



Systematic Review



Effectiveness of Mindfulness-Based Cognitive Therapy on Quality of Life among Oral Cancer Patients Undergoing Chemotherapy and Radiotherapy

Rajesh Kumar¹, Yasmin Amarsi^{1*}, Badil² and Adnan Abdul Jabbar³¹Faculty of Nursing and Midwifery, Ziauddin University, Karachi, Pakistan²Dow Institute of Nursing and Midwifery, Dow University of Health Sciences, Karachi, Pakistan³Department of Oncology, Dr. Ziauddin Hospital, Karachi, Pakistan

ARTICLE INFO

Keywords:

Mindfulness-Based Cognitive Therapy, Quality of Life, Oral Cancer Patients, Radiotherapy, Chemotherapy

How to Cite:Kumar, R., Amarsi, Y., Badil, .. & Jabbar, A. A. (2025). Effectiveness of Mindfulness-Based Cognitive Therapy on Quality of Life among Oral Cancer Patients Undergoing Chemotherapy and Radiotherapy: Effectiveness of Mindfulness-Based Cognitive Therapy on Life in Oral Cancer Patients. *Pakistan BioMedical Journal*, 8(2), 49-55. <https://doi.org/10.54393/pbmj.v8i2.1188>***Corresponding Author:**Yasmin Amarsi,
Ziauddin University Faculty of Nursing and Midwifery,
Karachi, Pakistan
yasmin.amarsi@zu.edu.pkReceived date: 10th December, 2024Revised date: 4th February, 2025Acceptance date: 10th February, 2025Published date: 28th February, 2025

ABSTRACT

Cancer is the second leading cause of death globally, with oral cancer representing a significant portion of head and neck cancers. It disproportionately affects developing nations, including Pakistan, where it is the second most common cancer. Oral cancer patients often endure treatment-related side effects, leading to reduced quality of life. Evidence suggests that mindfulness interventions, particularly mindfulness-based cognitive therapy, can improve quality of life by addressing psychological distress and promoting emotional resilience. **Objectives:** To assess the effectiveness of mindfulness-based cognitive therapy in improving the quality of life of oral cancer patients undergoing chemotherapy and radiotherapy. **Methods:** The literature review used various electronic databases: PubMed, Academia, Science Direct, Cumulative Index to Nursing and Allied Health Literature, and Google Scholar. The PRISMA flowchart approach documented the literature review process. We included 26 out of 294 studies that fulfilled inclusion criteria in the final review, which included the last five years, and researched the effects of mindfulness-based cognitive treatment on quality of life among oral cancer patients. Data were synthesized using quantitative methodologies to identify similar findings across studies. **Results:** Research indicates that mindfulness-based cognitive treatment significantly improves the quality of life for oral cancer patients receiving chemotherapy and radiotherapy. **Conclusions:** It was concluded that these findings provide baseline data for this study highlighting the significant impact of mindfulness-based cognitive therapy on improving the quality of life for patients with oral cancer receiving chemotherapy and radiotherapy.

INTRODUCTION

Cancer is the second foremost cause of death worldwide, responsible for almost one in every six deaths [1]. Every year, the world diagnoses approximately 18.1 million new cancer cases, leading to approximately 9.6 million deaths [2]. Research by Tufail and Wu highlights that cancer is the primary cause of mortality in a significant portion of the world, impacting 91 out of 172 nations [3]. Furthermore, projections by Wong estimate that by 2040, there will be 29.5 million new cancer cases and 16.3 million cancer-related deaths globally [4]. The sixth most frequent disease worldwide, oral cancer is rising rapidly in southern Asia. Annually, there are around 450,000 newly diagnosed cases of oral carcinoma globally. Furthermore, there has

been a significant rise in the prevalence of oral cancer recently. Oral cancer is a major concern in public health worldwide [5]. Oral cancer is the most prevalent type of head and neck cancer, which accounts for 10% of all cancers. Smoking cigarettes, drinking alcohol, using tobacco products, and being infected with the human papillomavirus are all causes of oral cancer [6]. Approximately, 14,000 new instances of oral squamous cell carcinoma (OSCC) are reported each year in Pakistan with Karachi having one of the highest rates worldwide. The disease is in an advanced stage (III or IV) in almost fifty percent of these patients [7]. Pakistan ranks among the top ten tobacco consumers, with 46 percent of its



population using gutka and paan (chewable betel nut products) daily. Nearly 56–80% of mouth cancer survivors suffer oral dysfunction with significant financial, social, and psychological effects on their quality of life [8]. The clinical course and management of oral cancer cause distress to patients. This condition and its management may result in the loss of bodily parts, scarring, alopecia, deformities, and weight variations, all of which can affect self-perception. Functional disability also affects swallowing, speaking, and social interactions. These side effects can significantly diminish patients' quality of life [9]. Mindfulness involves intentionally being present and nonjudgmentally addressing thoughts, feelings, and experiences. A decade of RCTs has tracked the effects of mindfulness-based therapies on anxiety, depression, psychological distress, and health-related quality of life among oral cancer patients [10].

Oral cancer patients undergoing chemotherapy and radiotherapy experience severe physical, psychological, and social burden, which significantly reduces their quality of life. Although mindfulness-based cognitive therapy (MBCT) has shown promising effects in reducing anxiety, depression, and stress in cancer populations, its evidence in oral cancer patients remains scattered across different studies with limited consolidated findings. Most available literature focuses on general cancer groups rather than specifically addressing oral cancer patients receiving active oncological treatment. Therefore, there is a need to systematically evaluate and synthesize existing evidence regarding the effectiveness of MBCT in improving quality of life in this population. The aim of this study is to assess the impact of MBCT on quality of life among oral cancer patients undergoing chemotherapy and radiotherapy through a systematic review of recent literature.

METHODS

Various search strategies were utilized for the literature review, drawing from multiple databases, including Academia, PubMed, Research Gate, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and Google Scholar. Boolean operators (AND, OR, NOT) were applied on PubMed, along with a custom date range filter (2019–2024), yielding 26 articles. The most recent and relevant publications were selected from this pool, while those unrelated to the research topic were excluded. Similarly, peer-reviewed academic publications were searched and filtered for the same date range, and the results were 294 relevant articles. A comparable approach was employed for Research Gate and Google Scholar. Keywords such as mindfulness-based intervention, quality of life, oral cavity, head-and-neck, oral tumor, lip-and-mouth cancer, oropharyngeal cancers, chemotherapy, and radiotherapy were used to refine the search and identify pertinent studies. The initial search yielded 23,902 results. After applying the filter for duplicates, 15,804 were removed;

further application removed 2,809 in five years. After studies screened eligibility in full-text 4,995, Filtering the citation and abstract reduced the results to 294. After reviewing the titles and abstracts, we excluded 268 and selected 26 for the final review, which is most relevant to our study. PRISMA chart was shown for this study (Figure 1).

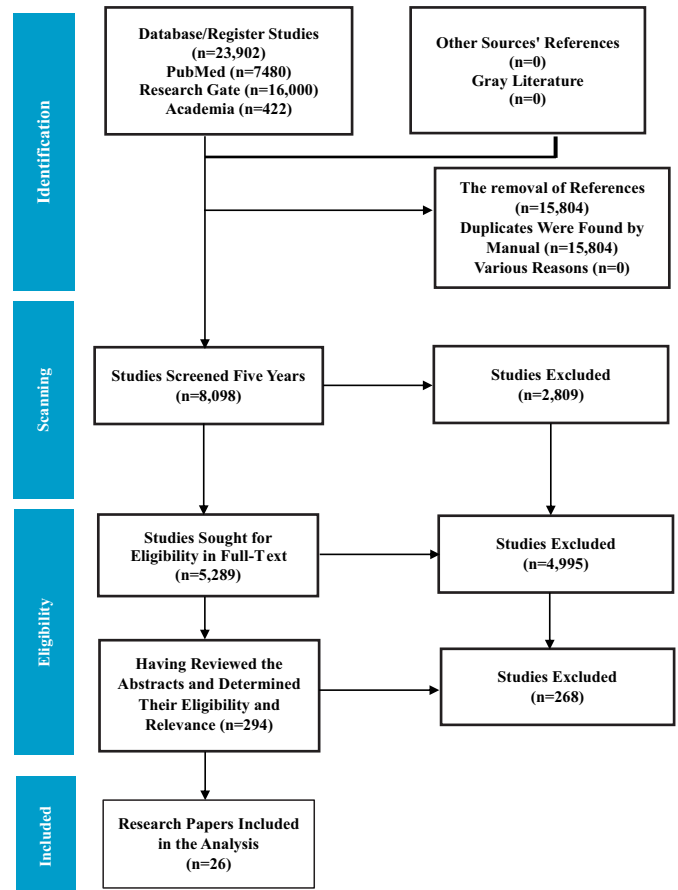


Figure 1: PRISMA flow chart for the study

RESULTS

From an initial search of 23,902 articles, 26 were selected for this study. Findings suggest that the effectiveness of Mindfulness-Based Cognitive Therapy (MBCT) on Quality of Life (QoL) among oral cancer patients undergoing chemotherapy and radiotherapy significantly impacts the QoL among oral cancer Patients. comprehensive information regarding the phases of the article search was presented (Table 1).

Table 1: Maintain Information Articles

S.No	References	Country	Method	Sample Size	Objective	Result
1	[11]	Korea	Quasi-Experimental	61	The study looks at how a full mouth care program affects the oral health of people with head and neck cancer (HNC) who have been treated with radiation.	Dental specialists' complete oral care interventions enhanced HNC patients' oral health and QoL.
2	[12]	France	Cross-Sectional	72	The study assesses patient concerns about head and neck squamous cell carcinoma (HNSCC) treatment and long-term QoL.	HNSCC patients' quality of life improved when multidisciplinary teams identified patient requirements and managed persistent symptoms and psychosocial difficulties.
3	[13]	Singapore	Quasi-experimental	61	The study examined the initial impact of a program that teaches cancer survivors to practice mindfulness-based psychoeducation.	Cancer survivors considerably improved their abilities to relax, practice mindfulness, and feel psychologically well.
4	[14]	Germany	Retrospective Analysis	1,657	The study aimed to investigate oral mucositis impairments and how they affect post-treatment quality of life.	Standardizing early supportive management for oral mucositis promotes better post-therapy results and QoL for oral cancer patients.
5	[15]	United States	Randomized Controlled Trial	97	The main goal is to identify whether online or smartphone mindfulness therapies might reduce cancer patients' discomfort and improve QoL.	Well-powered efficacy studies could enlighten clinicians about implementing this scalable intervention to improve cancer patients' and carers' QoL.
6	[16]	Malaysia	Longitudinal Observational	76	This research aimed to determine the effect of oral cancer treatment on HRQoL in patients.	Oral cancer patients' HRQoL changes with surgery and various treatments.
7	[17]	United Kingdom	Prospective Clinical Cohort	5,511	The goal is to find out how people's HRQoL changes when they are told they have head and neck cancer.	Higher physical and social functioning had better survival.
8	[18]	Canada	Systematic Review	3053	To assess the correlation between mindfulness-based interventions (MBI) and the alleviation of anxiety severity in cancer patients.	Up to 6 months after the intervention, MBIs were linked to lower levels of anxiety and depression in people with cancer.
9	[19]	Iran	Quasi-Experimental	40	To examine how MBCT affected patients' cognitive function, illness adaptability, quality of life, and perceived stress levels throughout chemotherapy.	MBCT markedly enhanced perceived stress, sickness resilience, and QoL.
10	[20]	Saudi Arabia	Descriptive Cross-Sectional	148	The goal is to evaluate the mental and physical suffering, symptoms of depression, and social problems of patients with cancer undergoing radiotherapy.	There was a significant association ($P < 0.05$) between the type of cancer patients had and their levels of physical suffering, distressing emotions, and depressive symptoms.

11	[21]	Taiwan	Prospective Study	127	This study aimed to evaluate individuals' QoL and utility assessments following survival from HNC.	Survivors of cancer scored lower than average. Married patients had more utility than single patients.
12	[22]	Iran	Descriptive Analytical Cross-Sectional	205	The purpose of the research was to find out if stress, quality of life, and mindfulness were all related for cancer patients.	Cancer patients' QoL was affected by mindfulness and stress. Mindfulness may help cancer patients both directly and indirectly.
13	[23]	India	Prospective Longitudinal	130	This study aimed to identify the characteristics that influence the QoL of people with HNC.	HNC treatment and intervention should focus on survival and QoL during managed intervention and recovery.
14	[24]	Sri Lanka	Prospective Longitudinal	90	This study looked at the oral health-related quality of life (OHRQoL).	There were statistically remarkable changes in OHRQoL between the periods ($p < 0.05$).
15	[25]	Pakistan	Analytical Cross-Sectional	250	To determine how various factors affect HNC patients' QoL.	Poor QoL is linked to psychological problems.
16	[26]	Pakistan	Cross-Sectional	79	This research aimed to assess OHRQoL.	Poor oral health after HNC treatment lowers QoL.
17	[27]	Netherlands	Randomized controlled Trial (RCT)	125	The purpose of this research was to forecast cancer patients' engagement with and success with the eMBCT program.	The study revealed that patient outcomes improved by adherence.
18	[28]	India	Prospective Study	150	The study assesses QoL to determine oral cancer patients' satisfaction with current treatment.	The results of this study show that oral cancer patients are happy with their existing treatment options.
19	[29]	Pakistan	cross-sectional	96	The study's goal is to examine the OHRQoL and the factors that are linked to it one year after cancer treatment.	The study found high mean OHRQoL scores in HNC.
20	[30]	Pakistan	cross-sectional	120	The study aimed to recognize the post-treatment problems met by OSCC clients.	Patients with tongue cancers highlighted significantly reduced scores for anxiety, mood, swallowing, and pain.

DISCUSSION

The study sought to evaluate the efficacy of MBCT in improving the QoL of oral cancer patients receiving chemotherapy and radiotherapy. The findings are consistent with prior studies and provide compelling evidence supporting the utility of MBCT as a non-pharmacological intervention for managing psychological issues and improving quality of life. The current study corroborates previous research highlighting the positive impact of MBCT on QoL. A systematic review demonstrating that mindfulness-based intervention significantly reduced depression anxiety in cancer patients. This result aligns with a study in Singapore and Canada that revealed the psychological benefits of MBCT and found that mindfulness-based psychoeducation improved relaxation and psychological well-being in cancer

survivors [31, 32]. A notable similarity between this study and the research is the identification of improvements in cognitive function, illness adaptability, and stress reduction in cancer treatment [33]. Both studies also found a link between early supportive interventions and better quality of life after treatment, which is in line with this study's focus on using MBCT during active treatment phases [34]. Despite these similarities, studies that solely focused on physical health interventions showed some differences in outcomes. However, this study enhanced oral health-related quality of life due to dental care interventions for HNC patients. In contrast, the present study emphasizes the enhancement of psychological and emotional well-being through MBCT. Moreover, it underlines the importance of psychosocial therapies to

counteract poor psychological outcomes in HNC patients. This study emphasizes the importance of MBCT [35]. This study highlights the need to incorporate MBCT into the care plans of oral cancer patients to address QoL challenges effectively. It also suggests the scalability of mindfulness-based interventions, as indicated by [36], can make them accessible to a broader population of cancer patients. Future research should explore the long-term effects of MBCT and its potential integration with other psychosocial and physical health interventions to provide a holistic care model.

The major limitation of the existing evidence is the predominance of quasi-experimental and cross-sectional designs, with relatively fewer large-scale randomized controlled trials specifically targeting oral cancer patients. Variations in MBCT protocols, intervention duration, and outcome measurement tools also limit comparability across studies. Additionally, most studies are short-term, with limited follow-up data to assess sustained effects on quality of life. Future research should focus on well-designed multicenter randomized controlled trials with standardized MBCT protocols and long-term follow-up. It is also recommended to explore integration of MBCT with other supportive care interventions to develop a more holistic, patient-centered approach for improving outcomes in oral cancer care.

CONCLUSIONS

It was concluded that the study underscores the significant role of mindfulness-based cognitive therapy (MBCT) in enhancing the quality of life for oral cancer patients undergoing chemotherapy and radiotherapy. This research validates prior evidence on the potential integration of care plans with a holistic approach to patient well-being. Future studies should investigate its long-term impacts and synergy with other interventions to optimize cancer care outcomes.

Authors' Contribution

Conceptualization: RK

Methodology: YA, B

Formal analysis: RK

Writing and Drafting: YA, B, AAJ

Review and Editing: YA, B, AAJ, RK

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

- [1] Weiss C. One in Four Dies of Cancer. Questions About the Epidemiology of Malignant Tumors. Ethical Challenges in Cancer Diagnosis and Therapy. 2021 May; 15-29. doi: 10.1007/978-3-030-63749-1_2.
- [2] Libring S, Enriquez A, Lee H, Solorio L. In Vitro Magnetic Techniques for Investigating Cancer Progression. *Cancers*. 2021 Sep; 13(17): 4440. doi: 10.3390/cancers13174440.
- [3] Tufail M and Wu C. Exploring the Burden of Cancer in Pakistan: An Analysis of 2019 Data. *Journal of Epidemiology and Global Health*. 2023 Jun; 13(2): 333-43. doi:10.1007/s44197-023-00104-5.
- [4] Lee HJ, Han DH, Kim JH, Wu HG. The Effect of Comprehensive Oral Care Program On Oral Health and Quality of Life in Patients Undergoing Radiotherapy for Head and Neck Cancer: A Quasi-Experimental Case-Control Study. *Medicine*. 2021 Apr; 100(16): e25540. doi: 10.1097/MD.00000000000025540.
- [5] Elaldi R, Roussel LM, Gal J, Scheller B, Chamorey E, Schiappa R et al. Correlations Between Long-Term Quality of Life and Patient Needs and Concerns Following Head and Neck Cancer Treatment and the Impact of Psychological Distress. A Metacentric Cross-Sectional Study. *European Archives of Oto-Rhino-Laryngology*. 2021 Jul; 278:2437-45. doi:10.1007/s00405-020-06326-8.
- [6] Kumari P, Debta P, Dixit A. Oral Potentially Malignant Disorders: Etiology, Pathogenesis, and Transformation into Oral Cancer. *Frontiers in Pharmacology*. 2022 Apr; 13:825266. doi:10.3389/fphar.2022.825266.
- [7] Arif K, Shaikh F, Khan R, Arif S, Arif H. Current Aspects of Oral Squamous Cell Carcinoma in Pakistan: A Review. *International Journal of Medical and Biomedical Studies*. 2021 Sep; 5(9): 108-113. doi: 10.32553/ijmbs.v5i9.2195.
- [8] Ali A, Manzoor MF, Ahmad N, Aadil RM, Qin H, Siddique R et al. The Burden of Cancer, Government Strategic Policies, and Challenges in Pakistan: A Comprehensive Review. *Frontiers in Nutrition*. 2022 Jul; 9: 940514. doi: 10.3389/fnut.2022.940514.
- [9] Kerr AR and Lodi G. Management of Oral Potentially Malignant Disorders. *Oral Diseases*. 2021 Nov; 27(8): 2008-25. doi: 10.1111/odi.13980.
- [10] Arshad S, JH SF, Jayaram S, Veeraraghavan VP, Karobari MI. Perspective on Enhancing Quality of Life in Oral Cancer Patients: Integrative Approaches and Comprehensive Care. *Oral Oncology Reports*. 2024 Aug; 11: 100633. doi: 10.1016/j.oor.2024.100633.

- [11] Klainin-Yobas P, Chng WJ, Ang NK, Lopez V, Arunoda PD, Lau Y. Effects of a Mindfulness Program on Stress and Psychological Outcomes Among Cancer Survivors: A Quasi-Experimental Study. *Mindfulness*. 2022 Apr; 13(4): 982-92. doi: 10.1007/s12671-022-01852-4.
- [12] Jehn P, Stier R, Tavassol F, Dittmann J, Zimmerer R, Gellrich NC et al. Physical and Psychological Impairments Associated with Mucositis After Oral Cancer Treatment and Their Impact On Quality of Life. *Oncology Research and Treatment*. 2019 Jun; 42(6): 342-9. doi: 10.1159/000499720.
- [13] Kubo A, Kurtovich E, McGinnis M, Aghaee S, Altschuler A, Quesenberry Jr C et al. A Randomized Controlled Trial of Health Mindfulness Intervention for Cancer Patients and Informal Cancer Caregivers: A Feasibility Study Within an Integrated Health Care Delivery System. *Integrative Cancer Therapies*. 2019 May; 18: 1534735419850634. doi: 10.1177/1534735419850634.
- [14] Doss JG, Thomson WM, Drummond BK, Ghani WM. Impact of Treatment Modalities On Oral Cancer Patients' Health-Related Quality of Life Over a Time Trajectory. *Frontiers of Oral and Maxillofacial Medicine*. 2022 Dec; 4. doi: 10.21037/fomm-21-90.
- [15] Rogers SN, Waylen AE, Thomas S, Penfold C, Pring M, Waterboer T et al. Quality of Life, Cognitive, Physical and Emotional Function at Diagnosis Predicts Head and Neck Cancer Survival: Analysis of Cases from the Head and Neck 5000 Study. *European Archives of Oto-Rhino-Laryngology*. 2020 May; 277: 1515-23. doi: 10.1007/s00405-020-05850-x.
- [16] Oberoi S, Yang J, Woodgate RL, Niraula S, Banerji S, Israels SJ et al. Association of Mindfulness-Based Interventions with Anxiety Severity in Adults with Cancer: A Systematic Review and Meta-Analysis. *Journal of American Medical Association Network Open*. 2020 Aug; 3(8): e2012598-.doi:10.1001/jamanetworkopen.2020.12598.
- [17] Oraki M, Safarina M, Bahrami S. The Effect of Mindfulness-Based Cognitive-Behavioral Therapy (MBCT) on Perceived Stress, Disease Adaptability, Quality of Life, and Cognitive Functions in Patients Undergoing Chemotherapy. *Iranian Journal of Health Psychology*. 2022 Nov; 5(4): 45-58. doi: 10.30473/ijohp.2023.63821.124.
- [18] Almigbal TH, Almutairi KM, Fu JB, Vinluan JM, Alhelih E, Alonazi WB et al. Assessment of Psychological Distress among Cancer Patients Undergoing Radiotherapy in Saudi Arabia. *Psychology Research and Behavior Management*. 2019 Aug; 12: 691-700. doi: 10.2147/PRBM.S209896.
- [19] Liao LJ, Hsu WL, Lo WC, Cheng PW, Shueng PW, Hsieh CH. Health-Related Quality of Life and Utility in Head and Neck Cancer Survivors. *BioMed Central Cancer*. 2019 Dec; 19: 1-0. doi: 10.1186/s12885-019-5614-4.
- [20] Dehghan M, Jazinizade M, Malakoutikhah A, Madadimahani A, Iranmanesh MH, Oghabian S et al. Stress and Quality of Life of Patients with Cancer: The Mediating Role Of Mindfulness. *Journal of Oncology*. 2020; 2020(1): 3289521. doi: 10.1155/2020/3289521.
- [21] Sharma Y, Mishra G, Parikh V. Quality of Life in Head and Neck Cancer Patients. *Indian Journal of Otolaryngology and Head and Neck Surgery*. 2019 Oct; 71(Suppl-1): 927-32. doi: 10.1007/s12070-019-01620-2.
- [22] Kosgallana S, Jayasekara P, Abeysinghe P, Lalloo R. Oral Health-Related Quality of Life of Oral Cancer Patients Treated with Radiotherapy Alone or with Chemotherapy in a Tertiary Referral Centre in Sri Lanka. *BioMed Central Oral Health*. 2023 Mar; 23(1): 162. doi: 10.1186/s12903-023-02854-x.
- [23] Zahid N, Martins RS, Dawood ZS, Zahid W, Azam I, Ikram M et al. Clinical and Psychosocial Factors Associated with Quality of Life in Patients with Head and Neck Cancer: An Analytical Cross-Sectional Study from a Lower-Middle-Income Country. *BioMed Central Psychology*. 2023 Sep; 11(1): 265. doi: 10.1186/s40359-023-01264-6.
- [24] Qamar S, Rozi S, Sawani S, Awan MS, Akhtar S, Siddiqui MI et al. Oral Health-Related Quality of Life in Head and Neck Cancer Survivors within the First Year Following Treatment: A Cross-Sectional Study in Karachi, Pakistan. *Scientific Reports*. 2024 Jan; 14(1): 2560. doi: 10.1038/s41598-024-52813-x.
- [25] Cillessen L, van de Ven MO, Compen FR, Bisseling EM, van der Lee ML, Speckens AE. Predictors and Effects of Usage of an Online Mindfulness Intervention for Distressed Cancer Patients: Usability Study. *Journal of Medical Internet Research*. 2020 Oct; 22(10): e17526. doi: 10.2196/17526.
- [26] Bakshi J, Goyal AK, Saini J. Quality of Life in Oral Cancer Patients Following Surgical Excision and Flap Reconstruction. *Journal of Maxillofacial and Oral Surgery*. 2022 Jun; 21: 1-6. doi: 10.1007/s12663-020-01499-5.
- [27] Farrukh S, Rozi S, Sawani S, Khan FR, Awan MS, Akhtar S et al. Assessment of Oral Health-Related Quality of Life and Its Associated Factors in Head and Neck Cancer Survivors, Within One Year, Post Cancer Treatment. A Cross-Sectional Study. 2023 May. doi: 10.21203/rs.3.rs-2889539/v1.

- [28] Syed Abbas SY, Tariq MU, Raheem A, Saeed J, Hashmi SS, Karim M *et al.* Assessment of Factors Affecting the Quality of Life in Oral Squamous Cell Carcinoma Patients Using the University of Washington Quality of Life Questionnaire. *Cureus*.2019 Jan;11(1).doi:10.7759/cureus.3904.
- [29] Wong CH, Wong W, Lin WL, Au DK, Wu JC, Leung TH *et al.* Prioritizing Chinese Medicine Clinical Research Questions in Cancer Palliative Care from Patient and Caregiver Perspectives. *Health Expectations*.2021 Aug;24(4): 1487-97. doi: 10.1111/hex.13289.
- [30] Ren ZH, Hu CY, He HR, Li YJ, Lyu J. Global and Regional Burdens of Oral Cancer from 1990 to 2017: Results from the Global Burden of Disease Study. *Cancer Communications*.2020 Mar; 40(2-3): 81-92. doi: 10.1002/cac2.12009.
- [31] Zhang Z, Leong Bin Abdullah MF, Shari NI, Lu P. Acceptance and Commitment Therapy Versus Mindfulness-Based Stress Reduction for Newly Diagnosed Head and Neck Cancer Patients: A Randomized Controlled Trial Assessing Efficacy for Positive Psychology, Depression, Anxiety, And Quality of Life. *Plos One*.2022 May;17(5):e0267887.doi:10.1371/journal.pone.0267887.
- [32] Qiu J, Gong Y, Zhang X, Mao W. Effectiveness of Mindfulness-Based Cognitive Therapy on Depressive Symptoms, Brain Potential, and Neuro-immunoinflammatory Factors in Depressed Patients. *Clinical Neuropharmacology*.2024Jul;47(4):128-33.doi:10.1097/WNF.0000000000000601.
- [33] Garcia AC, Junior JB, Sarto KK, Da Silva Marcelo CA, Das Chagas Paiva EM, Nogueira DA *et al.* Quality of Life, Self-Compassion and Mindfulness in Cancer Patients Undergoing Chemotherapy: A Cross-Sectional Study. *European Journal of Oncology Nursing*.2021 Apr; 51: 101924. doi: 10.1016/j.ejon.2021.101924.
- [34] Montero-Marin J, van der Velden AM, Kuyken W. Mindfulness-Based Cognitive Therapy's Untapped Potential. *Journal of American Medical Association Psychiatry*.2024Nov;81(11):1059-60.doi:10.1001/jamapsychiatry.2024.2741.
- [35] Zhang Z, Shari NI, Lu P, Zhang Q, Li D, Leong Bin Abdullah MF. Mindfulness-Based Interventions for Cancer Patients in China: A Meta-Analysis of Randomized Controlled Trials. *Current Psychology*. 2023 Oct; 42(29): 25445-59. doi: 10.1007/s12144-022-03665-z.
- [36] Yadav K, Jena SP. Mindfulness-Based Therapy in Cancer Patients: Meta-Analysis. *Asian Pacific Journal of Cancer Care*.2021 Aug; 6(3): 329-38.doi:10.31557/apjcc.2021.6.3.329-338.