Quality of life of elderly head and neck cancer patients before and after completion of curative radiotherapy: A prospective study

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ABSTRACT

Background
This study assessed the quality of life (QOL) of elderly head and neck cancer patients before and after curative radiotherapy.

Methods and Material
This cross-sectional study was done between December 2018 and May 2019. All elderly patients (≥60 years) with head & neck cancer attending the cancer OPD of Jawaharlal Nehru Cancer Hospital and Research Centre, Bhopal were recruited after considering inclusion and exclusion criteria. The Hindi version of EORTC QLQ-C30 was used for measuring the quality of life. Categorical data were expressed as frequency and percentages, whereas numerical data were expressed as mean (SD). The pre and post-radiotherapy scores were compared by using paired t-tests. $P < 0.05$ was considered significant.

Results
Data from 90 patients were finalized for analysis. The mean age of participants was 67.4 ± 5.7 years. Buccal mucosa carcinoma was most common and stage IVA was seen in most cases. Global health status of quality of life was significantly reduced after radiation therapy, while the majority of the functioning scales were significantly reduced except for cognitive functioning. Fatigue, pain, insomnia, appetite loss and nausea and vomiting were worsened following radiation therapy. However, substantial damage was seen in the financial impact of patients' quality of life in our study participants.

Conclusions: Radiation therapy significantly decreased the QOL in elderly head and neck cancer patients. Further research with extended follow-up and interventions to enhance QOL post-radiation are recommended.

Key-words:

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INTRODUCTION

Cancers of the oral cavity, pharynx and larynx are collectively termed head and neck cancers. Most oral cavity, larynx, and hypopharynx tumors are squamous cell carcinoma arising from the squamous cells that line these spaces.[1] Head and neck squamous cell carcinoma (HNSCC) are aggressive cancers that are the sixth most common cancer in the world. The 5-year survival of early-stage oral cancer is approximately 80%, while survival drops to 19% for late-stage disease.[2] As per GLOBOCAN 2020 data, a total of 9.31 lakhs of head & neck cancers were diagnosed over the world in the year 2020 with an overall mortality of 4.67 lakhs. India contributed to the list with around 1.9 lakhs new cases and a death toll of 1.08 lakhs.[3] As per the report of the National Cancer Registry Programme (2012-2016), 51942 male and 14040 female cases of head and neck cancer were detected.[4] Overall, 57.5% of global head and neck cancers occur in Asia especially in India accounting for 30% of all diseases. In India, most head and neck cancer patients present late in the course of their disease compared to the developed countries.[5]

Quality of life is an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.[6] Moreover, the term health-related quality of life (HRQOL) is often described as a term referring to the health aspects of quality of life, generally considered to reflect the impact of disease and treatment on disability and daily functioning; it has also been considered to reflect the impact of perceived health on an individual's ability to live a fulfilling life.[7]

The concept of QOL has become more significant in patient therapy, particularly in cancer, when treatment seldom provides complete recovery and life expectancy is restricted. Compared to other cancers head and neck cancer can have a profound effect on the quality of life (QOL) of the patients. Due to their unique location near to many anatomic structures involved in important aspects of physiological and social functions, head and neck cancers itself or their treatment may lead to collateral damage to these important structures which can have negative effects on the QOL of the patients. The availability of multiple treatment approaches has increased the survival rate of cancer patients in the current scenario. Head and neck cancer can have a profound effect on the quality of life (QOL) of the patients. As the quality of life is determined by functional, aesthetic, emotional, and social factors, therefore, these factors must receive adequate attention in treatment planning and rehabilitation.[8]Considering these issues, this present study aimed to assess the quality of life (QOL) of elderly head and neck cancer patients before and after the completion of curative radiotherapy.

MATERIALS AND METHODS
Study design & settings

This was a prospective cross-sectional study done in the Department of Radiotherapy, Gandhi Medical College Bhopal, in collaboration with Jawaharlal Nehru Cancer Hospital and Research Centre, Bhopal (JNCH). Patients were recruited from December 2018 to May 2019 from Jawaharlal Nehru Cancer Hospital and Research Centre, Bhopal.

Sample size, sampling and selection of participants

The sample size was calculated by the formula n= $(Z^2\sigma^2)/d^2$, where Z= 3.84 (at 95% confidence), σ = 23, σ is the standard deviation (SD) of Global health status after radiotherapy, which was 23% from a previous study[9] and d=5% (absolute precision). This gives a value 81.3 as the sample size. However, we have included all elderly patients (≥60 years) of head & neck cancer attending the cancer OPD of JNCH from December 2018 to May 2019. Non-probability sampling was done for our study purpose.

Selection criteria

Participants were included based on the following criteria: 1. histopathologically confirmed cases of squamous cell carcinoma of head and neck cancer, 2. Age ≥60 years, 3. Stage I to IV B, 4. patients being treated with curative intent with external beam radiotherapy, 5. patients with Karnofsky Performance Status (KPS) score ≥80.[10]

Patients with Karnofsky Performance Status Score <80, with a metastatic presentation at the time of diagnosis (stage IVC), with a history of head and neck surgery, receiving concurrent chemotherapy and who did not give consent were excluded.

Radiotherapy

Definitive radiation therapy was administered in doses respectively ranging from 66 grays (Gy) to 70 Gy (2.2 Gy /fraction to 2 Gy /fraction) daily Monday to Friday for 6 to 7 weeks by intensity modulated radiotherapy (IMRT) to the primary tumor and involved lymph node according to the stage. No concurrent chemotherapy was used.

Study tool

A semi-structured proforma was used, which had three parts: I. Basic profile of patients, II. Pre-RT EORTC-QLQ-30 and III. Post-RT EORTC-QLQ-30. Details of the patient's age, gender, religion, place of residence, KPS score, site of malignancy and stage of cancer were recorded. Data regarding the quality of life was collected within a week before starting of RT and also within a week of post-RT.

The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30[11,12]

The Hindi version of the EORTC QLQ-C30 was used after obtaining permission which is a validated scale.[11,12] The EORTC QLQ-C30 includes five functional scales for physical (PF), role (RF), cognitive (CF), emotional (EF), and social (SF) functioning, as well as symptom scales for fatigue (FA), pain (PA), nausea and vomiting (NV), dyspnoea (DY), insomnia (SL), loss of appetite (AP), constipation (CO), and diarrhea (DI), one item assessing perceived financial impact (FI) and a global health status (Global QOL). For all scales, item scores are summed and linearly transformed into a scale ranging from 0 to 100. Higher scores on the functioning scales indicate higher levels of functioning, whereas higher scores on the symptom scales represent more symptom burden.

Data analysis

Data was compiled using MS Excel and analyzed using IBM SPSS Software version 20. The scores recorded on each item of the respective QOL question was linearly transformed to provide a score ranging from 0 to 100; a scoring algorithm recommended by EORTC was used. Categorical data were expressed as frequency and percentages, whereas numerical data were expressed as mean and standard deviation. The pre and post-radiotherapy scores were compared by the use of paired t-tests. $P < 0.05$ was considered significant throughout.

Ethical consideration

This study was approved by the Institutional Ethical Committee, Gandhi Medical College, Bhopal (approval no.: 3605941/MC/IEC/2018). Informed written consent was taken from participants before enrolment.

Results

A total of 102 eligible patients were included in this study. However, data from 90 patients were finalized for analysis, as three patients succumbed to death, whereas five cases were defaulters and four patients were not able to complete due to the toxicity of radiotherapy. Sixty-eight (75.6%) were males and 22 (24.4%) were females, with a mean age of 67.4±5.7 years, where the majority belonged to 60 to 64 years of age group (37.8%). Among the study participants, the most common primary site of cancer of head and neck was buccal mucosa (18.9%), followed by carcinoma of tongue and oropharynx in 17.8% cases each. Details of patients' characteristics are mentioned in Table 1.

Table 1: Characteristics of study participants (N=90)

Age (in years)	Frequency	Percentage
60-64	34	37.8
65-69	23	25.6
70-74	21	23.3
75-79	7	7.8
≥80	5	5.5
Gender	Frequency	Percentage

Male	68	75.6
Female	22	24.4
Religion	**Frequency**	**Percentage**
Hindu	83	92.2
Muslim	7	7.8
Residence	**Frequency**	**Percentage**
Rural	59	65.6
Urban	31	34.4
KPS Score	**Frequency**	**Percentage**
80	31	34.5
90	39	43.3
100	20	22.2
Site of cancer	**Frequency**	**Percentage**
Buccal mucosa	17	18.8
Oropharynx	16	17.8
Tongue	16	17.8
Larynx	9	10
Hypopharynx	6	6.7
Alveolus	5	5.6
Base of tongue	5	5.6
Hard Palate	5	5.6
Valleculae	4	4.4
Arytenoid	2	2.2
Floor of mouth	1	1.1
Epiglottis	1	1.1
Pyriform sinus	1	1.1
Soft Palate	1	1.1
Tonsil	1	1.1

Stage	Frequency	Percentage
III	14	15.6
IVA	63	70
IVB	13	14.4
Histopathology	**Frequency**	**Percentage**
WDSCC	56	62.2
MDSCC	23	25.6
PDSCC	11	12.2

WDSCC-well-differentiated squamous cell carcinoma, MDSCC-moderately differentiated squamous cell carcinoma, PDSCC- poorly differentiated squamous cell carcinoma

Table 2 describes the comparisons between pre and post-RT EORTC-QLQ 30 scores

Table 2:Comparison of pre & post radiotherapy quality of life

EORTC QLQ-30 Component	Pre-RT mean (SD)	Post-RT mean (SD)	p-value#
Global health (GQL)	58.01 (12.03)	52.23(20.29)	0.014*
Physical functioning (PF)	84.97(17.41)	70.67(22.81)	0.001*
Role (RF)	80.48(18.37)	70.90(22.32)	0.001*
Emotional functioning (EF)	71.30(20.47)	53.64(24.23)	0.001*
Cognitive functioning (CF)	76.73(19.75)	73.87(12.69)	0.785
Social functioning (SF)	70.69(24.97)	42.63(32.09)	0.001*
Fatigue (FA)	35.70(19.63)	51.39(25.84)	0.001*
Nausea and vomiting (NV)	27.77(19.45)	33.57(21.88)	0.037*
Pain (PA)	27.60(20.47)	38.97(20.01)	0.001*
Dyspnoea (DY)	22.41(21.84)	17.58(25.08)	0.135
Sleep (SL)	26.47(23.86)	44.76(32.19)	0.001*
Loss of appetite (AP)	35.91(23.42)	52.30(30.78)	0.001*
Constipation (CO)	7.08(16.23)	9.52(19.10)	0.313
Diarrhea (DI)	13.59(17.83)	12.89(19.75)	0.782
Financial impact (FI)	24.10(20.99)	64.89(38.84)	0.001*

*#t-test, *statistically significant*

DISCUSSION

With the advent of medical and technological advancement, the survival of patients with head and neck cancers has improved but it has been associated with a financial burden as well as reduced quality of life of an individual. So, this present study aimed to assess the quality of life in elderly patients with head and neck cancer before and after radiotherapy with the help of The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire.

Global health status of quality of life

The quality of life of our study patients with head and neck cancer before radiotherapy was already low (58.01±12.03) which further reduced (52.23±20.29) post-radiotherapy and it was statistically significant (p<0.05). The findings of the present study were similar to the findings of Bashir et al. in which they found a significant deterioration in the mean GQL scores.[13] However, Filho et al. reported no significant difference in the mean global health status indicator of the quality of life of patients before and after radiotherapy.[14] Similarly, a systematic review also documented that the patients' global QOL deteriorated from the period before treatment to 1–6 months after, however, gradually improved thereafter until the 12-month mark.[7]

Functioning status

Emotional and social functioning were the most affected domain among patients with head and neck cancers before and after radiotherapy. In our study, the mean score in physical, role, emotional, and social functioning were significantly affected post-radiotherapy (p<0.001). Though the score for cognitive functioning decreased, it was not significant. Similar findings were also reported by various authors.[13,15] So et al. however documented a significant reduction in physical functioning following radiotherapy.[16] Worst functioning across all domains in patients with head and neck cancer could be attributed to side effects associated with radiotherapy. These patients usually experience emotional trauma as these cancers are associated with visible disfigurement. Also, the functioning depends upon the attitude of patients toward life and how patients cope with the diagnosis of cancer.

Symptoms scales

Our study documented a significant increase in the mean score of fatigue, pain, insomnia, appetite loss and nausea and vomiting following radiation therapy, suggesting worsening of symptoms. However, no significant difference was observed in the mean score of dyspnoea, constipation and diarrhea. Bashir et al. and Akkas et al. also reported similar findings regarding the symptoms scale.[13,17] The findings of the present study were also supported by the finding of Leung et al. in which all symptom scores worsened significantly following treatment.[18]

Financial difficulties

Elderly people are a part of the dependent population, they are not active breadwinners of the family, and many of them live off meager pensions, adding the additional burden of their palliative and supportive care significantly raises their financial liabilities. Before radiotherapy, the mean financial difficulty score among patients with head and neck cancer was 24.1±20.99, which increased significantly during post-radiotherapy assessment (64.89±38.84). Bashir et al also reported similar findings, where the mean financial difficulties increased significantly after radiotherapy compared to the pre-radiotherapy phase.[13] Yucel et al. also demonstrated a similar significant financial burden.[9] However, Filho et al. reported statistically insignificant differences in the mean score, despite an increase in financial difficulties following radiotherapy as compared to pre-radiotherapy levels.[14] The Institute chosen for the current study was a private setup with no financial aid for the elderly, which too was a critical factor for patients' financial burden. These points must be kept in mind before interpreting the results for financial difficulties. The observed difference in financial difficulties between the present study and reference studies could be due to the time and place difference of study. In the realm of managing head and neck cancer, the predominant focus has traditionally centered on curing the disease and controlling tumors, often neglecting considerations related to the quality of life. Effective communication, coupled with healthcare providers' access to quality of life data, may emerge as pivotal factors in addressing QOL concerns among head and neck cancer patients. Existing evidence suggests a potential positive

therapeutic impact on QOL for head and neck cancer patients when they perceive that their physicians possess access to QOL data and actively utilize this information in their patient interactions.[19]

LIMITATIONS

The possible limitation associated with our study is that it was a cross-sectional study from a single center which might affect the generalizability. Also, the time duration between the post-radiotherapy quality of life questionnaire administration was not long enough to evaluate late long-term effects.

CONCLUSION

The results of this prospective study showed a significant impact on the quality of life following radiation. Caregivers need management strategies for the early detection and treatment of specific problems throughout the treatment period to help in improving the quality of life. Further studies with long follow-up periods and interventional studies to improve the quality of life following radiation are recommended.

REFERENCES

1. BW S, CP W: World Cancer Report 2014. International Agency for Research on Cancer. France; 2014. [cited 2022 Dec 13]. Available from: https://publications.iarc.fr/Non-Series-Publications/World-Cancer-Reports/World-Cancer-Report-2014

2. Sung, H, Ferlay, J, Siegel, RL, Laversanne, M, Soerjomataram, I, Jemal, A, Bray, F. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2021: 71: 209- 249. https://doi.org/10.3322/caac.21660

3. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 2018; 68:394–424. https://doi.org/10.3322/caac.21492

4. Report of National Cancer Registry Programme [Internet]. [cited 2022 Dec 13]. Available from: https://ncdirindia.org/All_Reports/Report_2020/default.aspx

5. Kulkarni MR. Head and neck cancer burden in India. Int J Head Neck Surg 2013; 4:29–35. https://doi.org/10.5005/jp-journals-10001-1132

6. The World Health Organization Quality of Life (WHOQOL). [Internet]. [cited 2022 Dec 16]. Available from: https://www.who.int/publications/i/item/WHO-HIS-HSI-Rev.2012.03

7. Haraldstad K, Wahl A, Andenæs R, Andersen JR, Andersen MH, Beisland E, et al. A systematic review of quality of life research in medicine and health sciences. Qual Life Res 2019; 28:2641–50. https://doi.org/10.1007/s11136-019-02214-9

8. Khandelwal A, Neeli A, Gadiyar A, Khandelwal A. Assessment of quality of life of patients 1–5 years after treatment for oral cancer. Indian J Dent Res 2017; 28:538-44

9. Yucel B, Akkaş EA, Okur Y, Eren AA, Eren MF, Karapinar H, et al. The impact of radiotherapy on quality of life for cancer patients: a longitudinal study. Support Care Cancer 2014; 22:2479–87. https://doi.org/10.1007/s00520-014-2235-y

10. Performance Scales: Karnofsky & ECOG Scores. [Internet]. [cited 2022 Oct 31]. Available from: https://oncologypro.esmo.org/oncology-in-practice/practice-tools/performance-scales

11. EORTC Quality of Life Website. [homepage on the Internet]. [cited 2022 Dec 16]. Available from: https://qol.eortc.org/

12. Parmar V, Badwe RA, Hawaldar R, Rayabhattanavar S, Varghese A, Sharma R, Mittra I. Validation of EORTC quality-of-life questionnaire in Indian women with operable breast cancer. Natl Med J India. 2005 Jul-Aug;18(4):172-7.

13. Bashir A, Kumar D, Dewan D, Sharma R. Quality of life of head and neck cancer patients before and after cancer-directed treatment – a longitudinal study. J Can Res Ther 2020; 16:500. https://doi.org/10.4103/jcrt.JCRT_311_18

14. Filho MR de M, Rocha BA, Pires MB de O, Fonseca ES, Freitas EM de, Junior HM, et al. Quality of life of patients with head and neck cancer. Braz J Otorhinolaryngol 2015; 79:82–8. https://doi.org/10.5935/1808-8694.20130014

15. Gomes EPA de A, Aranha AMF, Borges AH, Volpato LER. Head and neck cancer patients' quality of life: analysis of three instruments. J Dent (Shiraz) 2020; 21:31-41. https://doi.org/10.30476/DENTJODS.2019.77677.0

16. So WKW, Chan RJ, Chan DNS, Hughes BGM, Chair SY, Choi KC, et al. Quality-of-life among head and neck cancer survivors at one year after treatment – a systematic review. Eur J Cancer 2012; 48:2391–2408. https://doi.org/10.1016/j.ejca.2012.04.005

17. Akkas EA, Yucel B, Kilickap S, Altuntas EE. Evaluation of quality of life in Turkish patients with head and neck cancer. Asian Pac J Cancer Prev 2013; 14:4805–9. https://doi.org/10.7314/APJCP.2013.14.8.4805

18. Leung SW, Lee TF, Chien CY, Chao PJ, Tsai WL, Fang FM. Health-related quality of life in 640 head and neck cancer survivors after radiotherapy using EORTC QLQ-C30 and QLQ-H&N35 questionnaires. BMC Cancer 2011; 11:128. https://doi.org/10.1186/1471-2407-11-128

19. Murphy BA, Ridner S, Wells N, Dietrich M. Quality of life research in head and neck cancer: a review of the current state of the science. Crit Rev Oncol Hematol. 2007; 62:251-67. doi: 10.1016/j.critrevonc.2006.07.005.