



Research Article

**Quality of Life in Head and Neck Cancer Patients Receiving
Chemoradiation**

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Abstract

Introduction: Concurrent chemoradiation that has been used as definitive modality of treatment for most of the locally advanced head and neck cancers acts on tumor cells as well normal tissues resulting in toxicities and changes in Health Related Quality of Life (HRQoL). We aim to assess the quality of life scales before and after treatment to address on which scales to focus on for improvement in quality of life.

Methods: A longitudinal prospective observational study was conducted from November 2016 to December 2017 at the department of Radiation Oncology, B.P Koirala Memorial Cancer Hospital (BPKMCH), Bharatpur in 73 patients diagnosed with head and neck cancer with stage III and IVA with curative intent. Patients were evaluated in two time frames before the start of treatment and 1 month after completion of treatment with EORTC (European Organization for Research and Treatment of Cancer) QLQ-C 30 and EORTC QLQ H&N 35 questionnaire.

Results: Of the 73 patients, 66 patients completed the study. Cognitive functioning scale improved after 1 month with clinical significance ($\Delta=+15.62$). Mean score of social functioning scale improved after 1 month with clinical significance ($\Delta=+18.09$). Mean score of role functioning improved after 1 month of completion of RT with clinical significance ($\Delta=+23.07$). Regarding EORTC QLQ H&N35 18 symptom scale pain and swallowing improved 1 month after completion of treatment. Senses, social eating, teeth, opening mouth, dry mouth, sticky saliva significantly worsened even after 1 month of completion of RT.

Conclusion: There was improvement in the role, social, cognitive, and emotional functioning scales 1 month after completion of chemoradiotherapy. Worsening of teeth, opening mouth, sticky saliva, social eating and dry mouth were the scales that needed focus for the improvement of quality of life.

Keywords: Health related Quality of Life (HRQoL), Head and Neck cancer

Introduction

Health related quality of life (HRQOL) and its assessment have become increasingly important in health care, especially in the field of chronic disease. The end points of medical care for cancer patients usually focus on the survival rate, local control rate or complication rate. These assessments lack the knowledge and understanding of patients' mental and emotional well being.¹

The concept of health-related quality of life (HRQOL) and its determinants have evolved since the 1980s. On the individual level, this includes physical and mental health perception and their correlates-including health risk and conditions, functional status, social support, and socioeconomic status. On the community level, HRQOL includes resources, conditions, functional status, social support and socioeconomic status.²

Radiotherapy with or without chemotherapy may cause transient side effects that usually subside at the end of treatment. Changes in appearance, voice, difficulty in swallowing, local pain, dyspnea, often at times followed by yellowish discoloration, thick, smelly secretions, intermittent cough, chronic fatigue, changes to olfaction, stress, depression and difficulty accepting one's body image, all play role in patients' loss of self-esteem and social isolation. These along with other factors associated with treatment such as mucositis, xerostomia, changes in sense of taste and infection resulting from cancer therapy all may trigger negative impact on quality of life of these individuals.³

There are number of studies^{4,5,6,7,8} regarding the changes in quality of life in head and neck cancer before and after treatment carried out in different parts of the world. This study was done as there was no prior study conducted in our country focusing on the quality of life parameters. The study was conducted to have an idea of the impact of disease and its effect in patient's daily routine so as to improve the care protocol with more encompassing clinical, social and rehabilitation support measures and also to find the increase in drop out during the treatment.

Methods:

A hospital based prospective observational study was conducted from November 2016 to December 2017 in patients of head and neck cancer attending B.P Koirala Memorial Cancer Hospital, Bharatpur after taking ethical clearance from Institutional Review Board (IRB), National Academy of Medical Sciences (NAMS), Kathmandu, Nepal. The aim of conducting this study was to assess quality of life of patients receiving

chemoradiation in head and neck cancer. All patients of locally advanced head and neck cancer stage according to AJCC (American Joint Cancer Committee) 7th edition⁹ attending the joint clinic of Radiation Oncology and Otorhinolaryngology and head and neck surgery who were planned for definitive chemoradiation according to inclusion criteria were included in the study.

We assessed the patient after one month of completion of chemoradiation and quality of life was compared pre radiation and post radiation. EORTC QLQ-C 30 and EORTC H&N 35 questionnaires were used as tool, after taking permission from the EORTC Quality of life department, Brussels, Belgium. Since the EORTC QLQ-C 30 questionnaire was present in nepali language it was used as such but EORTC H&N 35 questionnaire was present in english language so it was translated in nepali language through forward and backward translation in collaboration with EORTC. Pre-testing of the questionnaires was done in five patients. Time required for asking the questions was about 15-20 minutes with the reluctance shown in answering the question about sexuality. So, respective questions Q59 and Q60 from EORTC QLQ-H&N 35 were omitted while asking the questions. Method was well explained to the patient and consent was taken from each patient before the study was carried out. Head and neck cancer sites were coded according to ICD-10 (International Classification of Diseases).

The general objective was to assess the health related quality of life in head and neck cancer patients receiving chemoradiation and the specific objectives were to assess the functional scales that included physical, role, cognitive, emotional and social status using EORTC QLQ C30, to assess the symptom scale fatigue, pain, nausea, vomiting, constipation, diarrhea and financial difficulties using EORTC QLQ C30, to assess six subscales pain, swallowing, senses, speech, social eating, social contact using EORTC H&N 35 and to assess ten single items: teeth, dry mouth, cough, sticky saliva, mouth opening, weight loss, weight gain, use of nutritional supplements, feeding tube. Scoring was done as per EORTC scoring manual King and Osoba et al^{10,11,12}, where the raw score was converted to the linear score between range of 0 to 100. High score for a functional scale represented high/healthy level of functioning, high score for global health status/QoL represented a high QoL but high level for symptom scale/item represented high level of symptomology/problems. After converting raw scores to linear scores mean and standard deviation was calculated. Similarly difference of 10 scores between two time frames was considered significant. Statistical significance was calculated using Friedman's non parametric test and clinical significance was calculated by difference of mean score of two time frames.

Results

A total of 73 patients were enrolled in the study. Of them three patients developed severe mucositis and dysphagia on third week and one patient developed dysphagia and skin reaction so they discontinued the treatment despite of counselling. Two patients did not follow up after 1 month. One patient was admitted to ICU due to aspiration pneumonia and discontinued the treatment. Thus, there were seven patients who dropped out of the study. The remaining 66 patients were assessed at baseline and one month after completion of treatment. The results were then analyzed.

Age at which disease was most commonly observed was between 50-59 years and least commonly seen in between 30-39 years. Of the 73 participants incorporated in the study male patients were 67% and female 32.9%.

Of the 73 participants incorporated in the study, disease site was classified according to ICD code. 1.4% cases were carcinoma lip, 5.5% carcinoma of base of tongue, 5.5% carcinoma of floor of mouth, 2.7% parotid carcinoma, 2.7% tonsil, 5.5% oropharynx, 20.5% nasopharynx, 12.3% pyriform sinus, 5.5% hypopharynx, 38.4% larynx. The most common site was larynx followed by nasopharynx and oropharynx.

Most common cause of head and neck carcinoma in these patients was smoking which comprised of 89%, whereas chewing tobacco comprised of 41.1%.

Out of 73 participants, 39.7% were in stage III, 32.9% stage IVA and 16.4% were in stage IVB.

FUNCTIONING SCALES

There were five functioning scales that were assessed before and after 1 month of chemoradiation. Mean scores of QoL (Quality of Life) scales before and after 1 month of radiotherapy were assessed given in Table I. The difference of physical functioning scale was not significant. Emotional functioning, cognitive functioning, social functioning and role functioning scale was found to be better with statistical and clinical significance after 1 month of RT.

Table I: Mean scores (standard deviation) and difference of quality of life scales for functioning scales, before and after 1 month of RT

EORTC QLQ-C30	Before RT	1 month after RT	Difference	p-value
Physical functioning	82.12(12.87)	79.06(11.53)	-3.06	0.228
Role functioning	60.21(22.06)	83.28(11.88)	+23.07	<0.05
Social functioning	70.31(13.35)	88.4(8.21)	+18.09	<0.05
Emotional functioning	61.16(21.63)	83.79(8.62)	+22.63	<0.05
Cognitive functioning	76.13(17.53)	91.75(8.06)	+15.62	<0.05

SYMPTOM SCALES

Out of the nine symptom scales, pain, fatigue, dyspnea, insomnia, financial difficulties and nausea was less after completion of 1 month of radiation as shown in Table II.

Table II: Mean scores (standard deviation) and difference of quality of life scales for symptom scales before and after 1 month of start of treatment

EORTC QLQ-C30	Before RT	1 month after RT	Difference	p-value
Pain	64.12(10.63)	14.23(5.01)	-49.89	<0.05
Fatigue	58.33(20.58)	18.58(13.7)	-39.75	<0.05
Nausea	6.55(10.83)	00.00(00.00)	-6.55	<0.05
Dyspnea	27.77(22.03)	1.88(3.50)	-25.89	<0.05
Insomnia	43.43(24.08)	11.11(15.83)	-32.32	<0.05

Appetite loss	23.23(21.85)	30.3(27.25)	+7.07	0.042
Financial difficulties	40.40(16.62)	8.08(14.39)	-32.32	<0.05

GLOBAL HEALTH STATUS

Mean score of global health status was analyzed according to scoring module of EORTC QLQ-C 30. While analyzing global health status, there was no significant difference. High score of global health status indicated high quality of life. Though there is high score after 1 month than before RT but it was clinically and statistically not significant as shown in Table III.

Table III: Mean scores (standard deviation), difference of global health quality of life

EORTC QLQ-C30	Before RT	1 month after RT	Difference	p value
Global health score	41(15)	40(11.25)	-1	0.157

SYMPTOM SCALES: EORTC H & N 35

Pain and swallowing improved after 1 month of completion of RT but social eating, Teeth, mouth opening, dry mouth and sticky saliva worsened after completion of 1 month of RT. Senses of taste, smell and social eating scale was improved after RT. Other scales had slight difference but not clinical and statistically significant.

Table IV: Mean scores (standard deviation), difference of symptom scale according to EORTC H&N35

EORTC H&N 35	Before RT	1 month after RT	Difference	p-value
Pain	64.123(10.63)	14.23(5.02)	-49.89	<0.05
Swallowing	30.86(29.5)	12.29(5.51)	-18.57	<0.05

Senses	13.45(5.59)	20.39(13.24)	+6.94	<0.05
Speech	21.27(23.47)	15.58(10.83)	-5.69	0.75
Social eating	11.10(10.42)	22.34(22.31)	+11.24	<0.05
Social contact	11.05(17.42)	12.07(11.23)	+1.02	0.564
Teeth	5.17(16.52)	35.98(15.54)	+30.81	<0.05
Opening mouth	5.5(13.8)	40.9(14.07)	+35.4	<0.05
Dry mouth	6.43(11.57)	53.53(16.41)	+47.1	<0.05
Sticky saliva	2.5(10)	46(17)	+43.5	<0.05
Coughing	11.82(19.17)	8.06(15.6)	-3.76	0.251

EORTC H&N35 included other five items feeling ill, use of nutritional supplements, use of pain killers, feeding tube, weight gain and loss. All items improved after 1 month of completion of RT as shown in Table V.

Table V: Mean scores (standard deviation), difference of symptom scales/items EORTC H&N35

EORTC H&N35	Before RT	1 month after RT	Difference	p value
Felt ill	34.84(16.97)	3.03(17.27)	-31.81	<0.05
Pain killers	81.81(38.86)	7.5(26.66)	-74.31	<0.05
Feeding tube	9.09(28.96)	0.00(0.00)	-9.09	0.014
Weight gain	0.00(0.00)	43(50)	+43	<0.05
Weight loss	63(48)	12.12(32)	-50.88	<0.05
Nutritional supplements	75.75(43.18)	15.15(36.12)	-60.6	<0.05

Difference in item scales according to sites of head and neck cancer

Comparing mean scores between the commonest disease, physical functioning (79.96) and social functioning (89.4) was better with carcinoma of larynx 1 month after chemoradiation. Global health scale was better with carcinoma nasopharynx (42.9). Regarding symptom scales, dry mouth (76.1), and sticky saliva (48.71) was more in carcinoma of nasopharynx compared to other sites. Similarly pain (22.59), teeth problem (39.27), feeling ill (11.11) was associated with carcinoma oropharynx. Speech (17.7) was affected more in carcinoma larynx. Cough (13.3), social eating (15.26), requirement of nutrition supplement (20) was associated more with carcinoma hypopharynx.

Discussion

Due to compact structure in head and neck cancer most of the structures nearby the tumor site also receives radiation dose and direct injury to basal epithelial cells leading to release of cytokines during radiation causing problems like mucositis¹³. Other side effects are xerostomia due to radiation effect on parotid and submandibular glands, dysphagia due to pain and inflammation and skin reactions. These leads to change in quality of life.

In developing country like ours most of the patient ignore the basic symptoms. Moreover they are managed with medications for cough and rhinitis, antibiotics for tonsillitis and pain is usually managed with oral analgesics in local settings, thus most of the patient presents late in locoregionally advanced stage.

Several prospective studies have been carried out regarding study of change in quality of life. In the study conducted in Taiwan by F.M Fang et al⁷, they assessed quality of life before radiotherapy and 2 years after completion of radiotherapy. The study included the patients who have undergone radical surgery so most of the patients were of carcinoma of the oral cavity whereas in our study those patient who have undergone surgery were not included so most of the cases were of carcinoma larynx followed by carcinoma of nasopharynx and pyriform sinus. In our study the problem of social eating was clinically and statistically significant. This may have resulted due to difficulty in opening mouth, sticky saliva and dry mouth. Similar findings was seen in F.M Fang et al.⁷ which showed significant worsening of social eating scales even after 2 years of post-operative RT . Study conducted by de Graeff et al ⁵ showed worse scores for fatigue, pain, dyspnea, swallowing and social eating at 6 months but significantly improved within the follow up of 36 months. Since both studies were long term study compared to ours, so most of the symptom scale was

significantly improved till the end of study.

Our study showed that there was improvement in role, social, cognitive and emotional functioning scales even after 1 month of treatment which was similar to the study by de Melo Filho et al.³ where mean scores of function assessed were high just after completion of treatment. Study conducted by Lohith et al.⁸ in HCG Bangalore institute of Oncology showed significant decrease in physical functioning scale, role functioning scale, social, cognitive and emotional functioning on completion of treatment but gradually showed upward trend after 1 month of completion of treatment. Our patients showed improvement in functioning scale considering social, emotional, role and cognitive scale as they had assurance of completion of treatment and involved in carrying their daily activities without feeling fear of disease.

In our study, symptom scale according to EORTC QLQ-C30 showed improvement in pain, fatigue, dyspnea, insomnia, financial difficulties after 1 month of treatment. In the study conducted by de Melo Filho et al.³, just after completion of treatment there was no significant statistical difference between onset, middle and at the end of treatment though they changed very little prospectively.

In Lohith et al. study⁸ there was significant increase in appetite loss scores during treatment ($t=-2.6, p=0.01$), on treatment completion, one month and three months of treatment. Similar finding was present in our study where there was statistically significant difference in the loss of appetite scale even after one month of treatment. Our study showed significant difference in parameters like pain, fatigue, insomnia, financial difficulties, just in one month as most of the patients were diagnosed at locally advanced stage so the symptoms caused by the disease and the initial financial burden were more in patients one month after completion of treatment.

Regarding global quality of health scale from EORTC QLQ-C30 our study showed that though there was prospective change in global quality of health scale but it was not significant. Similar to the study by Melo Filho et al.³ and F.M. Fang et al.⁷ there was no significant change in the global quality of health scale before and one month after start of treatment.

Regarding EORTC H&N 35, in our study pain and swallowing improved after one month which was contrary to study conducted by Lohith et al.⁸ where there was significant increase in pain scores during treatment ($t=-8.9, p=0.01$), on completion of treatment and one month after completion of treatment. This difference resulted as most of the tumor studied in ours were carcinoma of larynx and carcinoma oropharynx. So presence of tumor in these sites resulted in compression that lead to pain and difficulty in swallowing

which got relieved after chemoradiotherapy. Pain and swallowing difficulty caused by radiotherapy after 1 month of completion of treatment was decreased in comparison to pretreatment which was similar to study by de Melo Fiho et al.³

Other scales included in EORTC H&N 35 like teeth, opening mouth, dry mouth and sticky saliva worsened even after 1 month of completion of treatment. Since all of the treatment was done on Cobalt-60 by conventional technologies, patients had more complaint of dry mouth post treatment as it was very difficult to spare parotid gland during the treatment. Problem of sticky saliva, dry mouth, difficulty in opening mouth was all significant even after 36 months as shown in study by de Graeff et al⁵ which signifies the importance of these items above other items for impacting the quality of life post treatment.

In our study, mean scores of problem of senses were clinically not significant but statistically significant that might be because of persistent effect of radiation. Study by F.M Fang et al.study⁷ showed that mean score difference in the problem with senses was significant even after 2 years of postoperative radiotherapy. Study by Loorents et al.¹⁴ showed problem of senses, dry mouth, and sticky saliva significant even after 1 year.

Regarding other scales from EORTC H&N 35, use of pain killers and nutritional supplements was decreased after 1 month of completion of treatment as symptoms like pain subsided that lead to easy feeding with less dependent on nutritional supplements.

Conclusion

In conclusion, regarding change in quality of life after completion of 1 month of chemoradiation, there was significant improvement in pursuing their hobbies or other leisure time activities, physical condition or medical treatment that interfered less with social activities or family life, emotional and cognitive functioning scales. There was improvement in pain, fatigue, dyspnea, insomnia and financial difficulties after 1 month of completion of chemoradiation. Overall there was no change in global quality of health. But the items that needed to be focused for better maintenance of quality of life were social eating, problem in teeth, mouth opening, dry mouth, and sticky saliva that worsened after completion of 1 month of treatment. Since all the treatments were done in Cobalt 60 machine, there was less sparing of normal tissues and more of these symptoms post treatment. We cannot compromise the curative intent at the cost of improving the quality of life but we definitely can focus parallelly on the items that need to be managed for better maintenance of quality of life. Assessing these parameters after IMRT setting may have shown different results, due to more

sparing of normal tissues.

LIMITATIONS

As the study period was short, further change in different scales in longer time frame could not be carried out. Similarly, post-operative cases were not included so quality of life scales would have changed in greater scale in those patients receiving adjuvant radiotherapy compared to definitive chemoradiation.

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