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Original Article

Quality of Life before and after Radiotherapy in Head and Neck Squamous Cell Cancer Patients Measured Using an Updated Head-Neck Specific EORTC QLQ-H&N43 at a Rural Tertiary Cancer Care Center

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Abstract

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Background Quality of life (QOL) in head and neck squamous cell cancer (HNSCC) patients from rural area is sparsely studied. Aim of this study was to evaluate the QOL before (pre-) and at first follow-up after radiotherapy (RT) (post-RT) in patients of HNSCC at a rural tertiary cancer care center (RTCCC).

Materials and Methods This analytical study commenced after an institutional ethics committee approval included HSCCC patients registered at a RTCCC from June 2019 to January 2022. Marathi version of the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ), EORTC QLQ-C30 (v3.0), and an updated head-neck specific EORTC QLQ-H&N43 were served to the eligible patients pre- and post-RT. Clinicodemographic details were collected from prospectively maintained hospital records. Graph-Pad, Instat-3 (California Inc) was used for statistical analysis. Effect size and minimal important change were noted.

Results A total of 100 patients completed both the pre- and post-RT (6–18 weeks post-RT) QLQ. Median age was 53 years (range: 30–78 years) and man to woman gender ratio was 4.56:1. Majority of the patients were farmer (46%), tobacco users (92%), and from middle socioeconomic class (57%). Oral cavity was the most common subsite involved (62%) and majority presented in locally advanced stage (82%) of disease.

Global health status improved significantly after treatment with a large effect size (ES = –0.84). QOL was significantly improved after treatment except for parameters depicting treatment-related toxicities, that is, dryness of mouth and sticky saliva (ES = –1.75), problem with senses (ES = –1.31), and skin (ES = –1.38).

Keywords

- quality of life
- head and neck squamous cell cancer
- radiotherapy
- rural cancer care center
- before and after radiotherapy

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Coronavirus disease pandemic and limitations of QLQ were few shortcomings of this study.

Conclusion There is considerable improvement in QOL in HNSCC patients post-RT except for the treatment-related toxicity domains.

Introduction

Cancer as a cause of premature mortality is more in the developed countries as compared to the developing countries; a price that west pays for its urbanization. Contrary to this, head and neck squamous cell cancer (HNSCC) is more common in the developing countries like India. Maharashtra, where the native language is Marathi, reported the highest incidence of oral cancer in India.[1] Literature reported urban-rural difference in HNSCC survival from developed countries is variable,[2,3] while in India, survival of rural HNSCC patients is poor as compared to their urban counterpart.[4] According to the World Bank collection of development indicators, 64% of the total Indian population is rural.[5] Rural population and rural area hinder the quality of oncology care.[4]

Despite advances in treatment modalities, the survival in HNSCC has reached a plateau.[6] Hence, the quality of survival has gained an increasing importance. Health-related quality of life (QOL) is the difference between patient's expectations and experience[7] and is better answered by patients themselves. QOL questionnaire (QLQ) is one of the ways to measure QOL. QOL is now viewed as a primary endpoint measure for quality of management and care in oncology practice as it reflects patient's discernment of an impact of cancer diagnosis and treatment on their daily living.[8] The European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ) is the most widely used self-reported questionnaire in oncology.[9]

HNSCC itself and side effects of its treatment are bound to have measurable impact on patient's QOL. Depending on the site, size, stage, and treatment, HNSCC can cause varying degrees of structural deformations, and functional handicaps compromising well-being, self-esteem, and social integration.[10] Treatment-induced side effects like facial disfigurement, speech, and swallowing changes cannot be concealed. This can further result in social withdrawal and avoidance of potentially helpful support systems.[11] Cure at the cost of morbidity reflecting in a poor QOL is not acceptable. The disease itself and its treatment affect patients' social, psychological, and functional aspects, which need to be measured to implement the problem-directed interventions. QOL is sparsely studied in rural HNSCC patients,[12–16] with further scarcity of "real-world scenario." Hence, this study was planned with an aim to evaluate the difference in QOL before (pre-) and at first follow-up after radiotherapy (RT) (post-RT) in patients of HNSCC at a rural tertiary cancer care center (RTCCC).

Materials and Methods

Ethical consideration: This before and after type of analytical study commenced after an institutional ethics committee (IEC) approval and was conducted in accordance with the ethical standards of IEC and the Helsinki Declaration of 1975, as revised in 2000.[17] Informed written consent in a vernacular language was obtained from all the study participants.

Study subjects: All consecutive newly diagnosed, nonmetastatic, histopathology-proven, HNSCC patients of oral cavity (OC), oropharynx (OPX), hypopharynx, and larynx registered at the department of radiation oncology of a RTCCC from June 2019 to January 2022 were evaluated for the study. Marathi language speaking adult patients of either sex with Eastern Cooperative Oncology Group performance status of ≤ 2,[18] treated with curative intent, accompanied by responsible caregiver, and consenting for the study were included. Patients with known acquired or congenital head-neck deformity, second primary head-neck cancer, or unable to interview were excluded.

Study tools: QOL was assessed using a translated and validated Marathi version of EORTC QLQ. A core questionnaire EORTC QLQ-C30 (version3.0)[10] and head-neck specific EORTC QLQ-H&N43[19] were used. EORTC QLQ-C30 is divided into three parts—a global health status (single item), function scales (5 multiple items), and a symptom scale (3 multiitem and 6 single-item scales). Thus, it includes a total of 15 item scales. EORTC QLQ-H&N43 is the supplementary head-neck specific questionnaire to be employed in conjunction with the core questionnaire. It incorporates 12 multi-item and 7 single-item scales. Thus, a total of 19 item scales are evaluable. Score calculation was done as per the EORTC guidelines[20] for core questionnaire and as per the EORTC QLQ-H&N43 scoring manual received from the EORTC QOL unit, EORTC Data Centre, Brussels, Belgium. The score ranges from 0 to 100. High score of function scale represents high/healthy (better) level of functioning, high score of global health status represents high (better) QOL, while high score of symptom scale represents high (worse) level of symptomatology or problem. Calculation and interpretation of all item scales of EORTC QLQ-H&N43 are similar to the symptom scale of EORTC QLQ-C30 (version3.0).

Study methodology: Consecutive eligible patients were enrolled in the study and were offered with the Marathi language version of EORTC QLQ-C30 (version 3)[10] and EORTC QLQ H&N43[19] pre-RT. The purpose of the study was briefly explained to each participant. Patients completed the EORTC QLQ and filled the answers on their own (module) or with the help of an investigator (schedule); either because of illiteracy problem or technical difficulties like unavailability of spectacles. In the schedule subgroup, investigator read the questions aloud and noted the respondent's responses. Treatment was delivered as per the discretion of the treating physician while respecting the evidence; using three-dimensional conformal RT (3DCRT), intensity-modulated RT (IMRT), or

combination of both to a dose ranging from 1.1 Gy/fraction twice a day to 2.5 Gy/fraction per day. Patients completing the planned RT and reporting for first physical follow-up visit (6–18 weeks after RT conclusion) were reserved with the EORTC QLQ. The patients completing both the pre- and post-RT QLQ were analyzed further.

Staging of HNSCC was done as per the American Joint Committee of Cancer staging manual (8th edition).[21] P-16 immunohistochemistry was not done and hence all patients of OPX were staged as human papillomavirus or P-16 negative. Socioeconomic status was noted according to the modified Prasad's classification.[22] Clinical and treatment details were collected from the prospectively maintained hospital records. Treatment toxicity was accessed as per the Common Terminology Criteria for Adverse Events version 5.0[23] and treatment response was accessed according to the Response Evaluation Criteria for Solid Tumors (RECIST-1.1) keeping in mind the limitations for postsurgery and RT.[24]

Statistical analysis: Considering the primary outcome as difference in QOL, before (pre-RT) and at first follow-up after RT (post-RT), and as per the literature review,[20,25,26] the sample size calculated was 100 in each arm. An α-error of 5% and β-error of 20% were considered.[20,25] The mean and standard deviation (SD) values of global health quality at pre-RT (mean [X1] = 53.80, SD1 = 21.60])] and at first follow-up post-RT (mean [X2] = 65.29, SD2 = 26.26) observed by Karimi et al, were referred.[26] Sample size was calculated using the following formula:

$$\text{Sample size } (n) = (Z_{1-\alpha/2} + Z_{1-\beta})^2 * (SD_1{}^2 + SD_2{}^2)/(X_1 - X_2)^2$$
$$= 7.84 * (21.60)^2 + (26.26)^2/(53.80 - 65.29)^2 = 66.87$$

Considering the heterogeneity of head and neck subsites, 1.5 times the calculated value was finalized as a sample size in each arm, that is, $66.87 \times 1.5 = 100$. Thus, 100 patients each in pre- and post-RT group were considered.

Statistical analysis was done using Graph-Pad, Instat-3 (California Inc) statistical software to derive a conclusion. Effect size (ES) for QOL items were calculated as it depicts clinically significant difference and was interpreted as trivial effect (0–0.19), small effect (0.2–0.49), medium effect (0.5–0.79), and large effect ($\geq$ 0.8). Minimal important change (MIC) (difference in mean of 5 to 15 for EORTC QLQ-C30, and for EORTC QLQ-H&N43 the difference of –3 to –14 was considered as improvement, and the difference of 8 to 16 was considered as deterioration for swallowing scale)[27,28] was noted.

Appropriate sample size was calculated to take care of random errors. Consecutive patients were evaluated to avoid selection bias. All the study participants were evaluated by single investigator to reduce an investigator bias. The questionnaires were checked for missed items/no response and readministered then and there to take care of no-response bias.

Results

Patient selection: A total of 364 HNSCC patients registered during the study period were evaluated. Note that 210 eligible enrolled patients completed the pre-RT QLQ. A total of 100 patients who completed both the pre- and post-RT QLQ were included in the study, analyzed, and reported further. ►Fig. 1 depicts the selection of study participants.

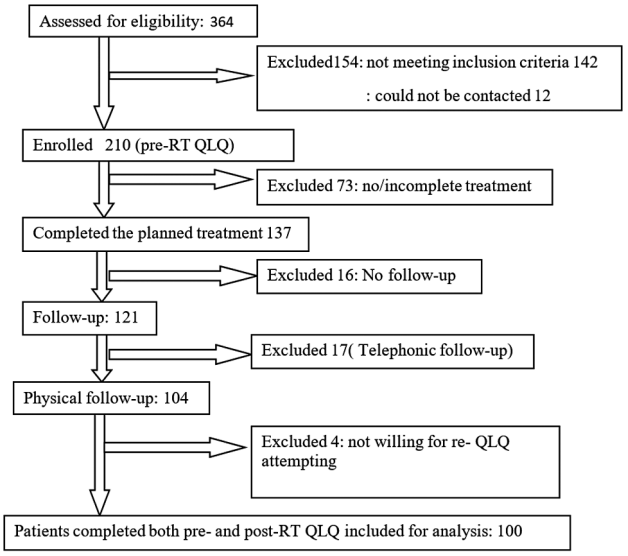

Fig. 1 Selection of study participants.

Patient characteristics: Note that 100 patients who completed both the pre- and post-RT QLQ were included in the study. Median age of patients was 53 years (range: 30–78 years) and man to woman gender ratio was 4.56:1. Detailed patient characteristics are depicted in ►Table 1.

Patients received either radical (45) or adjuvant (55) RT to a dose ranging from 46 Gy/19# to 72 Gy/36# over 3.5 to 7 weeks with 6 MV photons. Treatment and treatment response details are given in ►Table 2. Note that 1, 2, 1, and 1% patients had more than grade II skin, xerostomia, trismus, and neck edema as a RT toxicity.

Pre- versus post-RT QOL: For EORTC QLQ-C30, large ES was observed for financial difficulty (FI) (ES = 0.98), while medium ES was observed for pain (PA) (ES = 0.69), insomnia (SL) (ES = 0.59), constipation (Con) (ES = 0.41), and emotional functioning (EF) (ES = –0.62). MIC was observed for dyspnea (DY) (ES = –0.41), fatigue (FA) (ES = 0.42), loss of appetite (AP) (ES = 0.38), cognitive functioning (CF) (ES = –0.49), and social functioning (SF) (ES = –0.32).

For EORTC QLQ-H&N43, large ES was observed only for deterioration, that is, dry mouth and sticky saliva (DR) (ES = –1.75), problems with senses (SE) (ES = –1.31), and problems with skin (SK) (ES = –1.38). Swelling in the neck (SN) (ES = –0.40) showed deterioration with small ES. Medium ES for improvement was observed for pain in mouth (PM) (ES = 0.53) and fear of progression (AX) (ES = 0.75). Improvement with trivial and small ES was observed with speech (SP) (ES = 0.17), sexuality (SX) (ES = 0.17), shoulder pain (SH) (ES = 0.16), weight loss (WL) (ES = 0.16), problems with wound healing (WO) (ES = 0.13), and neurological problems (NE) (ES = 0.23), respectively.

Global health status improved significantly after treatment showing large ES (ES = –0.84). Thus, at short-term

Table 1 Characteristics of study subjects

Study parameters	Patients ($N = 100$)
Age in years Median Min-Max	 53 (30–78)
Sex male:female	4.56:1 (82:18)
Education 1. Illiterate 2. Up to secondary school 3. Above secondary school	 15 38 47
Occupation 1. Farmer 2. Manual worker 3. Technician/industrial worker/ teacher/office worker 4. Business 5. Homemaker 6. Retired 7. Unemployed	 46 16 19 04 06 08 01
Residence Rural Semiurban	 83 17
Socioeconomic class (modified Prasad classification [2018])[22] Upper class Middle class Lower class	 29 57 14
Substance abuse Yes No	 92 08
Comorbidities No Yes	 70 30
Duration of symptoms >3 mo ≤ 3 mo	 57 43
Site Oral cavity Oropharynx Hypopharynx Larynx	 62 12 14 12
Stage Stage I Stage II Stage III Stage IVA Stage IVB	 06ES = 18 12 27LA = 82 44 11
Treatment before registration at a RTCCC No definitive oncology treatment Surgery (Sx) Neoadjuvant chemotherapy (NACT)	 58 40 02

Abbreviations: ES, early stage; LA, locally advance stage; RTCCC, rural tertiary cancer care center.

follow-up, majority of parameters showed improvement except for treatment-related side effects (►Fig. 2). The detailed ES difference in pre- and post-RT QOL parameters is depicted in ►Table 3.

Table 2 Treatment and treatment outcome details ($N = 100$)

Study parameters	Frequency
Treatment received at a RTCCC Radical RT/CTRT Adjuvant RT/CTRT - After surgery - After NACT - After NACT followed by surgery	 45 55 - 46 - 06 - 03
RT details Dose range: 46 Gy/19# to 72 Gy/36# RT techniques 3DCRT IMRT Combined (3DCRT + IMRT)	 71 13 16
RT gap	16 patients 9–65 d (10 d median)
Treatment outcome Complete response/LRC Partial response Progressive disease Static disease	 74 20 03 03

Abbreviations: CTRT, concurrent chemoradiotherapy; IMRT, intensity-modulated radiotherapy; LRC, locoregionally controlled; NACT, neo-adjuvant chemotherapy; RT, radiotherapy; RTCCC, rural tertiary cancer care center; 3DCRT, three-dimensional conformal radiotherapy; #, fraction of radiation.

Discussion

Majority of Indian HNSCC patients presents in locally advanced stage of disease[29] resulting in poor treatment outcome and prognosis. Even after treatment majority of them are lost to follow-up. Hence, the long-term results are lacking.[4] Eighty-two percent patients in the present study had locally advanced stage. Note that 65.24% (137) patients completed the planned treatment; out of which 75.91% (104) patients reported for physical follow-up.

The function of head and neck region is affected by the disease and the side effects of surgery, chemotherapy, concurrent chemoradiotherapy (CTRT), and/or RT. Extent of surgery negatively affects the QOL, especially in patients of OC.[30] RT-related acute (mucositis, dysphagia, dermatitis) and late (xerostomia, speech, swallowing and voice changes, silent aspiration, osteoradionecrosis, laryngeal edema, sensory-neural hearing loss, skin fibrosis) toxicities result in increased morbidity and altered symptom scales of QOL during[31,32] and after treatment.[33–36] Indirectly it affects the functional domains of QOL.[31] Few late RT toxicities are permanent resulting in poor QOL in symptom scale even 3 years post-RT.[36] MacDowell et al concluded that despite IMRT, survivors experience many physical symptoms negatively affecting QOL.[37] It is difficult to spare the salivary glands completely so as the xerostomia. Posttreatment salivary function-related QOL is better with IMRT with equal survival as compared to two-dimensional or 3DCRT.[38,39] Though prophylactic exercises may help to improve the

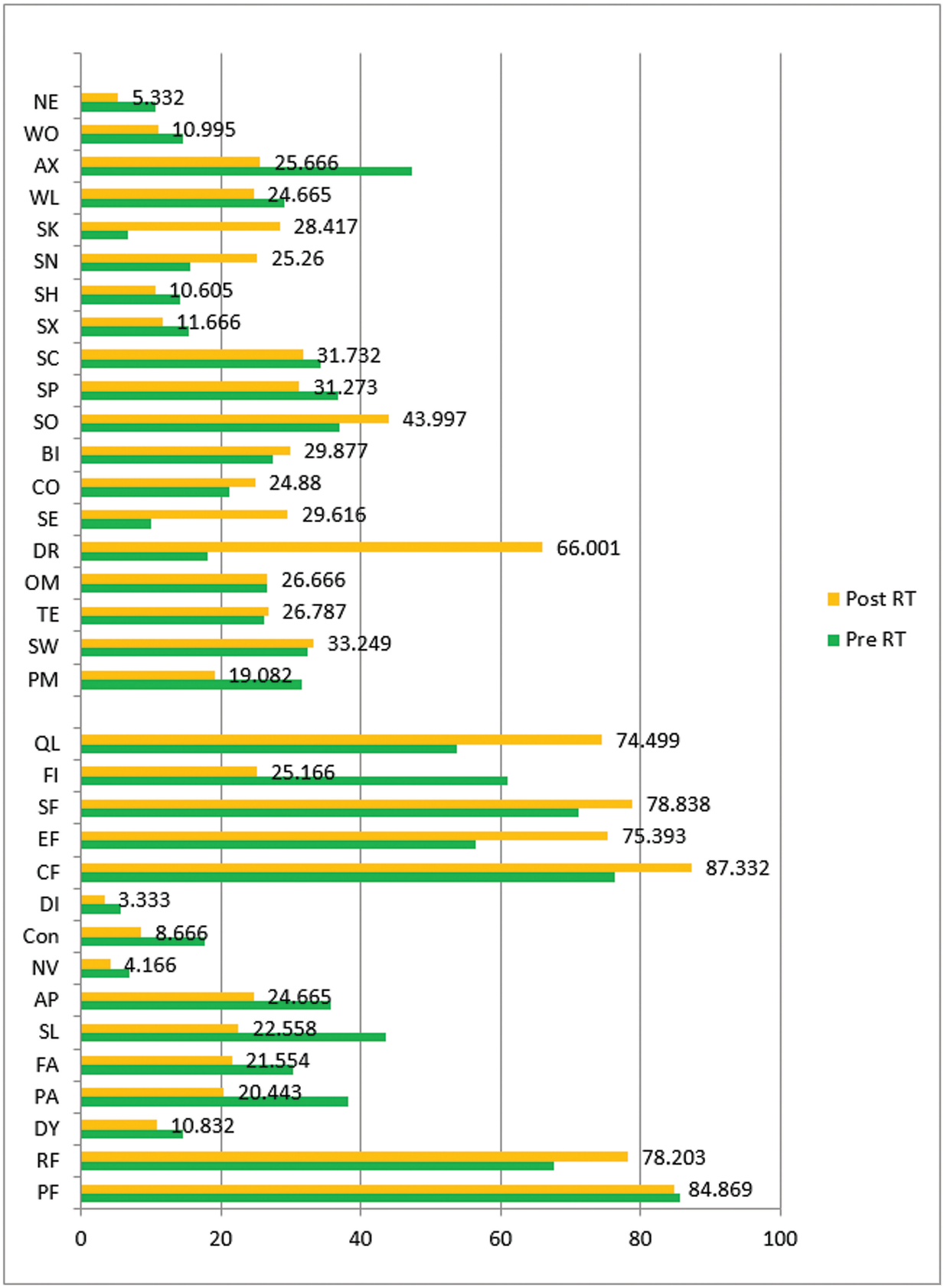

Fig. 2 Comparison between pre- and postradiotherapy quality of life ($N = 100$).

Table 3 Effect size difference in pre- and postradiotherapy quality of life ($N = 100$)

	Pre				Post				Post-pre treatment				
	Mean	SD	95L	95U	Mean	SD	95L	95U	Difference in mean	D95L	D95U	ES	ESI
EORTC QLQ-C30 (v3.0)													
PF	85.579	15.629	82.474	88.684	84.869	17.665	81.359	88.379	−0.71	1.115	0.305	0.045428	T
RF	67.672	25.276	62.65	72.895	78.203	26.14	73.01	83.398	10.531	−10.36	−10.503	−0.41664	S[a]
DY	14.665	21.256	10.422	18.909	10.832	18.253	7.206	14.46	−3.833	3.216	4.449	0.180326	T
PA	38.222	25.724	33.111	43.334	20.443	25.85	15.31	25.579	−17.779	17.801	17.755	0.691144	M
FA	30.277	20.883	26.128	34.427	21.554	21.118	17.359	25.751	−8.723	8.769	8.676	0.417708	S[a]
SL	43.669	35.675	36.578	50.755	22.558	28.89	16.786	28.331	−21.111	19.792	22.424	0.591759	M
AP	35.665	28.528	29.997	41.334	24.665	29.442	18.815	30.515	−11	11.182	10.819	0.385586	S[a]
NV	7.004	13.228	4.372	9.629	4.166	10.154	2.149	6.184	−2.838	2.223	3.445	0.214545	S
Con	17.665	21.945	13.305	22.026	8.666	17.485	5.192	12.14	−8.999	8.113	9.886	0.410071	M
DI	5.666	15.752	2.536	8.796	3.333	13.813	0.588	6.078	−2.333	1.948	2.718	0.148108	T
CF	76.283	22.373	71.838	80.729	87.332	19.243	83.595	91.14	11.049	−11.757	−10.411	−0.49385	S[a]
EF	56.38	30.46	50.335	62.439	75.393	24.988	70.074	80.004	19.013	−19.739	−17.565	−0.6242	M
SF	71.166	23.79	66.44	75.894	78.838	22.204	25.166	29.445	7.672	41.274	46.449	−0.32249	S[a]
FI	61	36.409	53.765	68.235	25.166	29.445	19.135	31.017	−35.834	34.63	37.218	0.984207	L
QL	53.749	24.715	48.839	58.66	74.499	23.535	69.823	79.176	20.75	−20.984	−20.516	−0.83957	L
EORTC QLQ-H&N43													
PM	31.583	23.4	26.934	36.233	19.082	22.073	14.697	23,469	−12.501	12.237	−23432.8	0.534231	M
SW	32.416	26.981	27.056	37.778	33.249	19.908	29.294	37.205	0.833	−2.238	0.573	−0.03087	T
TE	26.107	27.826	20.578	31.636	26.787	24.147	21.898	31.585	0.68	−1.32	0.051	−0.02444	T
OM	26.666	27.217	21.258	32.074	26.666	24.505	21.797	31.535	0	−0.539	0.539	0	T
DR	18.166	27.226	12.756	23.576	66.001	31.24	59.793	72.208	47.835	−47.037	−48.632	−1.75696	L
SE	10.008	14.983	7.024	12.978	29.616	21.301	23.383	33.849	19.608	−16.359	−20.871	−1.30868	L
CO	21.333	29.785	15.415	27.251	24.88	27.767	19.371	30.405	3.547	−3.956	−3.154	−0.11909	T
BI	27.388	23.092	22.8	21.977	29.877	22.32	25.442	34.312	2.489	−2.642	−12.335	−0.10779	T
SO	36.921	26.75	31.606	42.237	43.997	26.142	38.805	49.194	7.076	−7.199	−6.957	−0.26452	S
SP	36.699	31.246	30.491	42.908	31.273	26.414	26.025	36.522	−5.426	4.466	6.386	0.173654	T
SC	34.332	27.811	28.806	39.859	31.732	26.039	26.558	36.906	−2.6	2.248	2.953	0.093488	T
SX	15.499	22	11.128	19.871	11.666	21.386	7.417	15.916	−3.833	3.711	3.955	0.174227	T

Table 3 (*Continued*)

	Pre				Post				Post-pre treatment				
	Mean	SD	95L	95U	Mean	SD	95L	95U	Difference in mean	D95L	D95U	ES	ESI
SH	14.11	22.016	9.736	18.486	10.605	17.73	7.065	14.147	−3.505	2.671	4.339	0.159202	T
SN	15.666	23.903	6.778	15.626	25.26	27.393	19.78	30.723	9.594	−13.002	−15.097	−0.40137	T
SK	6.778	15.626	3.673	9.883	28.417	25.845	23.255	33.579	21.639	−19.582	−23.696	−1.38481	L
WL	28.999	26.657	23.702	34.296	24.665	26.641	19.372	29.959	−4.334	4.33	4.337	0.162584	T
AX	47.421	28.867	41.686	53.158	25.666	26.74	20.353	30.98	−21.755	21.333	22.178	0.753629	M
WO	14.666	27.348	9.232	20.1	10.995	21.729	6.68	15.319	−3.671	2.552	4.781	0.134233	T
NE	10.665	23.152	6.066	15.267	5.332	13.169	2.717	7.948	−5.333	3.349	7.319	0.230347	S

Abbreviations: AP, appetite loss; AX, fear of progression; BI, body image; CO, coughing; Con, constipation, CF, cognitive functioning; DI, diarrhea; DR, dry mouth, sticky saliva; DY, dyspnea; EF, emotional functioning; EORTC QLQ, European Organization for Research and Treatment of Cancer Quality of Life Questionnaire; ES, effect size; ESI, effect size interpretation; FA, fatigue; FI, financial difficulties; NE, neurological problems; NV, nausea and vomiting; OM, problems opening mouth; PA, pain; PF, physical functioning; PM, pain in mouth; QL, global health status; RF, role functioning; SC, social contact; SD, standard deviation; SE, problems with senses; SF, social functioning; SH, problems with shoulder; SK, skin problems; SL, insomnia; SN, swelling in the neck; SO, social eating; SP, speech; SW, swallowing; SX, sexuality; TE, problems with teeth; WO, problems with wound healing; WL, weight loss; 95L-95% confidence interval lower limit; 95U–95%, confidence interval upper limit.
[a]Minimal important change (MIC), T - trivial ES, S - small ES, M - medium ES, L - large ES.

organ function at no added cost,[40,41] IMRT, a significantly more costly RT modality is widely adopted,[42] specially as a dysphagia aspiration-related structure sparing RT modality.[43] Majority of QOL parameters of our study showed clinically significant improvement except for the QOL domains depicting the treatment toxicities. Thus, the QOL assessment helps to identify a subgroup requiring specific symptom-directed therapy. Presently, the MIC for head-neck specific questionnaire is exemplified for swallowing domain[28] and the rest are under development. The clinically significant difference or change is gaining importance over the statistically significant difference. Future studies directed to reduce the treatment toxicities or improved functional outcome measured using QLQ evaluating the clinically significant difference are warranted.

An important study from an apex urban Indian cancer institute concluded that there is substantial deterioration in QOL after curative-intent head–neck irradiation that gradually improves over time. IMRT results in clinically meaningful and statistically better QOL scores for some domains compared to 3DCRT at several time points with comparable disease outcomes. This could support widespread adoption of IMRT in routine clinical practice.[38,39] At the same time, Kumar and Bhaskar concluded that cobalt brachytherapy and teletherapy are best for the developing nations like India and highly conformal RT should be used in trail setting.[44] Quality training of oncology professionals and regular quality check are necessary,[45] specially when using higher technology. Risk (financial toxicity) and benefits (majority presenting in locally advance stage) of highly conformal therapy needs to be considered and individualized treatment should be offered.

QOL domains affected in rural HNSCC patients showed geographical variation. Adamowicz et al observed poor QOL in emotional domain in rural HNSCC survivors from America.[13] Physical domain of QOL was affected in Australian literature.[14] European studies showed poor QOL in both physical and emotional domains.[12,15] These differences could be because of QOL assessment at different time points of patient's cancer life (e.g., as a cancer patient or as a cancer survivor). We could identify a single cross-sectional study from rural India evaluating the QOL in 50 HNSCC patients admitted in hospital and undergoing various forms of treatment (neoadjuvant chemotherapy /RT/CTRT). QOL instrument used by the author was World Health Organization QOL scale. Authors concluded poor QOL of patients which was dependent on patient's socioeconomic status.[16] None of the studies compared pre- versus post-RT QOL difference.

Rural-urban disparities were observed in diagnostic and therapeutic facilities in India which affected the stage at presentation and survival of HNC patients,[4] and hence the QOL. Note that 83% patients of the present study were rural residents while 17% were from small town (taluka place). Reverse was the picture described in western literature; 26.3% were rural residents and majority of the patients were insured.[46] No urban-rural difference in stage at presentation or survival was observed by Mukherjee et al among the HNSCC patients of south eastern America.[47]

Multimodality treatment and technological advances have helped improve the survival[48] which along with the tumor or disease control has almost reached a plateau. Hence, the QOL assessment is important. Though QOL improves after treatment in certain domains, treatment-related side effects limit the better QOL outcome. Thus, there is need to increase the benefit-to-risk ratio by timely interventions, and QOL assessment helps to identify the subgroup of patients in need of symptom-directed interventions. QOL is multidimensional and all dimensions should be considered simultaneously, because of potential tradeoffs between them. Physical, social, and emotional well-being along with development and activity are important dimensions of QOL.[49] QLQ, that is, subjective assessment, in patient's own language should be incorporated in clinical studies for better understanding and timely addressing the patient's problems. With the help of advancement in information technology and artificial intelligence, patient-friendly QLQ needs to be designed considering the literacy and understandability issues of rural patients.

There were few shortcomings of this study. QOL itself means a quality which is quantified while score calculation of EORTC QLQ. Hence, the limitations of qualitative study, that is, informer bias, cannot be ruled out. Patient's perception and attitude about QLQ and their physical and emotional status at the time of attempting QLQ may affect the outcome. These are the major limitations of any QOL study. The coronavirus disease pandemic and local transport constraints affected the patients' physical follow-up. The study group could have been more homogenous in terms of patient (age, gender, socioeconomic status, literacy level), disease (head-neck subsite, stage), and treatment (3DCRT/IMRT, dose-fractionation schedules, extent of surgery, and post-surgery recovery) characteristics.

Conclusion

There is considerable improvement in QOL in HNSCC patients after RT; especially in financial and emotional domains and except for the treatment-related toxicity domains. Future studies with large number of patients with relatively uniform characteristics and long-term follow-up will direct the trend of change in QOL after treatment.

Authors' Contributions

C.M.W. contributed to Conception and design, data collection whereas C.M.W., H.J.P. helped in Drafting the manuscript. C.M.W., H.J.P., B.R. completed Analysis and interpretation, revising, approval.

Conflict of Interest

None declared.

References

1 Coelho KR. Challenges of the oral cancer burden in India. J Cancer Epidemiol 2012;2012:701932
2 Kim JD, Firouzbakht A, Ruan JY, et al. Urban and rural differences in outcomes of head and neck cancer. Laryngoscope 2018;128 (04):852–858
3 Clarke JA, Despotis AM, Ramirez RJ, Zevallos JP, Mazul AL. Head and neck cancer survival disparities by race and rural-urban context. Cancer Epidemiol Biomarkers Prev 2020;29(10): 1955–1961
4 Kulkarni MR. Head and neck cancer burden in India. Int J Head Neck Surg 2013;4:29–35
5 Rural population in India. Assessed May 2, 2023 at: https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS?locations=IN
6 Pulte D, Brenner H. Changes in survival in head and neck cancers in the late 20th and early 21st century: a period analysis. Oncologist 2010;15(09):994–1001
7 Calman KC. Quality of life in cancer patients–an hypothesis. J Med Ethics 1984;10(03):124–127
8 Yan B, Yang LM, Hao LP, et al. Determinants of quality of life for breast cancer patients in Shanghai, China. PLoS One 2016;11(04): e0153714
9 Waghmare CM. Why is the EORTC QLQ-C30 (version 3) still the most widely used quality of life assessment tool in oncology? Cancer Res Stat Treat 2022;5:376–378
10 Chaukar DA, Das AK, Deshpande MS, et al. Quality of life of head and neck cancer patient: validation of the European organization for research and treatment of cancer QLQ-C30 and European organization for research and treatment of cancer QLQ-H&N 35 in Indian patients. Indian J Cancer 2005;42(04):178–184
11 Baile WF, Gibertini M, Scott L, Endicott J. Depression and tumor stage in cancer of the head and neck. Psychooncology 1992;1:15–24
12 Depta A, Jewczak M, Skura-Madziała A. Quality of life of patients from rural and urban areas in Poland with head and neck cancer treated with radiotherapy. A study of the influence of selected socio-demographic factors. Arch Med Sci 2017;13(06): 1474–1482
13 Adamowicz JL, Christensen A, Howren MB, et al. Health-related quality of life in head and neck cancer survivors: evaluating the rural disadvantage. J Rural Health 2022;38(01):54–62
14 Pateman KA, Cockburn NL, Batstone MD, Ford PJ. Quality of life of head and neck cancer patients in urban and regional areas: an Australian perspective. Aust J Rural Health 2018;26(03):157–164
15 Thomas AA, Timmons A, Molcho M, et al. Quality of life in urban and rural settings: a study of head and neck cancer survivors. Oral Oncol 2014;50(07):676–682
16 Barot R, Sivabalan T. A study to evaluate the quality of life in head and neck cancer patients admitted in Pravara Rural Hospital, Loni (BK). Asian J Nurs Educ Res 2013;3:21–24
17 Declaration of Helsinki 2000-WMA-world medical association. Accessed January 21, 2023 at: https://www.wma.net/medical-ethics/doh-oct2000
18 Performance scales: Karnofsky and ECOG score. Assessed November 19, 2022 at: https://oncologypro.esmo.org/oncology-in-practice/practice-tools/performance-scales
19 Waghmare CM, Pawar HJ, Jain VS, Bhanu A, Thakur PK, Nirmal PH. Marathi translation and linguistic validation of an updated European Organization for Research and Treatment of Cancer Quality of Life module for head and neck. South Asian J Cancer 2020;9 (04):199–203
20 Scott NW, Fayers PM, Aaronson NK, et al. On behalf of the EORTC quality of life group. EORTC QLQ-30 reference values Brussels: Published by European Organisation for Research and Treatment of Cancer; 2008:6
21 Part II. Head and Neck. In: Amin MB, Edge S, Greene F, Byrd DR, Brookland RK, Washington MK, Gershenwald JE, Compton CC, Hess KR, et al., eds. AJCC Cancer Staging Manual. 8th ed. Chicago, IL: American Joint Commission on Cancer, Springer International Publishing; 2017:55–161
22 Pandey VK, Aggarwal P, Kakkar R. Modified BG Prasads socio-economic classification 2018: The need of an update in present scenario. Indian J Community Health 2018;30:82–84
23 National Cancer Institute updates CTCAE v5.0. Assessed September 15, 2023 at: http://www.uptodate.com

24 Eisenhauer EA, Therasse P, Bogaerts J, et al. New response evaluation criteria in solid tumours: revised RECIST guideline (version 1.1). Eur J Cancer 2009;45(02):228–247
25 Michael CJ, Machin D. Medical Statistics: A Commonsense Approach. 2nd ed. West Sussex: John Wiley & Sons Ltd.; 1996:156
26 Karimi AM, Gairola M, Ahlawat P, et al. Health-related quality of life assessment for head-and-neck cancer patients during and at 3 months after radiotherapy - a prospective, analytical questionnaire-based study. Natl J Maxillofac Surg 2019;10(02):134–140
27 Musoro JZ, Coens C, Singer S, et al; EORTC Head and Neck and Quality of Life Groups. Minimally important differences for interpreting European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 scores in patients with head and neck cancer. Head Neck 2020;42(11): 3141–3152
28 Singer S, Hammerlid E, Tomaszewska IM, et al; EORTC Quality of Life Group and the EORTC Head and Neck Cancer Group. Methodological approach for determining the minimal important difference and minimal important change scores for the European Organisation for Research and Treatment of Cancer Head and Neck Cancer Module (EORTC QLQ-HN43) exemplified by the Swallowing scale. Qual Life Res 2022;31(03):841–853
29 Mathur P, Sathishkumar K, Chaturvedi M, et al; ICMR-NCDIR-NCRP Investigator Group. Cancer statistics, 2020: report from National Cancer Registry Program, India. JCO Glob Oncol 2020; 6:1063–1075
30 Jimenez JE, Nilsen ML, Gooding WE, et al. Surgical factors associated with patient-reported quality of life outcomes after free flap reconstruction of the oral cavity. Oral Oncol 2021; 123:105574
31 Kelly C, Paleri V, Downs C, Shah R. Deterioration in quality of life and depressive symptoms during radiation therapy for head and neck cancer. Otolaryngol Head Neck Surg 2007;136(01):108–111
32 Trotti A, Bellm LA, Epstein JB, et al. Mucositis incidence, severity and associated outcomes in patients with head and neck cancer receiving radiotherapy with or without chemotherapy: a systematic literature review. Radiother Oncol 2003;66(03):253–262
33 Wijers OB, Levendag PC, Braaksma MMJ, Boonzaaijer M, Visch LL, Schmitz PI. Patients with head and neck cancer cured by radiation therapy: a survey of the dry mouth syndrome in long-term survivors. Head Neck 2002;24(08):737–747
34 Mendenhall WM. Mandibular osteoradionecrosis. J Clin Oncol 2004;22(24):4867–4868
35 Bhinde SA, Harrington KJ, Nutting CM. Otological toxicity after postoperative radiotherapy for parotide tumors. Clin Oncol 2007; 19:77–82
36 Hammerlid E, Taft C. Health-related quality of life in long-term head and neck cancer survivors: a comparison with general population norms. Br J Cancer 2001;84(02):149–156
37 MacDowell LJ, Rock K, Xu W, et al. Long term late toxicity, quality of life and emotional distress in patients with nasopharyngeal carcinoma treated with IMRT. Int J Radiat Oncol Biol Phys 2018; 102:340–352
38 Rathod S, Gupta T, Ghosh-Laskar S, Murthy V, Budrukkar A, Agarwal J. Quality-of-life (QOL) outcomes in patients with head and neck squamous cell carcinoma (HNSCC) treated with intensity-modulated radiation therapy (IMRT) compared to three-dimensional conformal radiotherapy (3D-CRT): evidence from a prospective randomized study. Oral Oncol 2013;49(06):634–642
39 Gupta T, Kannan S, Ghosh-Laskar S, Agarwal JP. Systematic review and meta-analyses of intensity-modulated radiation therapy versus conventional two-dimensional and/or or three-dimensional radiotherapy in curative-intent management of head and neck squamous cell carcinoma. PLoS One 2018;13:e0200137
40 Kotz T, Federman AD, Kao J, et al. Prophylactic swallowing exercises in patients with head and neck cancer undergoing chemoradiation: a randomized trial. Arch Otolaryngol Head Neck Surg 2012;138(04):376–382
41 van Gogh CD, Verdonck-de Leeuw IM, Boon-Kamma BA, et al. The efficacy of voice therapy in patients after treatment for early glottic carcinoma. Cancer 2006;106(01):95–105
42 Razfar A, Mundi J, Grogan T, et al. Intensity modulated radiotherapy for head and neck cancer: cost implications. Am J Otolaryngol 2016;37(6):479–483
43 Eisbruch A, Schwartz M, Rasch C, et al. Dysphagia and aspiration after chemoradiotherapy for head-and-neck cancer: which anatomic structures are affected and can they be spared by IMRT? Int J Radiat Oncol Biol Phys 2004;60(05):1425–1439
44 Kumar RV, Bhaskar S. Is the fast-paced technological advancement in radiation therapy good for India. J Cancer Policy 2015; 4:26–30
45 Laskar SG, Sinha S, Krishnatry R, Grau C, Mehta M, Agarwal JP. Access to radiation therapy: from local to global and equality to equity. JCO Glob Oncol 2022;8:e2100358
46 Nguyen M-L, Derouen JT, Cantrell JN, et al. Rural disparities in head and neck cancer from 2017 to 2021: a single institution analysis. J Radiother Pract 2023;22:1–7
47 Mukherjee A, Idigo AJ, Ye Y, et al. Geographical and racial disparities in head and neck cancer diagnosis in South-Eastern United States: using real-world electronic medical records data. Health Equity 2020;4(01):43–51
48 Pignon JP, Bourhis J, Domenge C, Designé L Chemotherapy added to locoregional treatment for head and neck squamous-cell carcinoma: three meta-analyses of updated individual data. MACH-NC Collaborative Group. Meta-Analysis of Chemotherapy on Head and Neck Cancer. Lancet 2000;355(9208):949–955
49 Felce D, Perry J. Quality of life: its definition and measurement. Res Dev Disabil 1995;16(01):51–74

