designed Nursing Education on Awareness of Patients Receiving Head and Neck Radiation Therapy. *Menoufia Nursing Journal*, 5(1), 1-18.
2. AbdElwadoud, A. M., Hassanein, S. M., El-Deen, D. S., & Abdou, I. (2019). Using chamomile for alleviating oral mucositis among patients with head and neck cancer receiving radiotherapy. *Egyptian Nursing Journal*, 16(3), 186.
3. Bossi, P., Giusti, R., Tarsitano, A., Airolidi, M., De Sanctis, V., Caspiani, O., ... & Siano, M. (2019). The point of pain in head and neck cancer. *Critical Reviews in Oncology/Hematology*, 138, 51-59.
4. Brown, T. E., Banks, M. D., Hughes, B. G., Lin, C. Y., Kenny, L. M., & Bauer, J. D. (2017). Randomised controlled trial of early prophylactic feeding vs

- standard care in patients with head and neck cancer. *British journal of cancer*, 117(1), 15-24.
5. Deneuve, S., Charbotel, B., Massardier-Pilonchéry, A., Fort, E., Milliet-Baude, C., Pérol, O., ... & Fervers, B. (2019). Systematic screening for occupations and occupational exposures in head and neck squamous cell carcinoma patients. *European Archives of Oto-Rhino-Laryngology*, 276(3), 857-864.
  6. Duzova, U. S., & Can, G. (2021). The effect of navigation program on the management of symptoms related to head and neck radiotherapy. *Transplant immunology*, 69, 101488.
  7. Emadzadeh, M., Shahidsales, S., Bajgiran, A. M., Salehi, M., Massoudi, T., Nikfarjam, Z., & Salehi, M. (2017). Head and neck cancers in North-east Iran: A 25 year survey. *Iranian journal of otorhinolaryngology*, 29(92), 137.
  8. Ellis, Paul D. (2010). *The Essential Guide to Effect Sizes: An Introduction to Statistical Power, Meta-Analysis and the Interpretation of Research Results*. United Kingdom: Cambridge University Press.
  9. Evans, D. C., Corkins, M. R., Malone, A., Miller, S., Mogensen, K. M., Guenter, P., ... & ASPEN Malnutrition Committee. (2021). The use of visceral proteins as nutrition markers: an ASPEN position paper. *Nutrition in Clinical Practice*, 36(1), 22-28.
  10. Fang, C. Y., & Heckman, C. J. (2016). Informational and Support Needs of Patients with Head and Neck Cancer: Current Status and Emerging Issues. *Cancers of the head & neck*, 1, 15. <https://doi.org/10.1186/s41199-016-0017-6>.
  11. Handley, M. A., Lyles, C. R., McCulloch, C., & Cattamanchi, A. (2018). Selecting and Improving Quasi-Experimental Designs in Effectiveness and Implementation Research. *Annual review of public health*, 39, 5-25. <https://doi.org/10.1146/annurev-publhealth-040617-014128>
  12. Kabzinski, J., Maczynska, M., & Majsterek, I. (2021). MicroRNA as a Novel Biomarker in the Diagnosis of Head and Neck Cancer. *Biomolecules*, 11(6), 844. <https://doi.org/10.3390/biom11060844>.
  13. Kusiak, A., Jereczek-Fossa, B. A., Cichońska, D., & Alterio, D. (2020). Oncological-Therapy Related Oral Mucositis as an Interdisciplinary Problem-Literature Review. *International journal of environmental research and public health*, 17(7), 2464. <https://doi.org/10.3390/ijerph17072464>.
  14. Kubota, K., Kobayashi, W., Sakaki, H., Nakagawa, H., Kon, T., Mimura, M., ... & Kimura, H. (2015). Professional oral health care reduces oral mucositis pain in patients treated by superselective intra-arterial chemotherapy concurrent with radiotherapy for oral cancer. *Supportive Care in Cancer*, 23(11), 3323-3329.
  15. Lee, S. C., Wang, T. J., & Chu, P. Y. (2019). Predictors of weight loss during and after radiotherapy in patients with head and neck cancer: a longitudinal study. *European Journal of Oncology Nursing*, 39, 98-104.
  16. Liu, S., Zhao, Q., Zheng, Z., Liu, Z., Meng, L., Dong, L., & Jiang, X. (2021). Status of treatment and prophylaxis for radiation-induced oral mucositis in patients with head and neck cancer. *Frontiers in Oncology*, 11, 752.
  17. Lopez-Vaquero, D., Gutierrez-Bayard, L., Rodriguez-Ruiz, J. A., Saldaña-Valderas, M., & Infante-Cossio, P. (2017). Double-blind randomized study of oral glutamine on the management of radio/chemotherapy-induced mucositis and dermatitis in head and neck cancer. *Molecular and Clinical Oncology*, 6(6), 931-936.

18. Maria, O. M., Eliopoulos, N., & Muanza, T. (2017). Radiation-induced oral mucositis. *Frontiers in oncology*, 7, 89.
19. Morais, M. O., Martins, A. F. L., de Jesus, A. P. G., de Sousa Neto, S. S., da Costa, A. W. F., Pereira, C. H., ... & Mendonça, E. F. (2020). A prospective study on oral adverse effects in head and neck cancer patients submitted to a preventive oral care protocol. *Supportive Care in Cancer*, 28(9), 4263-4273.
20. Nirban, R. K., Kumar, R., Mahariya, S., Harsh, K., & Sharma, N. (2021). Prevalence of Radiotherapy Induced Oral Mucositis in Head and Neck Cancer Patients. *Journal of Advanced Medical and Dental Sciences Research*, 9(3), 116-119.
21. Pathak, S., Soni, T. P., Sharma, L. M., Patni, N., & Gupta, A. K. (2019). A randomized controlled trial to evaluate the role and efficacy of oral glutamine in the treatment of chemo-radiotherapy-induced oral mucositis and dysphagia in patients with oropharynx and larynx carcinoma. *Cureus*, 11(6).
22. Parahoo, R. S., Semple, C. J., Killough, S., & McCaughan, E. (2019). The experience among patients with multiple dental loss as a consequence of treatment for head and neck cancer: A qualitative study. *Journal of dentistry*, 82, 30-37.
23. Saeidzadeh, S., Gilbertson-White, S., Cherwin, C. H., Reisinger, H. S., Kendell, N., Pagedar, N. A., & Seaman, A. T. (2021). Post-treatment head and neck cancer survivors' approaches to self-management: A qualitative study. *European Journal of Oncology Nursing*, 52, 101944.
24. Singh, V., & Singh, A. K. (2020). Oral mucositis. *National journal of maxillofacial surgery*, 11(2), 159-168. [https://doi.org/10.4103/njms.NJMS\\_10\\_20](https://doi.org/10.4103/njms.NJMS_10_20)
25. Soutome, S., Yanamoto, S., Nishii, M., Kojima, Y., Hasegawa, T., Funahara, M., ... & Umeda, M. (2021). Risk factors for severe radiation-induced oral mucositis in patients with oral cancer. *Journal of Dental Sciences*, 16(4), 1241-1246.
26. Stanford-Moore, G., Bradshaw, P. T., Weissler, M. C., Zevallos, J. P., Brennan, P., Anantharaman, D., ... & Olshan, A. F. (2018). Interaction between known risk factors for head and neck cancer and socioeconomic status: the Carolina Head and Neck Cancer Study. *Cancer Causes & Control*, 29(9), 863-873.
27. Unal, D., Orhan, O., Eroglu, C., & Kaplan, B. (2013). Prealbumin is a more sensitive marker than albumin to assess the nutritional status in patients undergoing radiotherapy for head and neck cancer. *Contemporary Oncology*, 17(3), 276.
28. Wei, J., Wu, J., Meng, L., Zhu, B., Wang, H., Xin, Y., ... & Jiang, X. (2020). Effects of early nutritional intervention on oral mucositis in patients with radiotherapy for head and neck cancer. *QJM: An International Journal of Medicine*, 113(1), 37-42.
29. Vesty, A., Gear, K., Biswas, K., Mackenzie, B. W., Taylor, M. W., & Douglas, R. G. (2020). Oral microbial influences on oral mucositis during radiotherapy treatment of head and neck cancer. *Supportive Care in Cancer*, 28(6), 2683-26.