INTERNATIONAL ANNALS OF HEALTH SCIENCES (IAHS)

Original Research

Open Access

Assessment of functional outcome and quality of life after-treatment of oral squamous cell carcinoma

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Abstract

Objective

To assess the functional outcome and impact on the quality of life after treatment for squamous cell carcinoma using Qol questionnaire

To assess the level of anxiety and depression among patients treated for SCC

To emphasize the implementation of the QoL questionnaire as a regular assessment tool to identify post-treated patients' special needs and improve care protocol.

Methodology

A cross-sectional survey was done with post-operative patients of oral squamous cell carcinoma, where a structured, close-ended questionnaire was used comprised of 30 items that are intended to inquire about patient's post-operative status of quality of life based on standardized scales as EORTC Quality of life (QLQ-C30), Quality of life Questionnaire Head & Neck (QLQ-H&N35) and HADS Questionnaire of hospital Anxiety and depression scale. However, the sample was sub-divided into three groups according to the treatment received Patients treated with surgery & reconstruction, Patients treated with Radiotherapy, and Patients treated with Surgery + Reconstruction and Radiotherapy respectively. The data was collected from three tertiary care hospitals and the total sample size was 120.

Results and conclusion

Treatment that included both surgery and radiotherapy resulted in the highest level of symptom burden and psychological morbidity including depression and anxiety. These changes were most devastating to younger patients as they mostly lamented over loss of bodily function, reduced ability to work and changes in body appearance became key determinants of social and psychological well-being. The study also highlights the need to establish a more long-term follow-up beyond treatment and perform a QoL questionnaire to discover per-patient needs.

Keywords

Oral squamous cell carcinoma, oral health-related quality of life, functional and psychosocial outcomes, post-treatment, radiotherapy, surgical resection

Introduction

Head and neck cancer (HNC) poses a dual challenge to patients, threatening not only their survival but also their functional and aesthetic well-being. The oral cavity, vital for swallowing, speech, breathing, and social interaction, plays a crucial role in maintaining quality of life. Cancer treatments often compromise these functions and esthetics, leading to significant physical limitations, reduced self-esteem, and social isolation.

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Date of Receiving: December 4, 2024

Date of Revision: January 6, 2025

Date of Acceptance: January 6, 2025

DOI: https://doi.org/10.69491/3f9hrs58

Globally, oral cancer ranks among the ten most common cancers, affecting approximately 14.1 million people (1). However, its prevalence is disproportionately higher in developing countries, particularly in South Asia (2). In Pakistan, oral and pharyngeal cancers are among the most frequently diagnosed cancers. From 2005 to 2006, head and neck cancers accounted for 14.5% of cancer cases, with 90–95% of oral cancers classified as squamous cell carcinomas or their variants (3). Annually, around 13,000 new oral cancer cases are reported, making it the second most common cancer among men (after lung cancer) and women (after breast cancer) in Pakistan. Despite a global incidence rate of less than 5%, oral cancers constitute 40% of cancer cases in the Indo-Pakistani subcontinent (4). The high burden of oral cancers in Pakistan is driven by several socio-cultural factors, including the widespread use of smokeless tobacco products such as pan, chaalia, gutka, and naswar. These habits, deeply ingrained in local culture, contribute significantly to the disease's prevalence and late-stage presentation, leading to poor survival outcomes. While advancements in diagnostic and therapeutic modalities have improved prognosis globally, Pakistan continues to face challenges due to delayed diagnoses, limited awareness, and inadequate access to specialized care.

This study focuses on addressing the public health crisis posed by oral cancer in Pakistan by examining its epidemiological trends, risk factors, and outcomes. By narrowing the scope to the cultural, behavioral, and systemic factors unique to this region, the research aims to identify barriers to early detection and effective management. Addressing these issues is crucial for developing targeted prevention strategies, raising public awareness, and improving patient outcomes in a country where oral cancer remains a leading cause of cancer-related mortality.

Objective of the study

- To assess the functional outcome and impact on the quality of life after treatment for squamous cell carcinoma using Qol questionnaire
- To assess the level of anxiety and depression among patients treated for SCC
- To emphasize the implementation of the Qol questionnaire as an assessment tool on a regular basis to identify post-treated patients' special needs and improve care protocol.

Materials and methods

The study follows Cross Sectional (Analytic) design where data was collected from three major institutes of Sindh Pakistan between March 2015 to September 2016.

1. Abbassi Shaheed Hospital.
2. Liaquat University of Medical Health Science Jamshoro
3. ISRA University and Dental College Hyderabad

The Sampling Technique that was employed was the Convenience Sampling technique. Sample Size comprises 120 patients treated for SCC which was calculated via using open-epi software. The sample was categorized into three groups.

- ➢ Group 1: Patient treated with surgery & reconstruction
- ➢ Group 2: Patient treated with Radiotherapy
- ➢ Group 3: Patients treated with Surgery + Reconstruction and Radiotherapy

Inclusion criteria comprised patients visiting for regular post-operative follow-up at least 4 months after treatment. Age group 18 – 70 years consider both Gender and those who were willing to participate in the study. Participants that were recruited were ensured to be presented after treatment of Oral Squamous Cell Carcinoma with at least 4 months of completion of treatment. However, Patients with Co-morbid & systemic illness, recurrence or residual disease, terminally ill, cancer other than the oral cavity, patients on chemotherapy, and patients with mental and physical disabilities or taking medication for such illness were excluded. Three questionnaires were used at the same time as a snapshot

- **The EORTC Quality of life (QLQ-C30)**, 30 questions grouped into five functional scales, nine scales associated with symptoms, and a global scale(8).
- **Quality of life Questionnaire Head & Neck (QLQ-H&N35)**, 35 questions – 30 grouped into 13 scales and of five simple answers (9).
- **HADS Questionnaire of hospital Anxiety and Depression scale**, (14-item questionnaire, two subscales; Depression and Anxiety (10).

Data analysis was done by using SPSS version 21 mean, Standard Deviation, and percentages were calculated for quantitative variables. ANOVA test & Nonparametric test (Kruskal Wallis test) were used for different group comparisons. P value is also calculated.

Results

Table 1-Overview of socio-demographic and clinical characteristics of the study sample n=120

Variable	**n**	**%**
Gender		
Male	90	75
Female	30	25
Age Range		
18 to 35 years	40	33.3
36 to 50 years	64	53.3
> 50 years	16	13.4
Marital Status		
Single	20	16.7
Married Stable Union	88	73.4
Divorcee Separated	10	8.3
Widow	1	0.8
Widower	1	0.8
Occupation		
Private Worker	21	17.5
Government Worker	42	35
Self Employed	39	32.5
Retire	15	12.5
Jobless	3	2.5
Income*		

< 15,000 per month	41	34.2
16,000 -25,000 per month	38	31.7
> 25,000 per month	22	18.3
50,000 – 100,000 per month	19	15.8

Around 39.2% had dependant family members b/w 5-8, and 37.5% completed 5-8 years of schooling. Highest percentage of Urdu speaking were found in our sample which highlights the major population of them in Karachi city (table-2)

Table 2-familial dynamics of the participants

Dependent Family Members		
< 4 Members	46	38.3
5 – 8 Members	47	39.2
> 10 Members	27	22.5
None	0	0
Years of schooling		
≤ 4 Years	12	10
5 to 8 Years	45	37.5
9 to 12 Years	40	33.3
>12 Years	23	19.2
Ethnicity		
Urdu Speaking	41	34.2
Sindhi	39	32.5
Punjabi	12	10
Balochi	14	11.7
Pathan	7	5.8
Others	7	5.8

Clinical characteristics include the highest exposure to smoking followed by betel nut and Gutka. The primary site of the tumor was highest for buccal mucosa followed by tongue ca and floor of the mouth. The highest number presented with an advanced stage at the time of diagnosis and moderately differentiated SCC on grading were more prevalent in our sample (table-3)

Table 3-pattern of OSCC amongst study participants

Risk Factor		
Smoking	33	27.5
Tobacco	18	15
Pan	08	6.7
Chalia (Betel Nut)	28	23.3
Naswar	10	8.4
Gutka	22	18.3
Alcohol	1	0.8
Site of Cancer		
Tongue	36	30
Buccal Mucosa	51	42.5
Floor of Mouth	22	18.3
Lip	2	1.7
Palate	2	1.7
Maxilla	4	3.3
Alveolus	3	2.5
Grading		
Poorly Differentiated	39	32.5
Moderately Differentiated	52	43.3
Well Differentiated	29	24.2
TNM Stage		
Stage 1	7	6
Stage 2	10	8.4
Stage 3	61	51
Stage 4	42	35

It represents scores for function and symptoms for the general quality of life C30 questionnaire. The highest mean values were calculated in all domains of function and symptom for a group who received surgery and radiotherapy in combination which means low disease impact was seen in terms of function but a high burden of symptoms was seen in the same group, as table shown high mean value for loss of appetite was calculated in surgery alone group. You can appreciate statistically significant p-values for physical, emotional, and social functions indicating high treatment impact in this domain of a person's life. The highest mean value for general health status was noted in radiotherapy alone group (table-4)

Table 4-: Results of EORTC QLQ C30 between different treatment groups of OSCC patients (n=120)

	Type of Treatment			
	Surgery + Reconstruction	**Radiotherapy**	**Surgery + Reconstruction + Radiotherapy**	
Functions[1]	Mean(SD)	Mean(SD)	Mean(SD)	p-value
Physical Function	76.4(22.6)	82.1(24.3)	89.7(20.3)	0.032
Emotional Function	76.3(18.2)	79.6(17.1)	86(17)	0.044
Cognitive Function	88.6(20.1)	86.9(16.4)	92.3(14.1)	0.353
Social Function	72.8(15.6)	78.5(15.9)	84.8(15.5)	0.004
Role Performance	80.4(24.2)	76(22)	87.6(20)	0.064
Symptoms[2]				
Fatigue	17.9(29.3)	15.7(26.2)	20.1(31.8)	0.797
Nausea and Vomits	8(16.7)	7.8(18)	8.3(18.8)	0.988
Pain	17.6(19.8)	14.5(20)	29.4(21.6)	0.003
Dyspnea	6.6(11)	2.1(5.7)	7.2(13)	0.06
Insomnia	11.8(19.6)	13.3(21.1)	13.9(20.2)	0.892
Loss of appetite	22.4(39.2)	18(39.6)	20(37)	0.878
Constipation	7.5(21.5)	8(22.7)	8.8(26.4)	0.969
Diarrhea	8.3(20.1)	6.2(19.3)	11.9(25.1)	0.494
Financial Difficulty	25.8(28.3)	25.1(24.2)	40.5(34.7)	0.033
General Health **Status / Qol**	63.6(20.1)	77.7(17.6)	70.4(18)	0.004

1 One Way ANOVA Test, 2 Kruskal Wallis Test

Representation of QOL H & N specific questionnaire shows statistically significant p-value between 3 groups for pain, feeling sick, food supplement, weight loss, and weight gain categories of symptom. You can appreciate a higher mean value calculated for problems with teeth in the radiotherapy alone group. Pain, problems with speech, feeling sick, food supplements, and weight loss have high mean values in the group that underwent surgery and radiotherapy in combination which indicates a higher impact on symptoms in this group (table-5)

Table 5-Results of QLQ-H&N35 Between different treatment groups of OSCC patients (n=120)

Symptoms	**Surgery + Reconstruction**	**Radiotherapy**	**Surgery + reconstruction + radiotherapy**	**p-value***
	Mean (SD)	Mean (SD)	Mean (SD)	
Pain	18 (19.1)	17.9 (20.2)	29.5 (20.5)	0.018
Senses (taste and smell)	33.3 (38)	29.4 (35.4)	34.8 (40.2)	0.916
Swallowing	22.6 (30.6)	15.7 (28.6)	22 (29.7)	0.492
Problems with speech	27.1 (27.3)	21 (28.8)	30.4 (34.5)	0.462
Social Feed Problems	20.8 (28.5)	18.9 (28.2)	19.1(30.6)	0.893
Interact Difficulties	8.8 (14.7)	8.1(12.6)	9.3 (13)	0.881
Sexuality	10.9 (16.6)	11 (18.4)	11.1 (22.3)	0.934
Problems with Teeth	32.7 (46.1)	35.4 (45.5)	34.8 (42.2)	0.648
Difficulty Opening Mouth	13.6 (28)	14(26.3)	13.2 (27.5)	0.786
Dry Mouth	31.4 (39.1)	34 (36.7)	34.8 (40.2)	0.692
Sticky Salvia	20.2 (33.2)	26.1 (32)	24.3 (30.5)	0.574
Cough	16.2 (29)	18.9 (31.5)	17.4 (29.3)	0.221
Feels Sick	37.6 (36.4)	27.7 (20.3)	47.3 (31)	0.021
Takes analgesic	29.3 (40.5)	21.8 (30.2)	30.9 (46.6)	0.539

Food Supplement	32.5 (36.8)	23.4 (29.8)	43.1 (41.7)	0.048
Feeding with a probe	8.9 (27.5)	7 (14.1)	8.1 (26.2)	0.854
Weight Loss	45.8 (51.3)	28.7 (25.2)	50.6 (44.4)	0.049
Weight Gain	36.4 (37.3)	52.5 (45.4)	31.1 (35)	0.039

Table 6-Anxiety & Depression as measured by HADS

	HADS-T	**HADS-D**	**HADS-A**
Score (Mean ±SD)	16.1 ± 8.3	8.2± 5.6	7.9 ± 5.2
Scoring n (%)			
Normal (0 – 7)	13(32.5)	11(27.5)	12(30)
Borderline case (8 – 10)	13(32.5)	15(37.5)	13(32.5)
Case (11+)	14(35)	14(35)	15(37.5)

Table 7-Mean ± SD HADS according to different treatment groups of patients

	HADS-T (Mean ±SD)	**HADS-D (Mean ±SD)**	**HADS-A (Mean ±SD)**
Surgery + Reconstruction	15.7 ± 8.1	8.3± 5.6	7.9 ± 4.4
Surgery + Reconstruction + Radiotherapy	17.5 ± 8.9	9.2 ± 6.6	8 ± 5.3
Radiotherapy	15.2 ± 7.8	7.2 ± 4.7	7.7 ± 6
p-value*	0.428	0.293	0.967

Tables 6 & 7 represent the Hospital anxiety and depression scale calculated for three different groups. The mean value calculated was higher for cases that truly had anxiety and depression symptoms because of cancer treatment HADs Total calculated in this case category was 35%. Though P values were not significant in any of the groups as shown in the table but highest mean values for both anxiety and depression were calculated for the surgery and radiotherapy combination group.

Discussion:

Depression, isolation, and low social interaction were highly prevalent among patients with less time after elapsed of treatment. Patients treated with radiotherapy alone suffered poor QOL initially (11). High impact on symptoms was common with aggressive surgery along with post-operative radiation Functional loss & effect on QOL were less significant among stage I as compared to the advanced stage which is compatible with other studies. Young patients were found to be more depressed than old patients due to their functional loss and esthetics in this study (12). Patients who were able to eat and speak properly showed greater well-being and social interaction similar to other studies. Regardless of whatever different treatment modalities were used to treat patients, compromised physical function and difficulties in social return were significant among all groups in this study(13). The present study has offered valuable implications for the functional outcomes and QoL of patients who have received treatment for OSCC. From the data analysis of QoL self-completed forms and the subjects' HADS score, the study confirms that OSCC and its treatment methods significantly affect the patient's physical, social, and psychological spheres of life (14). Those receiving both surgery and radiotherapy reported higher NHPC version Symptom Burden which includes pain, difficulty in eating, and weight changes. These conclusions prove the highly active approach of combined treatments, which are usually required for further stages of a disease, to negatively affect the QoL. About the initial QoL findings patients in the radiotherapy alone group had lower QoL scores therefore indicating the need for specific supportive care during the recuperative period(15).

The study also highlights the demographic and cultural phenomenon of disease incidence and the efficacy of treatment in Pakistan, including high levels of smokeless tobacco use and the late stage of the disease due to lack of awareness and access to health care. This socio-cultural environment hinders the survival of OSCC in the region making the outlook even more miserable for affected patients (16).

Notably, the authors pointed out that young participants had higher depression and anxiety scores compared to older participants. Thus, such a trend could be explained by increased awareness of such adverse changes and their social rehabilitation among the young (17). It is considerations such as these that mean there is a need for psychological support and rehabilitation services to be developed along with taking into consideration the age of the patients(18).

Endorsement of clinically standardized tools such as the EORTC QLQ-C30, QLQ-H&N35, and HADS were effective in establishing the multiple-dimensional impact of OSCC treatments (19). These tools have shown some variation in the physical and emotional function of the patients across the treatment arms and the worst anxiety and depression scores were seen in patients who underwent surgery and radiotherapy (20). Thus the study has limitations it used convenience sampling and excluded patients with co-morbid conditions thus may be biasing the results (21).

In conclusion, these results highlight the desperate urgency of sequentially integrated protocols of care for physical, emotional, and social well-being. Assessment of QoL is suggested to be performed systematically to ascertain the potential requirements after the treatment, which will help direct necessary activities (22). As a subject of further research, future research should aim to involve a large number of patients of different ages and genders and use longitudinal research design to address the complexities of OSCC treatment's effects on QoL. The enhancement of diagnostic measures and the creation of early intervention programs can enhance the possibilities for highly prevalent areas of the world including Pakistan (23).

Conclusion

This paper aims to focus on a critical analysis of OSCC with certain consideration of the candidate treatment options, which do not exclude consideration of such relevant and important factors as the improvement of patient's QoL (quality of life) both in functional and psychoemotional perspectives. Treatment that included both surgery and radiotherapy resulted in the highest level of symptom burden and psychological morbidity including depression and anxiety. These changes were most devastating to younger patients as they mostly lamented over loss of bodily function, reduced ability to work and changes in body appearance became key determinants of social and psychological well-being. Attributed to improving early diagnosis and treatment is enhanced survival, but difficulties in enhancing QoL remain and are evident in countries like Pakistan where there is delayed diagnosis coupled with behaviors, for instance, tobacco smoking. The study also highlights the need to establish a more long-term follow-up beyond treatment and perform a QoL questionnaire to discover per-patient needs.

Recommendations

- Implementation of Routine QoL Assessments: Integrate reliable quality of life assessment measurements such as EORTC QLQ-C30, QLQ-H&N35, and HADS into follow-up assessments to determine the general, head and neck as well as the emotional status of OSCC patients (24).
- Comprehensive Rehabilitation Programs: Create and launch individualized and group I&D for PT, SLP; and BR psycho-social support to meet the patient’s needs.
- Early Detection and Prevention Campaigns: Launch targeted community Programs/ awareness for early screening and dietary changes for OSCC as well as cessation of smokeless tobacco use. To promote timely medical consultation among the identified risk groups education intervention should be focused (25).
- Customized Support for Younger Patients: It is essential to offer more specific programs targeted at younger breast cancer patients such as body image counseling, social reintegration services, and vocational rehabilitation.
- Support Groups and Community Involvement: Organize focus groups to minimize loneliness and maximize interactions from patient to patient. Make an appeal to the community to support the survivor to enhance his or her recovery.
- Resource Allocation for Palliative Care: More direct funding for all forms of palliative care to adequately treat the symptoms for better quality end-of-life options for the advanced stage (26).

Future intents:

Further large and locally diverse, prospective research should be done to study OSCC treatment effects on QoL in the long run. Promote the use of new therapies intended to reduce undesirable consequences of toxic therapeutic interventions.

The following is the implication that compliance with these recommendations would and career health care system to improve the overall recovery and quality of life of OSCC patients particularly in resourced limited settings.

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Conflict of interest: Author declares no conflict of interest.
Funding Disclosure: Nil

Author's Contribution:
Dr. Kamal Muhammad Mustafa: Conception and Design of work, drafting.
Dr. Sufiyan Ahmed: Supervise the research and provide critical evaluation for intellectual context.
Dr. Rida Faiz: Data collection and support in final draft
Dr. Mahrukh Iqbal: Data analysis and interpretation.