

# Psychological Intervention in Head and Neck Cancer from Molecular Standpoint

<sup>1</sup>Gargi S Sarode, <sup>2</sup>Sachin C Sarode, <sup>3</sup>Rahul Anand, <sup>4</sup>Shankargouda Patil, <sup>5</sup>Roopa Rao, <sup>6</sup>Dominic Augustine

## ABSTRACT

Treatment of head and neck cancer (HNC) can cause significant physical and social-emotional trauma to the patient with an increased risk of suicide compared to other cancer patients. Despite having the knowledge about the stress influences on cancer relevant biological processes and psychological intervention, it is not being studied and practiced routinely. We recommend that psychosocial interventions should be routinely practiced as one of the adjuvant treatment modalities for the benefit of HNC patients which can decrease psychological distress and improve social functioning and quality of life (QoL).

**Keywords:** Adjuvant treatment, Head and neck cancer, Psychological intervention.

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## INTRODUCTION

Head and neck cancer (HNC) is often associated with long-term dysfunction and disfigurement. Treatment can cause significant physical and social-emotional side effects which include poorer quality of life (QoL), higher frequency of distress, and an increased risk of suicide compared to other cancer patients. Even after the treatment, a large proportion of HNC patients report chronic dysfunction, followed by psychological difficulties.

*In vitro*, *in vivo* and clinical studies show that stress related processes can impact pathways implicated in

cancer relevant biological processes. These pathways are summarized as follows<sup>1</sup>:

Modulation of tumor initiation and development by suppressing elements of the immune response.

VEGF stimulation by stress-related mediators, such as norepinephrine, epinephrine and cortisol.

- Modulation of tumor associated macrophages and cytokines (interleukin-6 and interleukin-8) involved in angiogenesis.
- Direct activation of angiogenesis-promoting molecules (signal transducer and activator of transcription factor 3).
- Modulation of migration and invasion of malignant cells by stimulating production of matrix metallo-proteases.
- Association with increased DNA damage and poorer DNA repair.
- Shortened telomeres and decreased telomerase activity.

These above mechanisms suggest that stress can act directly or indirectly at molecular level and cause initiation and progression of cancer. Stress originates in human mind through a negative thought process. Hence, indirectly, thoughts are acting at molecular level in progression of cancer. Thus, it is conceivable that there is a cause and effect relationship between negative thoughts and progression of cancer. Suppression or elimination of the negative thoughts can slow down the molecular events responsible for progression of cancer.

## PSYCHOLOGICAL INTERVENTION IN HEAD AND NECK CANCER

A long-term psychological group therapy was used by Hammerlid<sup>2</sup> on newly diagnosed HNC patients who demonstrated improvement in QoL compared to controls. The second trial by Hammerlid et al<sup>2</sup> assessed the impact of a short-term psychoeducational program for patients at 1 year post-treatment. The intervention group showed improvements in measures of physical symptoms and functioning. Petruson et al<sup>3</sup> found no difference in health-related QoL between controls and participants who engaged in repeated meetings with a multidisciplinary medical team for 1 year following their initial cancer diagnosis. Allison et al<sup>4</sup> reported positive findings in intervention that offered participants

<sup>1,4</sup>Associate Professor, <sup>2</sup>Senior Lecturer, <sup>3</sup>Intern, <sup>5</sup>Professor and Head, <sup>6</sup>Assistant Professor

<sup>1-3</sup>Department of Oral Pathology and Microbiology, Dr DY Patil Dental College and Hospital, Dr DY Patil Vidyapeeth Pune, Maharashtra, India

<sup>4-6</sup>Department of Oral and Maxillofacial Pathology, Faculty of Dental Sciences, MS Ramaiah University of Applied Sciences, Bengaluru, Karnataka, India

**Corresponding Author:** Sachin C Sarode, Associate Professor Department of Oral Pathology and Microbiology, Dr DY Patil Dental College and Hospital, Dr DY Patil Vidyapeeth, Sant Tukaram Nagar Pimpri, Pune, Maharashtra, India, Phone: +919922491465, e-mail: drsachinsarode@gmail.com

a choice of several intervention modalities, including individual, group, and home-format options. Participants experienced improvements in global QoL and reductions in depressive symptoms. In another study, HNC patients with post-treatment psychosocial dysfunction were able to self-select into an individualized problem-focused intervention or a control condition. The intervention group reported decreases in psychological distress and improved social functioning and QoL scores.<sup>5</sup> Research suggests that psychosocial interventions, especially those that contain elements of cognitive-behavioral therapy, can have a significant impact on various QoL outcomes. HNC patients who recently completed cancer treatment reported a preference for individual psychosocial interventions over group-based programs, bibliotherapy, or computer-assisted therapy.<sup>6</sup>

Till date, psychological intervention in HNC focused mainly at improving QoL of the patients. There is no literature available on the stress influence on cancer relevant biological processes in HNC. Despite having the valuable knowledge about the stress influences on cancer relevant biological processes and psychological intervention, it is not being studied and practiced widely in treating HNC patients. It is our personal observation that at many head and neck oncology centers in India, psychological interventions are not routinely practiced. As there are no side effects associated with such therapy,

we recommend that psychosocial interventions should be routinely practiced as one of the adjuvant treatment modalities of HNC for the benefit of patients. Moreover, future studies should aim at finding the link between psychological aspects and molecular pathogenesis in HNC patients.

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