Original Article

Oral Health and Experiences of Oral Care in Radiotherapy Patients with Head and Neck Cancer in Sudan

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ABSTRACT

Background: In spite of careful planning and modern techniques, radiotherapy inevitably involves side-effects due to exposure of surrounding normal tissues. Patients treated for head and neck cancer who experience oral symptoms do not always consider these symptoms to be related to their disease or its treatment.

Objectives: To evaluate oral health status, experience of oral care and presence of complications in patients with head and neck malignancies receiving radiotherapy and assess the information received by these patients about oral effects of radiotherapy.

Materials and methods: Thirty nine adult male and female patients from Khartoum and Wadmedani Radiation and Isotope Centers were interviewed by questionnaires and their oral health status was examined clinically (three refused to participate and one discontinued). Comparison between variables by chi-square test and statistical significance difference was set at P-value < 0.05.

Results: Out of thirty five studied patients 63.6% maintained their oral hygiene as usual**.** Majority (88.6%) did not receive any information regarding oral complications of radiotherapy, and self-reported complaints expressed by (88.6%). Side effects experienced as 48.6% dry mouth, 45.7% pain, 46% alteration of taste and 25.7% reported inability to eat and drink. On examination 41.2% had ulceration and/or mucostitis, 26% xerostomia, 26.5% trismus, 17.6% candidasis and 11.8% angular chelitis. Association between xerostomia and patients with pharyngeal carcinoma is statistically significant (P = .003)

Conclusion: lack of information regarding oral complications of radiotherapy, dry mouth, pain and alteration of taste were common complaints.

Keywords: Head and neck cancers, oral hygiene, radiotherapy, Xerostomia, mucostitis.

Head and neck cancer represents a heterogeneous group of neoplasms affecting a number of sites in the aero-digestive tract, histologically primarily epithelial in type.

The majority of head and neck cancers need radiotherapy as a primary treatment, as an adjunct to surgery or in combination with chemotherapy. The radiation dose needed for the treatment of cancer is based on location and type of malignancy, and whether or not radiotherapy will be used solely or in combination with other modalities[1]. Radiotherapy for malignant tumors of the head and neck is associated with significant side effects involving the oral cavity[2]. Side-effects of radiotherapy are commonly classified as acute, consequential late or late effects, depending on the time of appearance of symptoms. Acute side effects develop during the early phases of radiotherapy and continue into the immediate post treatment period (2–3 weeks) [3]. Late side-effects, which develop months or years after treatment, are seen in tissues with a slower turnover of cells[4, 5]. Acute oral complications include oropharyngeal mucositis, sialadenitis and xerostomia, infections (primarily candidiasis), and taste dysfunction[6]. Nowadays intensity-modulated radiotherapy (IMRT) has been widely

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adopted as a means of decreasing toxic side effects, but limited clinical data exist on its potential effect on long-term quality of life[7]. A study compared patients treated with IMRT to conventional three-dimensional conformal radiotherapy (3D-CRT) showed better quality of life and lower oral side effects[8,9]. The Sudan is experiencing a growing cancer problem, but little is presently known on tumor patterns, cancer epidemiology and ethnic or environmental cancer risk factors[10]. The burden of cancer in Sudan is not known, due to the lack of regional and national cancer registries, but few hospital based studies showed that cancer is prevalent[11, 12]. In Khartoum State according to recent data; a result from cancer registry 2009 – 2010, the most commonly diagnosed cancer among women was breast followed by leukemia, cervix, and ovary, and among men it was prostate cancer followed by leukemia, lymphoma, oral, colorectal, and liver.[13].

Radiotherapy in Sudan started in 1967 with the establishment of the Radiation and Isotope Centre Khartoum (RICK). This was the only radiation facility in the whole country till 1999, when another centre has been started in Wadmedani (in Gezira state) affiliated to the University of Gezira[14]. Patients experience abnormal oral signs and symptoms as a side effect of the radiotherapy; do not always considered it to be related to their disease or its treatment, and may therefore not spontaneously report oral discomfort or even complaint. Dentists, oncologists and nurses working in radio-isotope centers, have a vital, proactive role to play in supportive care before, during and following surgery and radiotherapy for head and neck cancers[15]. In Sudan it seems that no information are given to those patients about the effects of radiotherapy on the oral cavity and no oral care is provided before, during and after radiotherapy, therefore oral complications arise and remain untreated. There is need to assess and evaluate oral health and oral care experience among patients with head and neck cancers.

The objectives of this study was to assess oral health status and experiences of oral care in radiotherapy patients with head and neck cancers, to assess the information received by these patients about the oral side effects of radiotherapy and to assess presence of oral complications.

MATERIALS AND METHODS:

Descriptive cross-sectional hospital based study among Sudanese head and neck cancer patients undergoing radiotherapy. Including; both genders, patients undergoing chemotherapy and those having other than head and neck cancer were excluded. Patients were involved from the only two hospitals serving the whole of the Sudan; (Radiation and Isotope Centre Khartoum (RICK) and University of Gezira Radiation and Isotope Centre, Wadmedani (RIUG). Thirty nine patients were found during the period of May to September 2007. Nineteen patients from RICK and sixteen from RIUG (three refused to participate and one discontinued), with a total number 35 participants.

Interview questionnaire was used for data collection including demographic data gender, age, and education level. Questions about past and present oral hygiene and care, oral complications suffered since the start of radiation and information received on oral side effects of radiotherapy were also included. The oral cavity of the patients was examined using a dental mirror at daylight; the presence of complication was checked and registered. SPSS version 15 was used to analyze the results; data was displayed in form of tables and figures. Comparison between nonparametric variables by chi-square test and statistical significance difference was set at P-value < 0.05. The study was approved by Ethical committee of the University of Medical Science and Technology. Permission was taken from the two centers and patients were requested to participate voluntary with written informed consents. Oral hygiene instructions were given to all patients and those who needed dental treatment either referred to a near dental hospital or if simple scaling needed it was performed as a bedside procedure under anaesthetic gel application.

RESULTS:

The result showed that males were more than females, 65.7% and 34.3% respectively. Age group of less than 18 years comprised (2) 5.7%, from 18 – 50year (16) 45.7% and more than 50 year (17) 48.6%. The distribution of the different types of cancer as shown in figure (1), the highest percentage (34.3 %) was represented by pharyngeal carcinomas. Regarding numbers of radiotherapy visits; most of the questioned patients (68.6%) completed more than three visits. Dental varies was found among more than half of the participants (55.9%). Concerning the ability of the patients to perform oral hygiene as usual, 63.6% said they could perform oral hygiene as usual and 36.4% could not. Frequency of brushing teeth by patients displayed in table (1), the valid percent is given, excluding one edentulous patient and one who did not answer. Regarding information received on oral complications of radiotherapy; it revealed that 31 (88.6%) of patients did not receive any information, only 4 (11.4%) received such information from their doctors or treating staffs (Table (2)).

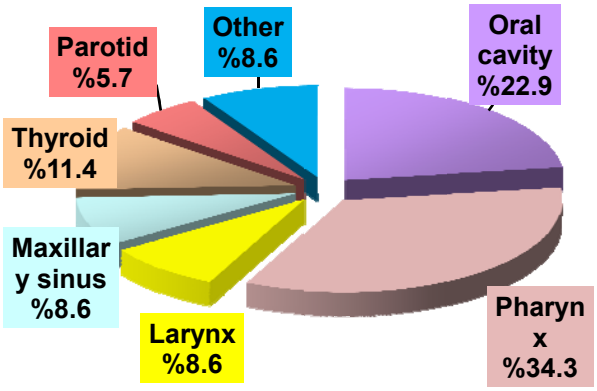

Figure (1): Types of head and neck cancer among patients receiving radiotherapy.

Table (1): Brushing habits performed by patients under radiotherapy treatment.

Brushing teeth	Frequency	Percentage	Valid percent
Never	1	2.9	3.0
Occasionally	2	5.7	6.1
Once per day	16	45.7	48.5
Twice per day	12	34.3	36.4
More than two/day	2	5.7	6.1
Total	33	94.3	100.0
Edentulous	1	2.9	
No response	1	2.9	
Total	35	100.0	

Table (2): Sources and information received by patients on oral complications of radiotherapy

Received information	Frequency	Percentage %
No	31	88.6 %
Yes	4	11.4 %
From doctor	2	5.7%
From staff	1	2.9%
Doctor and staff	1	2.9%
Total	35	100 %

Regarding the self-reported complaints of the patients which arise after starting radiotherapy the results as displayed in figure (2) with almost half of the participants complained of pain, dry mouth and alteration of taste. On examination 55.9% had caries, 38.2% gingival inflammation, 32.4% ulceration, 14.7% mucositis, 26.5% trismus

and 26.5% xerostomia.

There is a statistically significant relationship between the presence of xerostomia and pharyngeal cancer (P = .0034) (Table (3)).

The relationship between the presence of mucositis and/or ulceration on examination and pain experienced by the patients was statistically significant (P = 0.017) (Table(4)).

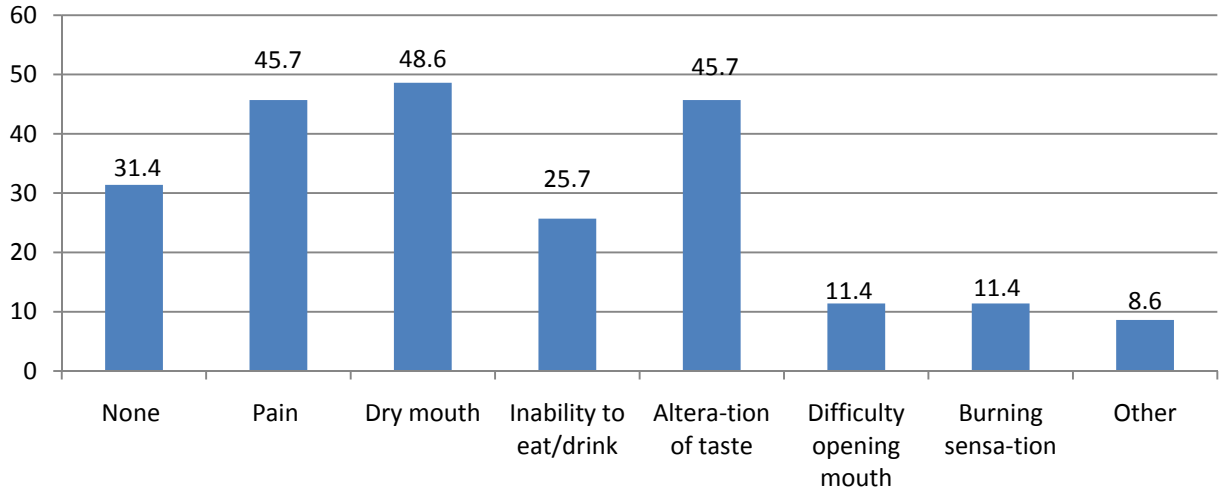

Figure (2): Oral complaints experienced by the patients.

Table (3): The relation between xerostomia and type of head and neck cancer among the studied patients.

Type of cancer	Xerostomia No. & %	No Xerostomia N0. & %	Total No. & %
Pharyngeal	7 (77.8%)	4 (16.0%)	11 (32.4%)
Oral cavity	0 (0%)	8 (32.0%)	8 (23.5%)
Parotid	1 (11.1%)	1 (4%)	2 (5.9%)
Other	1 (11.1)	12 (48.0%)	13 (38.2%)
Total	9 (100%)	25 (100%)	34 (100%)

P = 0.0034

DISCUSSION:

In Sudan there were no previous studies concerning oral health and experiences of oral care of head and neck cancer patients undergoing radiotherapy. This study was undertaken to provide such information and draw attention to this subject.

The total sample size was 35 patients. This small sample size is similar to that found in the literatures[16,17,18]. Pow *et al*., 2002; studied only 13 nasopharyngeal carcinoma radiotherapy treated patients[19]. This reflects in general small sample size from different populations. Similar to two of the above studies males were more than females[16,18], this may be justified by the information gathered from the cancer registry report of 2009 – 2010 (Khartoum State); that among the top five cancers affecting men; oral cancer was third, while among women, it is not counted among the top five[13].The reason for the high number of men patients having oral cancer when compared to women may be due to the high prevalence of Toombak use among Sudanese adult males.

Radiotherapy patients with head and neck cancers visit dentists only upon complaint. Routine checkup or examination prior to radiotherapy treatment is lacked; unfortunately this contradicts the recommended routine and regular oral and dental checkup for those patients before, during and after treatment[16]. This shows a very big difference between Sudan and the developed countries. Also it highlights the

importance of pretreatment protocols for dental and oral health care as necessary measures for patients undergoing radiotherapy for head and neck cancers.

In this study oral hygiene habits and brushing frequency when compared to Ohrn *et al* results[16], are less; reflecting a poor participation of dentists in treating patients undergoing radiotherapy for head and neck cancers although it is well known that oral complications will follow such a treatment. Majority of the patients did not receive any information about complications caused by radiotherapy and did not receive any information on oral hygiene, this is in contrast to Ohrn's results[16]. They also experienced severe side effects due to the mode of treatment as compared to IMRT[7,8].

Table (4): The relationship between the presence of mucositis/ulceration on examination and pain experienced by the studied patients.

		Mucositis/Ulceration					
		Yes		No		Total	
		Frequency	Valid percent	Frequency	Valid percent	Frequency	Valid percent
Pain	Yes	10	71.4	6	30.0	16	47.1
	No	4	28.6	14	70.0	18	52.9
	Total	14	100.0	20	100.0	34	100.0

P =0.017

The majority of patients agreed about the importance of maintaining good oral hygiene and they believed that poor oral hygiene can increase complications after treatment. This should encourage oncologists and dentists to have a role in maintaining good oral hygiene for those patients thereby reducing unwanted side effects. The results related to self-reported signs and symptoms showed that 31.4% did not experience any complaints, while Ohrn *et al*., reported that all his 18 patients had complaints[16,18]. However in Ohrn's sample patients were asked to fill in a form on a daily basis. Dry mouth was experienced by 50% of the participants, compared to 91.8% of Epsteins results[20]. The difference is clear when compared with Epsteins results regarding alteration in taste but similar results were obtained regarding pain experience and difficulty in eating. Differences between our results and Epstein's results; may be due to the fact that Epstein's data were collected more than six months following completion of radiotherapy and all Epstein's patients had nasopharyngeal carcinoma. Dental caries was seen in 55.9% of patients; this was not due to radiation as radiation caries (RC) is atypical, rampant and affects the entire tooth surfaces. However it puts the patients at risk of developing radiation caries in the future if not properly treated. In the study by Pow *et al*[19] all patients had xerostomia which is much more than in the present study where only 38.2% have xerostomia. The relation between xerostomia and types of cancer was investigated. It was statistically highly significant (P=0.0034), especially with the pharyngeal cancers. This was also demonstrated by the results from others studies like Pow *et al*[18] where all their patients had nasopharyngeal cancer and developed xerostomia. A significant relation between the number of radiation visits and the complications revealed by oral examination could be established (P=0.03). This is expected as complications get worse with the increase in the number of radiotherapy visits. Ohrn's studies demonstrated the same[17, 18]. In the present study we could not find a significant difference between the self-reported complaints and examined complications (P=0.08). Bjordal *et al*., 1994; mentioned that they found more self-reported complaints than at the clinician's assessment[21].

Patients with head and neck cancer are at high risk for nutritional problems. The malignancy itself, poor nutrition before diagnosis, and the complications of surgery, radiation, and chemotherapy all contribute to malnutrition.

In head and neck cancer patients, loss of appetite can also occur secondary to mucositis, xerostomia, taste loss, dysphagia, nausea, and vomiting. Quality of life is compromised as eating becomes more problematic. Severe pain due to mucostitis may lead to selection of foods that do not irritate the oral tissues, often at the expense of adequate nutrition, with consequent loss of weight and compromised immunity. Nutritional deficiencies can be minimized by modifying the texture and consistency of the diet and by adding more frequent meals and snacks to increase calories and protein. Ongoing nutritional assessment and counseling with a registered dietitian should be part of the patient's treatment plan[22,23,24].

CONCLUSION:

The majority of the patients maintained their oral hygiene as usual, but they did not receive information regarding side effects of radiotherapy. Majority suffered from side effects and complications of the radiotherapy treatment. Almost half of the patients complained of pain, dry mouth and alteration of taste. The association between the presence of xerostomia and patients with pharyngeal carcinoma is statistically significant (P = .0034). Majority of patients with mucostitis/ulceration experience associated symptoms of pain. . There is a need for interdisciplinary cooperation between oncologists, dentists and nursing staff and the development and adoption of specific protocols as a routine in cancer patients' treatment.

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