

# Assessment of oral mucositis during concurrent chemoradiation of head and neck cancers using patient-reported measurement scale

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## Abstract

**Introduction:** Oral mucositis (OM) is a major challenge encountered in concurrent radiochemotherapy for the treatment of head and neck cancers. The patient reported OM symptoms scale (PROMS) was administered on these patients. The objective was to develop the similar scale in an Indian language and prescribe it population undergoing cancer treatment. **Materials and Methods:** PROMS scale was converted to Telugu language. Fifty-one patients took part in the study. All of them answered the 10-point questions marked their responses on 100 mm visual analog scale after thorough oral examination using WHO grading by the same examiner. **Results:** Internal consistency of Cronbach's alpha on PROMS scale was 0.81–0.97. The questionnaire study was administered on 35 males and 16 females with the mean age of  $54.9 \pm 11.8$ . The decrease in the total PROMS score was marked on day 35 in almost all patients, with a mean value of  $34.04 \pm 30.2$  followed by a further significant decrease on day 60 (follow-up) with a mean of  $3.71 \pm 7.8$ . The PROMS scores correlated strongly with the clinician-rated OM scores during the first 35 weeks from the baseline at 0.84 with  $P < 0.01$  and poor correlation was at day 60, i.e. 0.32 with  $P < 0.05$  using Spearman's Rho correlation. **Conclusion:** The study showed a good correlation between patient-reported items and clinical score by standard grading scale. This questionnaire may not be a sole guide in assessing the severity of OM but could be definitely used as an adjunct to clinical oral examination at assessment levels.

**Key words:** Patient-reported oral mucositis symptoms, questionnaire, Telugu

## Introduction

Oral mucositis (OM) is a predictable and unavoidable representation during the course of radiotherapy/concurrent radiochemotherapy for the treatment of head and neck cancers. Significant morbidity, pain, odynophagia, and malnutrition are commonly encountered during the treatment sessions, thereby affecting overall quality of life (QOL) coupled with increased risk of infections due to impaired host defense. Psychological consequences of such a presentation are a common sequel among the treatment groups associated with anxiety and depression.<sup>[1-4]</sup>

Successful cancer treatment is a complex interplay between patient factors, source of treatment, and the attending physician.<sup>[2-5]</sup> Assessment of OM by clinician rating scales are universally accepted and are already popular. This is essential for effective supportive care during the treatment.<sup>[4,6]</sup>

Self-reported scales from the patient's perspective could assist in addressing their physical and psychological issues during the course of treatment. This is essential for effective management of complications during the treatment and also in the development of novel therapeutic protocols.<sup>[7-9]</sup> Nevertheless, some studies have assessed self-reported OM scales with considerable success. It has been stressed that patient-reported scales should be part of any new clinical trials on OM.

Gussgard and Tenenbaum *et al.* have developed the patient reported OM symptoms scale (PROMS) for administration on patients undergoing chemoradiotherapy and on patients undergoing bone marrow transplantation. It is a 10-item visual analog scale with questions on symptoms experienced during chemoradiotherapy self-marked on 100 mm scale.<sup>[1,2,10]</sup> It has been successfully validated and administered among the patients with good outcome as it has been found to be easy and reliable

on par with clinician-rated assessment of OM. There is an urgent need for such a scale for Indian population undergoing cancer treatment.

## Materials and Methods

The present questionnaire study was undertaken among the Indian patients suffering with head and neck cancers and undergoing chemoradiotherapy for cancers. The PROMS questionnaire was used in the study after obtaining consent from the authors to convert it into local Indian language - Telugu. The questionnaire was administered among ten patients undergoing cancer treatment to calculate its Cronbach coefficient, the degree, and the difference in understanding the language used in the questionnaire. Modifications were incorporated based on the feedback from these patients, and the version was rechecked for its overall performance.

## Patient Selection

The patients attending an oncology center within age 18 or more years and ability to open the mouth for clinical examination were the participants. The study procedure was explained, and the volunteers were duly recruited after obtaining informed consent. The study was cleared by Ethical Board of Oncology Center for conducting it in the hospital. The sample size was determined statistically as fifty. Prior dental examination was performed to rule out visible signs of ulceration other than carcinoma itself. The questionnaire was intended to be administered at regular weekly intervals from the baseline as 0, 7, 14, 21, 28, and 35 days with 60 days as follow period. The oral examination was performed at every interval using grading of OM using WHO criteria.

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Conventional radiotherapy was the treatment employed for all patients. Patients who were candidates for IMRT and IGRT were excluded from the study. The comorbidities such as diabetes, hypertension, and seropositive conditions were excluded from the study.

All the patients who were under chemoradiotherapy were given the radiotherapy dose ranging between 44 and 66 Gy for various tumors of oral cavity. Cisplatin 50 mg slow intravenous infusion weekly once for 5 weeks was employed concurrently as a chemotherapeutic modality.

### Procedure and outcome measures

The questionnaire initially consisted of four questions which were not related to oral health status. This is followed by ten questionnaires on the specific oral complaint. The 100 mm visual analog scale was used to demonstrate both ends of the severity of the problem. The patients were allowed to mark a vertical line on the scale of 100 mm to rate their oral health problem intensity on the scale for all the questions. Their attendants helped the patients who were unable to read the questionnaire. A total number of 51 patients took part in the study. Each participant was asked to answer the questions after thorough oral examination by the same examiner at all intervals. The data thus obtained were duly entered in the prescribed format along with WHO scales obtained in each patient.

## Results

### Internal consistency of patient-reported oral mucositis symptoms scale

This was calculated after describing it on ten patients. Cronbach's alpha was used to measure the internal consistency for each question formulated in the study. Any higher levels of the alpha suggested that the items in the questionnaire were highly correlated and lower values depicted poor interrelatedness between test questions. The internal consistency of PROMS scale was high at every time point [Table 1; Cronbach's alpha: 0.81–0.97] with low scores recorded on day 60 (follow-up), followed by scores on day 35 (discharge day). Specifically, on day 60, the Cronbach's alpha was low (0.50) when three of the functional-related items related to speech, eating, and drinking were removed. The next low alpha value was 0.67 on day 60, when four of the functional-related items related to speaking, eating hard and soft foods, and drinking were removed. Removal of item "Change in taste" has increased the Cronbach's alpha (0.89–0.92) at day 60.

Assuming the good internal consistency of the scale after the modification in suitable language, the same was administered on 51 patients attending cancer hospital for the treatment of head and neck malignancies among 35 males and 16 females with the mean age of  $54.9 \pm 11.8$ . The scale was applied

on all the patients from the baseline day of study initiation (first admission) until 60-day follow-up period. The response rate as the study progressed was at day 7, 14, 21, and 28 days, respectively.

The decrease in the total PROMS score was marked on day 35 in almost all patients, with a mean value of  $34.04 \pm 30.2$  followed by a further significant decrease on day 60 (follow-up) with a mean of  $3.71 \pm 7.8$  [Table 2].

With no exceptions, all the data in the questionnaire, the PROMS item scores showed a significant increase up to day 28, followed by a transient decrease in scores at day 35 and then further significant decrease in scores on day 60. Item scores of mouth pain, difficulty in eating hard foods, and change of taste exhibited significant increase in their mean scores (above 40) on day 28 and reducing back to near baseline levels by day 60.

### Patient reported oral mucositis symptoms scale scores versus experience of oral mucositis

The participant's experience of OM according to the PROMS scale values was determined using Spearman's Rho correlation. The grades of erythema, ulceration, and alimentation difficulties were evaluated using WHO criteria and were found to be correlated significantly with the total PROMS scores from baseline (day 0) to follow-up (day 60).

These values also demonstrated good correlations (Spearman's Rho: 0.32–0.84,  $P < 0.01$ ) with the clinician determined scores at the group level of overall time points (from baseline to day 60) [Table 3]. The PROMS scores correlated strongly with the clinician-rated OM scores during first 35 weeks from the baseline at 0.84 with  $P < 0.01$  and poor correlation was at day 60, i.e., 0.32 with  $P < 0.05$  [Table 3].

A maximum number of patients presented with carcinoma of tongue followed by carcinoma of buccal mucosa and carcinoma of oropharynx, the least being carcinoma of supraglottis. Two patients expired before they could complete follow-up by 60 days.

## Discussion

Patients self-reported issues imply a major step forward as an adjunct for clinical oral examination. The present questionnaire PROMS study was designed in accordance with Stewart *et al.* criteria. It had good internal reliability and correlated well to most of the clinically relevant grading during all phases of OM. Good precision was found between what was found clinically and what the patients had reported scores from the beginning of the treatment till the follow-up period.<sup>[1-3,8,11-13]</sup>

According to the study, there was a gradual increase in OM as reported by the patients with a clinical demonstration at day 14, which peaked at day 28 through day 21. There was

**Table 1: Internal consistency of patient-reported oral mucositis symptom scale**

|                                                                                               | Cronbach's $\alpha$ |       |        |        |        |        |        |
|-----------------------------------------------------------------------------------------------|---------------------|-------|--------|--------|--------|--------|--------|
|                                                                                               | Baseline            | Day 7 | Day 14 | Day 21 | Day 28 | Day 35 | Day 60 |
| Overall scale (10 items)                                                                      | 0.94                | 0.97  | 0.97   | 0.96   | 0.96   | 0.96   | 0.89   |
| Scale without data for difficulty speaking, eating hard or soft foods, and drinking (6 items) | 0.87                | 0.90  | 0.88   | 0.88   | 0.91   | 0.88   | 0.67   |
| Scale without data for restriction of speech, eating and drinking (7 items)                   | 0.86                | 0.84  | 0.81   | 0.81   | 0.88   | 0.86   | 0.50   |
| Scale without data for change in taste (9 items)                                              | 0.92                | 0.97  | 0.97   | 0.97   | 0.96   | 0.96   | 0.92   |

**Table 2: Mean±standard error scores at baseline, on days 7, 14, 21, 28, 35, and on days 60**

| Scale (possible range)                   | Baseline<br>(n=51) | Day 7<br>(n=51) | Day 14<br>(n=51) | Day 21<br>(n=51) | Day 28<br>(n=51) | Day 35<br>(n=50) | Day 60<br>(n=49) | P      |
|------------------------------------------|--------------------|-----------------|------------------|------------------|------------------|------------------|------------------|--------|
| PROMS (range 0-100 per item and overall) | 1.09±0.7           | 7.5±13.9        | 14.3±17.8        | 26.2±24.2        | 37.6±28.4        | 34.1±25.5        | 3.8±5.1          | <0.001 |

PROMS=Patient reported oral mucositis symptoms scale

**Table 3: Spearman correlation coefficients between patient-reported oral mucositis symptom scores and world health organization grading**

|          | Spearman correlation coefficient |
|----------|----------------------------------|
| Baseline | 0.842**                          |
| Day 7    | 0.646**                          |
| Day 14   | 0.742**                          |
| Day 21   | 0.779**                          |
| Day 28   | 0.833**                          |
| Day 35   | 0.826**                          |
| Day 60   | 0.326*                           |

\*\*Correlation is significant at the 0.01 level, \*Correlation is significant at the 0.05 level

a gradual reduction by the time the patients were evaluated at day 35 with appreciable reduction in clinical grading with that of 10-point question scores.

Difficulty in drinking due to mouth sores and dysphagia to solid were at peak by day 28 which slowly declined by day 60. Similar findings were reported by studies which used PROMS scale concentrated on hematopoietic stem cell transplantation and also radiotherapy-treated patients.<sup>[1,2]</sup>

Almost all the patients had no difficulty in answering the questionnaire. The score and the impact of a questionnaire pertaining to mouth sores, dysphagia to solids and liquids as well as taste perception were greatest during the late phase of treatment and they consistently correlated with clinical grading by the WHO. Only a single investigator was allowed to perform the clinical examination during the entire study period to avoid variability in assessment and bias. Men included in the major part of the sample with carcinoma of buccal mucosa being the highest reported tumor. Although there were gender differences as a part of the sample, there was no significant difference among them, which could influence the result. The language in the questionnaire was simple and easy to understand. In this prevalidated survey, the degree of subjective variation with respect to age could have led to variation in results. However, it was not that significant to cause profound changes in the results.

Usage of narcotics (opioids) during the treatment was a part of the hospital protocol for the pain relief arising due to mucositis. It should be emphasized that this aspect also had no effect on pain perception among the study population in any tumor group. There was no active intervention carried out by the concerned oncology unit for reduction of OM during the therapy. The patients were off treatment for 2–3 days if there was significant mucositis and were allowed to return for the therapy once the symptoms subsided. All patients underwent prophylactic routine dental examination and had all the dental treatments carried out before initiation of radiotherapy.

The limitations in the study were minor are to be avoided in subsequent studies. The questionnaire was not intended to assess the QOL in patients undergoing cancer treatment and suffering with many other complications.

## Conclusion

The present study findings demonstrated a good correlation between patient-reported items to that of clinical score by standard grading scales. Thus, it was proved to be more precise in evaluating the patient in whom comprehensive oral examination was otherwise not possible. This questionnaire may not be a sole guide in assessing the severity of OM but could be definitely used as an adjunct to clinical oral examination at assessment levels.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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