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Assessment of Periodontal Status and Periodontal Treatment Requirement in Hospitalized Cancer Patients: A Cross-Sectional Study

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ABSTRACT

Background: Periodontal assessment for 35 cancer hospitalized patients was examined for oral hygiene conditions, periodontal status, and the need for oral care. Further, the study evaluates the necessity of medical personnel to assist in achieving oral health maintenance during their period of hospitalization.

Introduction: Cancer patients, usually present with low immunity during their period of hospitalization. Maintenance of oral hygiene is usually neglected, which leads to an increase in plaque and calculus accumulation, thus contributing to the initiation of Periodontal Disease (PD).

Materials and Methodology: A cross-sectional study was conducted among 35 cancer hospitalized patients at Kidwai Cancer Institute, Kalaburagi. A hard copy questionnaire comprising 15 questions, based on the condition of oral hygiene and periodontal status with their period of hospitalization was circulated among hospitalized cancer patients based on the inclusion and exclusion criteria.

Results: Poor periodontal status was observed in the hospitalized cancer patients with generalized bleeding on probing, with a mean pocket depth of 7.4mm, the percentage of furcation involvement (grade 1: 94.3%, grade 2: 91.4%, grade 3: 100%, grade 4: 31.4%), generalized recession, grade 1 mobility: 94.3%, grade 2 mobility: 97.1%, grade 3 mobility: 71.4%. missing teeth < 10 = 60%, > 10 = 40%.

Conclusion: Taking this into consideration, it is very necessary to implement oral health programs in the hospitals and appointment of dental staff/assistants in the wards to provide oral hygiene instructions and educate the patients about the need to keep their oral cavities healthy.

Key words: Hospitalized cancer patients, Periodontal assessment, Oral hygiene education, and Motivation

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INTRODUCTION

The easy accessibility to advanced technology has contributed to a significant improvement in our knowledge base of cancer biology and therapy.

With the emergence of focused cancer therapy and advances in chemo and radiation therapy, there have been notable advances in the field of cancer treatment. Although many advances have emerged, the primary method of treatment remains chemotherapy, radiotherapy, and surgical excision.

Periodontists and other dental specialties need to be aware of the effects of cancer treatments. Knowledge regarding these cancer therapies will allow dental practitioners to provide these patients with the highest standard of care before, during, and after the patient's cancer treatment and management.

Periodontal therapy of cancer patients at the time of diagnosis

Cancer treatment has several associated co-occurring conditions like neutropenia, anemia, impaired wound healing, etc. that can complicate periodontal maintenance and treatment. Thus, it is advisable to plan and complete the treatment strategy before the commencement of cancer therapy. In the pre-treatment protocol for chemotherapeutics, periodontal treatment is helpful if conducted before high-dose chemotherapy [1-3]. Oral hygiene instruction is often one of the most important and successful measures to prevent bacterial recolonization and maintenance of disease control. In a recent systematic review by Hong et al., 2017 [4], there are broadly three levels of dental treatment protocols prior to anti-neoplastic therapy and bone marrow transplants: complete, partial, and minimal. Complete treatment involves the treatment of all dental pathologies prior to cancer treatment or bone marrow transplantation. Partial treatment involves a graded approach to dental pathologies present prior to cancer treatment or bone marrow transplantation with the following criteria; Minimal treatment includes symptomatic treatment or if there are limited time constraints prior to cancer therapy or bone marrow transplantation.

Periodontal therapy of cancer patients undergoing treatment

In neutropenic patients undergoing cancer therapy, periodontal disease or periodontal infections may be intensified. Ulcerated periodontal pocket epithelium may serve as a gateway of entry for the migration of microorganisms into the bloodstream. In addition, the inflamed or infected periodontal tissues may serve as a reservoir of pro-inflammatory mediators and endotoxins that have systemic effects [5].

Periodontitis is assessed by bleeding, attachment loss, probing depth, mobility of tooth, gingival erythema, and other etiological factors which include the presence of bacterial plaque and calculus. Periodontal probing should be avoided during neutropenia, meaning that pre-treatment evaluation is of absolute importance to coordinate oral care [5]. Even if gingival signs and symptoms of inflammation are not observed; moderate to severe periodontitis in a patient who develops neutropenic fever should be considered a clinically defined infection.

Aim of the Study

To evaluate oral hygiene maintenance by measuring different parameters and periodontal conditions among patients suffering from different carcinomas and determining the preventive measures for dental problems during their period of hospitalization

MATERIALS AND METHODOLOGY

A hard copy questionnaire comprising 15 questions, based on the condition of oral hygiene and periodontal status with their period of hospitalization was circulated among hospitalized cancer patients.

The participants comprising both sexes were included in the study

Demographic data such as name (optional), age, sex, occupation, place, and address were included.

Sample Size

A total of 50 hospitalized patients admitted to Kidwai Cancer Institute of Kalaburagi district were randomly selected for the study.

Selection Criteria

Inclusion criteria

Patients admitted for any type of carcinomas.

Both sexes.

Participants' willingness for this survey.

Above 18 years of age.

Exclusion criteria

Pregnant and lactating women.

Below 18 years of age.

STUDY DESIGN

Case Survey

The questionnaire included in the survey: demographic data (Name, age, sex)

Number of days of patient's admission in the hospital:

Type of cancer

Head and neck region

Any other organ system

Type of cancer treatment received

Surgical resection

Radiotherapy

Chemotherapy

All

Whether the patient is associated with any other systemic diseases?

Yes

No

Mention drug history?

Do you have unsatisfactory diet?

Yes

No

Dental problems faced during hospitalization?

Pain with caries tooth/grossly decayed tooth

Bleeding gums

Mobile tooth

Hypersensitivity

Halitosis

Dry mouth

Or any other?

If present, have they managed to treat?

Simplest oral hygiene method used by the patient?

Cotton

Gauze

Soft tooth brush

Mouth wash.

Any other

Whether they require dental assistance during hospitalization?

Yes

No

Whether any support is provided by the hospital for dental assistance?

Yes

No

Do you know the impact of poor oral health on systemic illness?

Yes

No

How often the patient visited for regular checkup for prevention of oral diseases?

Do you have oral health unit in the hospital?

Yes

No

Is there pain associated with any tooth? If yes mention the tooth number.

All the patients agreed to answer the questionnaire.

Among the 35 participants, the distribution of tumors was as follows: esophageal (n=7), squamous cell carcinoma (n=3), breast (n=5), tongue (n=4), lung (n=5), cervical (n=1), testicle (n=1),

Rectum (n=2), thigh (n=2), gall bladder (n=1), ovary (n=1), gastric region (n=1), abnormal growth in the neck region (n=1), retro molar triangle (n=1).

DISCUSSION

Periodontitis is directly correlated to the systemic health of individuals and the treatment is now based on patients' current oral hygiene status and systemic state. Cancer patients are in need of standard periodontal care (chemotherapeutic, radiation surgical) before during, and after cancer therapy. However, hospitalized cancer patients with existing periodontal disease are at increased risk with the consequences of a bacterial challenge to other major organs and loss of teeth, improper diet, and nutrition.

From the analysis conducted in the present survey, 35 patients (M= 17, F= 18), with a mean age of 48.03 years presented with deteriorating periodontal status during their period of hospitalization [Figure 1 and Table 1]. The screening method included the following parameters: bleeding on probing, pocket depth, furcation involvement, tooth mobility, recession, and missing teeth.

This present study assessed oral hygiene methods in all the examined patients. The improper brushing habits mentioned above led to plaque retentive areas [Table 2].

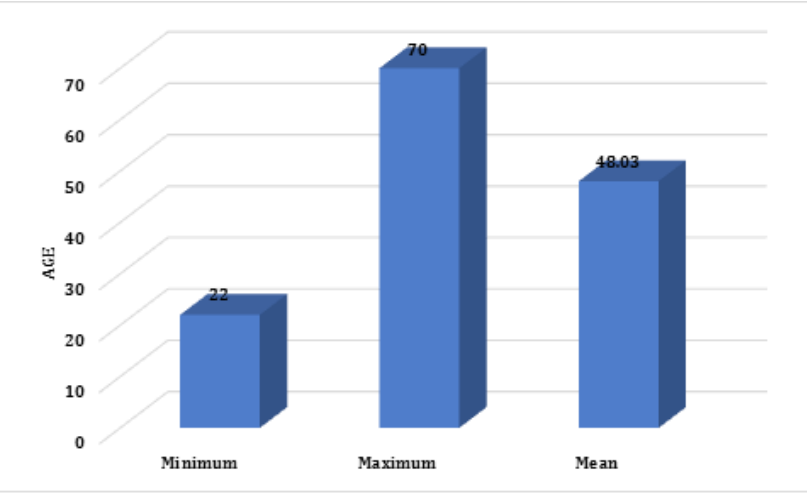

Figure 1: Demographic Data (Mean Age).

Table 1: Mean age of the patients.

AGE	N	Minimum	Maximum	Mean	Std. Deviation
	35	22	70	48.03	12.34

Table 2: Bleeding on Probing.

	Frequency	Percent
Generalized	35	100

This was associated with food lodgments and increased caries risk. Thus, as a result of, there was bleeding on probing, which was seen in all the 35 patients examined [Figure 2 and Table 3].

Studies conducted by Sjögren et al and Sachdev, M et al have shown an increase in plaque and gingival inflammation as well as an increase in the Bleeding on Probing index even in short periods of hospitalization [6-7].

No intervention was made by the staff in the unit that led to the severity of increased pocket formation, with a mean depth of 7.4mm [Figure 3 and Table 4].

One patient presented with pain in relation to the caries-affected tooth and stopped the basic oral hygiene procedures on the involved site, leading to halitosis and accumulation of plaque which was a vicious cycle, which finally led to periodontal disease.

Patients presented with different grades of furcation involvement. [Figure 4 and tables 5-8].

Patients also presented with generalized recession [Figure 5, table 9].

The existing mobility of the tooth which was at 97.1% is a main indication of bone loss, which is a sign of already existing periodontal disease, which was aggravated after radiation therapy [Figure 6, table 10-12].

This finally led to the loss of the tooth as there was no intervention done at this stage. This led to the overall unsatisfactory diet among the patients admitted to the ward resulting in added nutritional deficiencies.

We had substantial support for the same clinical findings, by a study conducted by Albuquerque et al in which the periodontal parameters were recorded in hospitalized ICU patients, a high dental plaque index and a high prevalence of periodontitis, in moderate and localized chronic form, were observed [Table 13]. Many patients, as a matter of fact, rely on attending staff for care and oral hygiene, which is usually ill-equipped, thus favoring the deterioration of oral conditions.

The overall summary of the findings has been depicted in [Table 14]. The patient's oral health maintenance was guided mainly by their attenders rather than a skilled and knowledgeable assistant and this affected their oral health as there was no proper protocol for following basic oral hygiene as noticed in our study.

No protocol was carried out for the treatment of periodontal diseases before the commencement

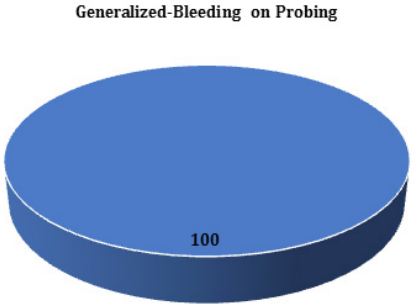

Figure 2: Bleeding on Probing.

Table 3: Pocket depth.

	N	Minimum	Maximum	Mean	Std. Deviation
PD	35	5	12	7.44	1.655

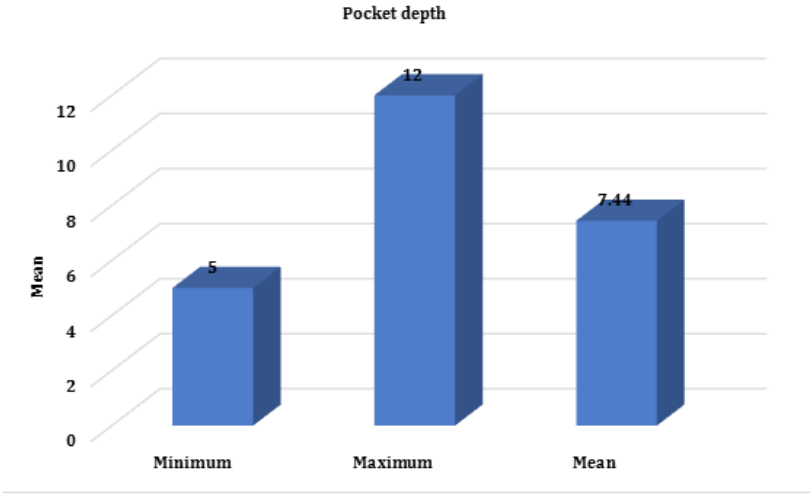

Figure 3: Periodontal Pocket Depth.

Table 4: Grade IV furcation involvement.

	Frequency	Percent
Absent	23	65.7
Present	11	31.4
NA	1	2.9
Total	35	100

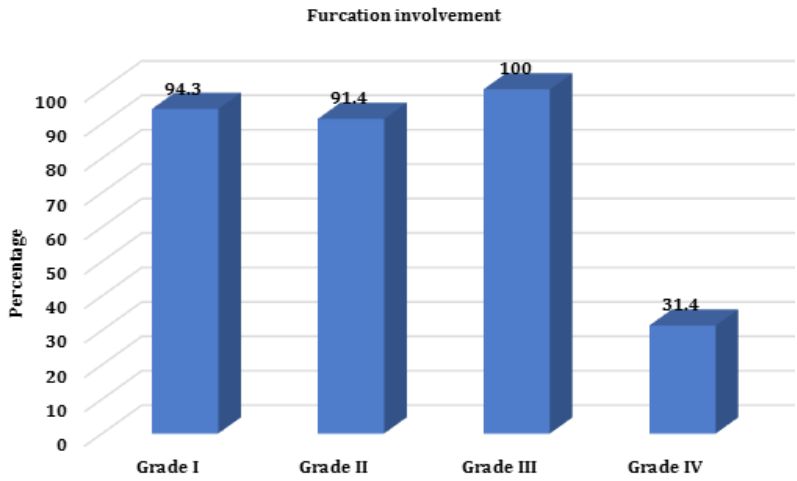

Figure 4: Grades of Furcation Involvement.

Table 5: Grade III furcation involvement.

	Frequency	Percent
Present	35	100

Table 6: Grade II furcation involvement.

	Frequency	Percent
Absent	3	8.6
Present	32	91.4
Total	35	100

Table 7: Grade I furcation involvement.

	Frequency	Percent
Absent	2	5.7
Present	33	94.3
Total	35	100

Table 8: Recession.

	Frequency	Percent
Generalized	35	100

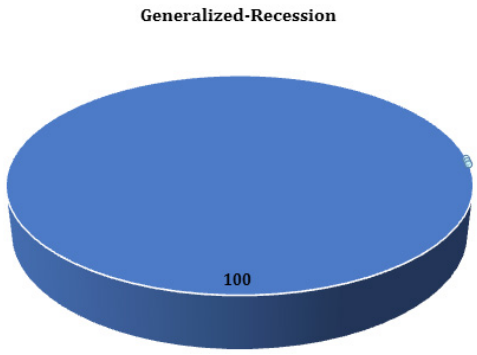

Figure 5: Gingival Recession.

Table 9: Grade I mobility.

	Frequency	Percent
Absent	2	5.7
Present	33	94.3
Total	35	100

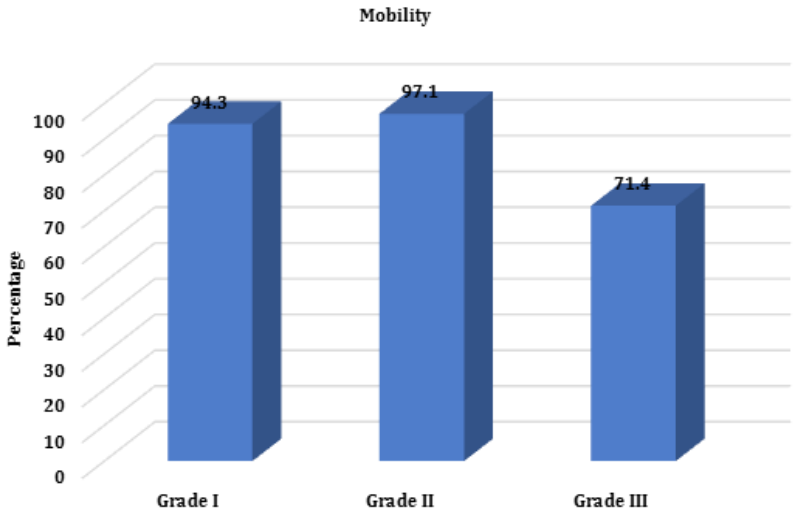

Figure 6: Grades of Mobility.

Table 10: Grade II mobility.

	Frequency	Percent
Absent	1	2.9
Present	34	97.1
Total	35	100

Table 11: Grade III mobility.

	Frequency	Percent
Absent	10	28.57
Present	25	71.4
Total	35	100

Table 12: Missing teeth.

	Frequency	Percent
<10	21	60
>10	14	40
Total	35	100

Table 13: Overall Summary of the Findings.

Age	Bleeding on Probing	Pocket Depth	Furcation Involvement	Mobility	Recession	Missing Teeth
48.03yrs (Mean)	1	7.44mm (Mean)	Grade 1: 94.3% Grade 2: 91.4% Grade 3: 100% Grade 4: 31.4%	Grade 1: 94.3% Grade 2: 97.1 Grade 3: 71.4%	1	<10= 60%, >10= 40%

Table 14: Oral Hygiene Habits of the Patients Examined.

Toothbrush	22 patients
Finger brushing	11 patients
Switch from tooth brushing to finger brushing	02 patients

of oncological therapy; patients treated by the oral surgery department were kept under observation post-surgically and were told to continue periodontal treatment. In the rest of the patients, the debilitating conditions overruled the present periodontal disease, and hence immediate periodontal treatment was not provided.

Oncological patients should start dental treatments before the beginning of cancer therapy; professional oral hygiene, the extraction of compromised teeth, and restorations of teeth with wide caries are recommended. At bedtime, it is advisable to use an electric toothbrush and floss (or, in the case of mucosal lesions, a soft toothbrush or sponges soaked in 0.20% chlorhexidine mouthwash).

To reduce the risk of caries in patients undergoing radiation therapy, it is advisable to use dental rinse and fluoridated toothpaste [9, 10].

Soutome et al concluded that chemotherapy is an independent risk factor related to the worsening of periodontal disease [11].

Limitation of This Study

This survey has a sample size of 50 subjects, but only 35 patients were examined as the rest of the patients were reluctant to participate in this study, as these patients were suffering from major illnesses and could not be assessed clinically. This survey was conducted over a period of 1 week and no further follow-up was done to assess the clinical conditions of the patients at later stages of cancer therapy.

CONCLUSION

These results mainly indicate how important it is to follow basic oral hygiene procedures among hospitalized patients and the ill effects it may cause if not followed properly. Taking this into consideration, it is very necessary to implement oral health programs in the hospitals and appointment of dental staff/assistants in the wards to provide oral hygiene instructions and educate the patients about the need to keep their oral cavities healthy.

DECLARATION

Trial registration: not applicable

Ethics: Ethical approval of the study was obtained from the ethical committee of HKE.SN Institute of Dental Science and Research, Kalaburagi.

Data availability: Kidwai institute on oncology, Kalaburagi.

Consent for publication: not applicable

Conflict of Interest: Nil

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