

## Oral Health Related Quality of Life in Patients of Head and Neck Cancer Attending Cancer Hospital of Bhopal City, India

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### Abstract:

**Background:** To assess the oral health related quality of life (OHRQoL) of head and neck cancer patients and to find association between QoL, demographic and disease variables.

**Methods:** This cross-sectional study was conducted on 153 patients diagnosed and being treated for head and neck cancer in Jawaharlal Nehru Cancer Hospital, India. Data collected from the survey included demographic details and OHRQoL, which was measured by European Organization of Research for Treatment of Cancer QoL questionnaire head & neck-35. Cancer measurements (location of tumor, stages of cancer, treatment type) were collected from the patient's hospital records.

**Results:** The majority of the population 84 (54.9%) belonged to 41-60 years age group and most of them were male (78.4%). The most frequent site of the primary tumor was the oral cavity (71.3%) and the majority of patients had Stage II and III cancer. Main factors affecting QoL were loss of weight, use of painkillers, sticky saliva, reduced mouth opening and problems in social eating. Significant association found between pain ( $P = 0.044$ ), swallowing ( $P = 0.018$ ), sense ( $P = 0.001$ ), Social eating ( $P = 0.003$ ), social contact ( $P = 0.008$ ), reduced mouth opening ( $P = 0.008$ ) with respect to type of treatment.

**Conclusions:** We conclude that there was a significant reduction in the QoL in cancer patients resulting from myriad forms of cancers. An assessment of the QoL and symptoms can help the dentist to direct attention to most important symptoms and provide counseling for appropriate interventions towards improving QoL outcomes and the response to the treatment.

**Key Words:** European Organization of Research for Treatment of Cancer-Head and Neck-35, head and neck cancer, quality of life

### Introduction

The term head and neck cancer (HNC) consists of group of tumors that arise from the lip, oral cavity, tongue, tonsil, oropharynx, hypopharynx, nasopharynx, nose and para nasal sinus, larynx, parotids and the thyroid.<sup>1</sup> In India, HNC accounts for approximately 30% of all the cancers and its important disease in term of incidence and mortality in the region.<sup>2</sup> Patients with HNC have multiple, unique, and challenging symptoms due to their disease and treatment side effects such as xerostomia, taste disturbances, dietary restrictions, dysphagia and pain, fatigue, distortion of physical appearance, permanent disfigurement and infirmity which has an impact on the patient's quality of life (QoL), thus, the concept of QoL is extremely important for these patients.<sup>3-5</sup> QoL is a multidimensional concept which looks at the way which patients feel about themselves in the context of a medical condition. Aspects such as physical status, emotional status, social factors and the way that patients consider that they are able to function in all aspects of their lives outside medical care are usually assessed. The evaluation of health-related QoL (HR-QoL) has become increasingly essential for health care, especially in the field of chronic diseases. For patients with HNC, where key functions are affected by both the disease and its therapy, the potential for an adverse effect on QoL is conceivably greater than that for other cancers.<sup>6</sup> No study have been conducted on HNC patients regarding their oral health related QoL (OHRQoL) in central India. Determining how to measure and quantify the subjective experience of OHR-QoL has been a challenging issue. So, questionnaire based study was conducted to assess OHRQoL in HNC patients attending the cancer care centre in Bhopal, central India.

### Methods

The study was conducted among the HNC patients in Jawaharlal Nehru Cancer Hospital of Bhopal city, India. The study was a descriptive cross-sectional questionnaire based study. Study protocol was discussed and ethical approval was taken from the ethical committee of the People's University and the respective authorities of Jawaharlal Nehru Cancer Hospital, Bhopal where study was conducted. All the patients of HNC diagnosed and receiving treatment in the hospital over a period of 6 months comprised the sample for the study. The study was conducted among 153 HNC patients between the periods of March 2014 and August 2014. Written consent was also obtained from the participants.

Subjects were selected by purposive sampling technique.

### Inclusion criteria

Patients with age of 18 years and above, both sexes, diagnosed with HNCs, receiving treatment and willing to participate were recruited in the study.

Data collection was obtained from questionnaire consisting of two parts. The first part consisted of demographic characteristics including age, gender, marital status, diet, socio-economic status and cancer information including, type of tobacco, duration of tobacco chewing, site of cancer, stage of cancer, duration of treatment, type of treatment, duration of treatment and category of treatment. The second part was the European Organization of Research and Treatment of Cancer QoL Head and Neck-35 (EORTC QLQ-H&N-35) questionnaire which assessed the QoL. In order to complete the questionnaire, personal information was completed by the patient and disease characteristics, including location, type and tumor staging was extracted from patient's hospital records.

### Scoring criteria

The time frame of the module (EORTC QLQ-H&N-35) is "during the past week," and the format is similar to that of the core questionnaire. The tool consisted of 35 items with the domains including: Pain, swallowing, sense, speech, social eating, social contact, sexuality and other single item (e.g., difficulty in opening mouth, sticky saliva, dry mouth, etc.) specific to HNC. Items HN1 to HN30 are scored on four-point Likert-type categorical scales ("not at all-1," "a little-2," "quite a bit-3," "very much-4"). Items HN31 to HN35 have a "no/yes" or (1 or 2) or response format. The scores are transformed into 0-to-100 scales.

All of the scales and single-item measures range in score from 0 to 100 with linear transformation by, symptom scale/items:  $S = RS-1/range*100$ .

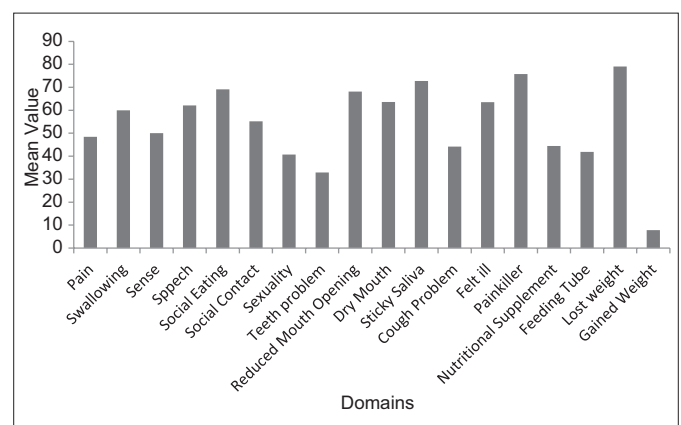
A high score for a symptom scale/item scale score represents a higher response level or symptomatology/problems.

The QLQ-H&N35, the HNC-specific HR-QoL questionnaire contains 35 questions of which 24 are component items of 7 domains (pain, swallowing, senses, speech, social eating, social contact, sexuality), and 11 are single items for example, taking pain killers, and tooth problems. In cases where the patient was low-literate or illiterate questions were read for the patient by the researcher who tried to read all questions in an identical manner in order to prevent any prejudice or from guiding the patient to give a specific answer. After collecting the data, they were entered into the computer manually and analysis was done by using SPSS software version 17 analyzed by Chi-square and ANOVA. ANOVA was used to assess the association between the QoL domains and location of tumor, cancer stage, therapy method, surgical method and radiotherapy dose. The  $P \leq 0.05$  is considered significant whereas  $P \leq 0.001$  highly significant.

The questionnaire was translated into local language (Hindi). Reliability of the tool was established by administering the QoL questionnaire to 20 patients with HNC and calculated Cronbach's alpha (reliability coefficient 0.92).

### Results

The study population consisted of 153 patients diagnosed with HNC and receiving treatment. Patients' characteristics for the whole study group are shown in Tables 1 and 2. Among the cancer patient's males comprised the majority of the study population i.e., 120 (78.4%). 84 (54.9%) belonged to 41 and 60 years age group. Most of them were married (148, 96.7%), the majority of subjects belonged to upper lower class 55 (35.9%) (Table 1). 95 (62.1%) HNC patients had smokeless tobacco and majority of duration of tobacco chewing 69 (45.1%) were more than 15 years. For ease of analysis we divided site of cancer into four categories. Buccal mucosa, tongue, alveolus, maxilla, mandible, gingivo buccal sulcus and pyriform fossa were clubbed into a single category i.e., oral cavity. The remaining three categories were oropharynx, hypopharynx and larynx respectively. majority of cancers originated in oral cavity i.e., 118 (77.12%). At the time of study 83 (54.2%) population presented with Stage II cancer and majority of the patients 88 (57.6%) were diagnosed within 6 months. The most administered form of treatment was radiation + surgery therapy 39 (25.5%) followed by radiation therapy 38 (24.8%). The QLQ-H&N35 specific questionnaire, Graph 1 shows the mean value of all the domains and single items. High mean score shows worst symptoms response. So, according to mean value the main factors affecting QoL were lost weight (79.08), taking painkiller (75.82), sticky saliva (72.75), reduced mouth opening (68.17) and difficulty in social eating (69.10). The scales and single items of QoL questionnaire were compared according to sites of tumor, stage of cancer, type of treatment method. Table 3 shows patients with small tumors (Stage I+II) scored better than those with large tumors (Stage III+IV). Patients with large tumor (Stage III+IV) had worst value for swallowing ( $P = 0.00$ ), speech ( $P = 0.00$ ), social eating ( $P = 0.00$ ), social contact ( $P = 0.001$ ), reduced mouth opening ( $P = 0.00$ ), dry



**Graph 1:** Percentage distribution of domains and single items according to mean value.

**Table 1: Percentage distribution according to socio-economic and demographic characteristics.**

Variable	N (%)
Gender	
Male	120 (78.4)
Female	33 (21.6)
Age range	
20-40	45 (29.4)
41-60	84 (54.9)
61-80	24 (15.7)
Marital status	
Married	148 (96.7)
Unmarried	5 (3.3)
Education	
Illiterate	26 (17)
Primary school	15 (9.8)
Middle school	55 (35.9)
High school	17 (11.1)
Intermediate	22 (14.4)
Graduate	18 (11.8)
Professional	0 (0)
Occupation	
Unemployed	41 (26.8)
Unskilled	20 (13.1)
Semi-skilled	21 (13.7)
Skilled	38 (24.8)
Clerical, shop owner	24 (15.7)
Semiprofessional	9 (5.9)
Professional	0 (0)
Income	
<1802	41 (26.8)
1803-5386	33 (21.6)
5387-8988	40 (26.6)
8989-13,494	35 (22.9)
13,494-17,999	4 (2.6)
17,999-18,000	0 (0)
More than 36,017	0 (0)
Socio-economic status	
Lower	38 (24.8)
Upper lower	55 (35.9)
Lower middle	49 (32)
Upper middle	11 (7.2)
Upper	0 (0)
Total	153 (100)

mouth ( $P = 0.001$ ), cough problem ( $P = 0.00$ ) feeling of being ill ( $P = 0.00$ ) and use of feeding tube ( $P = 0.050$ ).

Table 4 shows, statistically significant differences for reduced mouth opening in patients with oropharynx cancer ( $P = 0.00$ ).

In Table 5, when the QoL scores were compared with the type of treatment, statistically significant difference was found for pain, swallowing, sense, social eating, social contact and reduced mouth opening. The patients who were treated with radiotherapy had better symptoms for social contact, sexuality, teeth problem, cough, use of feeding tube and weight gained.

## Discussion

HNCs are one of the major problem worldwide. It is a substantial problem evolving in a country like India. Acknowledging the

**Table 2: Percentage distribution according to disease variables.**

Diseases variable	N (%)
Type of tobacco	
Smoking	32 (20.9)
Smokeless	95 (62.1)
Combined	16 (10.5)
No habits	10 (6.5)
Duration of tobacco chewing	
1-5 years	10 (6.5)
6-10 years	29 (19)
11-15 years	35 (22.9)
More than 15 years	69 (45.1)
Site of cancer	
Buccal mucosa	53 (34.0)
Tongue	43 (28.1)
Alveolus	9 (5.9)
Maxilla	4 (2.6)
Mandible	1 (0.7)
Gingivo buccal sulcus	7 (4.6)
Pyrifossa	1 (0.7)
Oropharynx	2 (1.3)
Hypopharynx	7 (4.6)
Larynx	26 (17)
Other (nasopharynx, thyroid)	0 (0)
Stages of cancer	
Stage I	6 (3.9)
Stage II	83 (54.2)
Stage III	52 (34)
Stage IV	12 (12)
Duration of illness	
1-6 months	88 (57.5)
7-12 months	41 (26.8)
Above 12 months	24 (15.7)
Type of treatment	
No treatment	2 (1.3)
Surgery alone	28 (18.3)
Radiation alone	38 (24.8)
Chemotherapy+radiation	25 (16.3)
Surgery+radiation	38 (24.8)
Surgery+chemotherapy+radiation	22 (14.4)
Total	153 (100)

relatively miscellaneous nature of HNC patients and treatments experienced, the findings of OHR-QoL outcome for oral cancer patients following treatment appear to be somewhat discordant and also complicated in the literature. The head and neck region include numerous delicate dainty structures necessary for basic physiologic function. On the basis of tumor size, location and type of treatment, HNC can affect varying degree of structural antonyms, and functional hindrance comprising of well being, self esteem, and social interactions. The treatment of HNC instigate the other problems by worsening the QoL of individuals which could, in the future, help in clinical judgment and the definition of the treatment approaches. In this context, the interest for the QoL of these patients is directly associated with the day-to-day care practices in health centers.<sup>7</sup> Hence, QoL is a important end point to assessing the treatment result.

We found that the male female ratio among the patients was 4:1. This correlates with the findings of the studies done

Table 3: Comparison of QoL points according to stage of cancer.

EORTC-H&N35	Mean				P value
	Stage I (N=6)	Stage II (N=83)	Stage III (N=52)	Stage IV (N=12)	
Pain	33.33	45.35	55.27	51.83	0.215
Swallowing	43.00	51.41	68.94	88.83	0.000**
Sense	38.67	46.83	53.06	65.08	0.296
Speech	22.17	54.39	72.94	89.00	0.000**
Social eating	40.33	61.71	79.02	91.58	0.000**
Social contact	39.00	47.86	62.81	82.08	0.001**
Sexuality	47.33	41.95	41.33	26.42	0.488
Teeth	16.50	34.13	34.58	25.00	0.619
Reduced mouth opening	83.50	66.39	82.67	86.02	0.000**
Dry mouth	38.83	52.57	79.48	83.33	0.001*
Sticky saliva	66.67	66.24	79.46	91.67	0.065
Cough	22.20	36.07	49.29	88.92	0.000**
Felt ill	61.00	50.94	79.46	83.25	0.000**
Painkiller	66.67	78.31	73.08	75.00	0.860
Nutritional supplement	16.67	39.76	51.92	58.33	0.196
Feeding tube	16.67	37.35	44.23	75.00	0.050*
Lost weight	66.67	75.90	82.69	91.67	0.460
Gained weight	50.00	8.43	3.85	0.00	0.001**

\*\*P<0.001, \*P<0.05. Domains like swallowing, speech, social eating and contact , reduced mouth opening, cough, feeling ill are highly affected by the advanced stage of tumor i.e., Stage IV, EORTC-H&N35: European Organization of Research and Treatment of Cancer, QoL: Quality of life

Table 4: Differences of scales and single items of the QLQ-H&N-35 by site of tumor.

EORTC-H&N-35	Mean				P value
	Oral cavity (N=118)	Oropharynx (N=2)	Hypopharynx (N=7)	Pharynx (N=26)	
Pain	50.16	33	42.43	45.31	0.744
Swallowing	57.79	100	71.14	63.81	0.216
Sense	47.14	100	68.86	51.59	0.097
Speech	59.11	100	81	67.92	0.060
Social eating	70.53	91.50	64.29	62.19	0.462
Social contact	58.36	83.50	49.43	40.23	0.033
Sexuality	42.80	16.50	40.57	33.27	0.448
Teeth	32.74	50	38.14	30.77	0.895
Reduced mouth opening	74.56	100	81	33.27	0.000**
Dry mouth	63.25	100	71.43	60.23	0.630
Sticky saliva	73.14	100	81	66.65	0.568
Cough	40.04	50	80.86	52.50	0.054
Felt ill	64.92	100	66.71	63.56	0.382
Painkiller	75.42	100	57.14	80.77	0.514
Nutritional supplement	43.22	100	42.86	46.15	0.462
Feeding tube	41.53	50	57.14	38.46	0.840
Lost weight	78.81	100	100	73.08	0.405
Gained weight	9.32	0.00	0.00	7.69	0.815

\*\*P<0.001 (Reduced mouth opening was the main problem posed to patients suffering from oropharyngeal cancer), EORTC-H&N35: European Organization of Research and Treatment of Cancer Head and Neck-35, QoL: Quality of life

by de Graeff *et al.*,<sup>8</sup> Alicikus *et al.*<sup>9</sup> and Herce Lopez *et al.*<sup>10</sup> Hammerlid *et al.*<sup>11</sup> examined patients with oral, pharyngeal and laryngeal cancer and found that the oral cavity was more common as tumor location among females (52%) than among male. Whereas in the present study oral cavity was more common as tumor among males (73.7%) than females.

Among the HNC patients 95 (62.1%) were tobacco chewers, 32 (20.9%) were smokers, 16 (10.5%) were both tobacco chewers and smokers and 10 (6.5%) patients had never smoked and chewed tobacco. These finding are very important

factor in development of tumor in the head and neck region. Meyer *et al.*<sup>12</sup> found a 64% incidence of tobacco use among their studied patients group. Our results correlate with these findings.

In present study the most commonly affected site was the buccal mucosa, in 53 patients (34%), followed by tongue in 43 patients (28.1%), whereas in a study done by Lam Thang *et al.*,<sup>13</sup> the mandible was the most affected area (44%). Kim *et al.*<sup>14</sup> conducted study on 133 patients, they found tonsillar area to be affected in 89 cases (66.9%), the base of the tongue in 23 (17.29%), and the soft palate in 15 patients (11.28%).



Table 5: Comparison of QoL points according to type of treatment of cancer.

EORTC-H&N-35	Mean						P value
	No treatment (N=2)	Surgery (N=28)	Rt (N=38)	Chemo+Rt (N=25)	Surgery+Rt (N=38)	Surgery+Chemo+Rt (N=22)	
Pain	0.00	45.68	51.97	47.12	42.76	63.77	0.044*
Swallowing	0.00	47.11	67.32	59.36	61.87	66.55	0.018*
Sense	0.00	27.86	55.53	51.12	60.79	53.68	0.001**
Speech	5.50	58.75	62.68	61.28	67.34	62.68	0.164
Social eating	0.00	57.07	67.97	72.32	74.34	79.91	0.003*
Social contact	6.50	67.57	45.16	50.72	55.71	65.41	0.008*
Sexuality	16.50	33.96	39.00	49.36	39.47	46.91	0.476
Teeth	0.00	26.11	39.50	26.52	30.76	43.91	0.296
Reduced mouth opening	0.00	84.54	56.13	59.96	73.66	74.18	0.008*
Dry mouth	0.00	50.00	68.37	61.32	71.03	68.14	0.120
Sticky saliva	16.50	71.39	71.00	74.76	76.29	74.18	0.498
Cough	33.00	39.11	39.42	49.28	50.84	42.41	0.795
Felt ill	0.00	72.54	70.13	51.92	63.13	60.55	0.114
Painkiller	50.00	89.29	76.32	76.00	68.42	72.73	0.456
Nutritional supplement	50.00	42.86	52.63	44.00	36.84	45.45	0.857
Feeding tube	0.00	57.14	28.95	36.00	42.11	54.55	0.129
Lost weight	50.00	75.00	76.32	72.00	89.47	81.82	0.447
Gained weight	0.00	21.43	7.89	4.00	5.26	4.55	0.168

\* $P \leq 0.05$ ; \*\* $P \leq 0.001$ . Domains pain, sense, social contact and eating and reduced mouth opening were highly affected when the treatment comprised of surgery or in combination with other treatments except domain swallowing which was most affected by radiotherapy treatment. EORTC-H&N-35: European Organization of Research and Treatment of Cancer Head and Neck-35, QoL: Quality of life

The most commonly applied treatment method was radiation alone (24.8%). This confirms with the result of Scharloo *et al.*<sup>15</sup> (40.7%), and Rinkel *et al.*<sup>16</sup> (32%).

The tumor localization and treatment method, together with the general disease stage, play essential role not only in the treatment of HNC but also the incidence and intensity of side effects and QoL.<sup>9,17,19</sup>

In our study main factors affecting QoL were weight loss, sticky saliva, use of painkiller, reduced mouth opening and difficulty in social eating. Psoter *et al.*<sup>18</sup> study showed that mainly affected factors were pain, social eating and social contact and loss of sexuality, whereas Silva *et al.*<sup>20</sup> found pain and loss of taste mainly affected the QoL.

In our study, QoL was evaluated with EORTC head and neck QoL questionnaire. According to questionnaire results, swallowing, speech, social eating, dry mouth, sticky saliva, taking painkiller and loss of weight in Oropharyngeal cancer have high symptom points and difficulty in mouth opening was significantly associated with it. While patients with oropharynx cancer had the worst values for reduced mouth opening ( $P = 0.00$ ).

Fang *et al.* found that patients presented with tumor in Stage IV had lower QoL than patients in Stage I, II and III, and this is consistent with the results of the present study.<sup>20</sup>

In our studies patients with large tumor, swallowing difficulties, speech problem, difficulties in social eating, reduced mouth opening, dry mouth, problem of cough and feeling of being ill were significantly high. So, the similar result will found in the

study done by Campbell *et al.*<sup>21</sup> In present study, according to QoL results, pain and swallowing were significantly high in radiotherapy group. Sense domain was significantly high in radiotherapy + surgery group. Surgical methods are directed to remove the cancer totally and to prevent the breathing, swallowing and voice functions.<sup>22-26</sup> In some studies it was shown that surgery increases the survival but physical changes causes difficulty in mouth opening and social contact and negatively affect the QoL.<sup>25</sup> Present study has found that majority of the subjects have mean scored more than 50, which shows their high level of symptomatology or problem. 79 patients in this study experienced severe weight loss after being affected by radiation-induced gustatory disturbance, which could be related to various factors leading to loss of appetite including burning sensation and appearance of lesions in different areas of oral mucosa and pharyngeal tissues, difficulty in swallowing, loss of ability to perceive taste or smell, feeling nauseous (because of radiotherapy or chemotherapy), and psychological complications such as depression. To assess the QoL of cancer patients is complex, considering the large number of variables which impact the patient's self-perception, from their social situation all the way to the very particularities of their diseases. It encompasses individual assessment characteristics, which does not depend on the patient's system of beliefs, values and even physical strength.<sup>7</sup> For these reasons, it is a fundamental tool used to assess the impact of the disease and its treatment obtaining epidemiological evidence which support changes to a more effective multi professional support protocol for the patients.<sup>7</sup>

## Conclusion

We conclude that there was a significant reduction in the QoL in cancer patients resulting from myriad types of HNC. An

assessment of the QoL and symptoms can help the dentist to direct attention to most important symptoms and provide counseling for appropriate interventions toward improving QoL outcomes and the response to the treatment. After the diagnosis of oral cancer, it is important to ensure that the diagnosed patient receives appropriate dental care before treatment and thus reducing the oral complication associated with cancer treatment.

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