REVIEW

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Psychosocial Distress of Head Neck Cancer (HNC) Patients Receiving Radiotherapy: A Systematic Review

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Abstract

Background: Head and Neck Cancer (HNC) patients are at increased risk of psychosocial distress compared with patients with other forms of cancer. Various symptoms of the disease and side effects of treatment are attributing factors for distress. This systematic review aimed to identify the prevalence of psychosocial distress among HNC patients receiving radiotherapy. **Methods:** The following search engines from 2000-2021 were searched: PubMed, CINAHL, Cochrane, Web of Science, ProQuest, Scopus, and Embase. Citation checking and extensive reference checking were also conducted. Cross-sectional, longitudinal, cohort, exploratory and prospective, repeated measure studies published in English were included. Newcastle Ottawa Scale assessed the quality, and the data were extracted on a validated data extraction form. **Results:** Out of 782 articles, eleven records met the eligibility criteria, including 776 HNC patients receiving radiotherapy. Data were synthesized and summarized descriptively as measurements were not homogenous. Prevalence estimates of depression or depressive symptoms were calculated. Outcomes were measured with various measuring tools and reported in frequency, percentage, mean, and standard deviation in various studies. All studies reported depression ranging from 9.8% to 83.8%, and pooled estimated prevalence of depression among HNC patients receiving radiotherapy is 63% (95% CI 42-83) with significant heterogeneity (I^2= 97.66%; p<0.001). An increase in the trend is observed along with treatment progression. Another three studies reported anxiety along with depression. Physical symptoms, body image, low social support, fatigue specific radiotherapy regimens were the predictive factors of depression. **Conclusion:** HNC patients are psychosocially distressed during radiotherapy, and the distress is steadily increased during the therapy. The predictive factors could serve as potential areas of intervention and supportive therapy during radiotherapy.

Keywords: Head and neck cancer- psychosocial distress- depression- anxiety- radiotherapy

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Introduction

Head and Neck Cancer (HNC) is a physically and mentally debilitating disease associated with adverse changes in basic functions such as eating, swallowing, breathing, speaking, and deterioration in social functioning and global quality of life (Oskam et al., 2013; Richardson et al., 2019). Diagnosis of HNC evokes significant levels of post-traumatic stress disorder symptoms (Posluszny et al., 2015). As defined by the National Comprehensive Cancer Network (NCCN), "Psychosocial distress" is a broad term representing the "unpleasant emotional experience of a psychological, social, and/or spiritual nature that may interfere with the ability to cope with cancer, its physical symptoms and its treatment" (Fundakowski, 2020). HNC patients significantly suffer from psychological distress compared to the general population (Hammermüller et al., 2021). They are more commonly noted as emotionally distressed than patients with any other tumors (Singer et al., 2012). They have a higher level of depression and anxiety than other oncological populations (Mehnert et al., 2014). Patients and survivors of HNC are a vulnerable group with disproportionately higher levels of psychosocial distress (Clover et al., 2011).

Though most patients with HNC have locally advanced disease at presentation, they are nevertheless eligible for treatment with curative intent. These patients often receive radiotherapy either alone or in combination with chemotherapy and/or surgery. The physical (e.g., mucositis, xerostomia, trismus, etc.) and functional (e.g.,

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loss of taste, swallowing, dysphonia, etc.) challenges that are caused by radiotherapy are increased in severity over the course of treatment and have shown a significant increase in distress (Badr et al., 2014). Treatments of HNC have been associated with loss of function, physical disfigurement, reduced quality of life, high mortality, and can precipitate depression (Fundakowski, 2020). Perceived illness identity predicts psychological distress, and unresolved symptoms may exacerbate the distress (Zhang et al., 2018). Evidence shows high rates of psychosocial distress among HNC patients, though it remains unaddressed in treatment settings of oncology (Williams, 2017).

Pre-treatment depression among HNC is a predictor of decreased radiotherapy compliance and inferior survival (A. M. Chen et al., 2018). Similarly, the prevalence of anxiety is severe enough to cause disruptions in the treatment sessions (Clover et al., 2011). Research studies have shown that the pre-treatment depressive symptoms are the strongest predictors of persistent post-treatment depressive symptoms (Karnell et al., 2006). Patients with HNC are found to have an increased risk of suicidal ideation with depression (Chang et al., 2019), more than three times the incidence of suicide compared to the general population, and the rates are higher among those patients treated with radiotherapy alone (Kam et al., 2015). Psychosocial distress of HNC patients is an essential aspect for consideration of the treatment team, including nurses, oncologists, and researchers, due to its implications posed mainly on well-being and quality of life. Thus, there is an increased need and emphasis on psychosocial distress screening for HNC patients (Text, 2017).

There is extensive literature examining psychological distress among HNC patients during follow-up care, distress before and after radiotherapy treatment, and depression at several points as longitudinal studies among survivors. There is also well-established evidence on pretreatment anxiety and depression with poor post-treatment outcomes. However, there is a lack of research screening on psychosocial distress during radiotherapy and its outcomes, when the distress experienced by the patients is likely to be at its zenith. To the best of our understanding, there is no published literature encompassing the available knowledge on distress in HNC patients using systematic review methodology. Hence, the primary objective of this review is to identify the prevalence of psychosocial distress among HNC patients receiving radiotherapy, and the secondary objective is to identify its predictors and long-term consequences. These findings would help the reader precisely understand the prevalence of psychosocial distress and its impact on HNC patients.

Materials and Methods

Design

This systematic review aimed to identify and appraise all the literature on the prevalence of psychosocial distress among HNC patients receiving radiotherapy. As defined by the NHS Centre for Reviews and Dissemination, a rigorous, explicit, and transparent, systematic review method was used (NHS, 2009). An analytical framework of Search, Appraisal, Synthesis, and Analysis (SALSA) (Grant et al., 2009) was used to aid the review process. This review used a broad search strategy using PEO (Population, Exposure, and Outcomes) (Bettany-Saltikov, 2012).

Search methods

The electronic databases, PubMed/MEDLINE, CINAHL, ProQuest, Scopus, Cochrane, Embase, and Web of Science, were searched for by using appropriate search terms. Reviewers reviewed Google Scholar to get an updated list. A manual search was also performed for additional studies based on the reference lists of selected articles, unpublished articles, and grey literature. The search was done from 24th January 2021 to 4th March 2021 in various databases, and the articles retrieved were from the year 2000 to March 2021.

The search strategy was built based on MeSH headings and database taxonomies combining with Boolean operators 'OR' and 'AND". New terms were added based on the synonyms identified with initial searches, and the search was rerun. The search strategy was validated with three subject experts and then refined based on suggestions (Table 1).

In this review, the types of studies included were cross-sectional, longitudinal, cohort, exploratory and prospective, repeated measure, and prospective quantitative studies. The studies published only in the English language and after 2000, which focused on assessing the psychosocial distress among patients with HNC during radiotherapy were included. We contacted the corresponding authors to get the findings related to psychosocial distress of HNC patients for the studies reported psychosocial distress among other oncology populations along with HNC. Findings of psychosocial distress of HNC patients only during radiotherapy treatment were considered from the studies reported at several points during and after the radiotherapy. Studies that reported the effectiveness of interventions on reducing distress, the prevalence of depression among long term survivors after radiotherapy, longitudinal studies measuring depression after completion of radiotherapy, psychosocial distress in newly diagnosed HNC, pretreatment distress and post-treatment outcomes, distress associated with a specific device or position used for immobilization during radiotherapy and those studies assessing depression at any random point such as patients attending the outpatient clinic, were not included in this review.

Selection of Studies

The review was done by two reviewers independently in all the electronic databases, with specific search strategies for the relevant articles. After obtaining the initial hits from each database, the results were exported in an appropriate format. Duplicates were removed through Microsoft excel. After removing the duplicates, the articles were assessed for their relevance regarding title and abstract, followed by selecting relevant articles for full-text review based on the objectives. Two reviewers independently screened the full-text articles. Discrepancies between the reviewers

regarding the decision to include the articles or not were judiciously sorted out by the third reviewer.

Data extraction

The data were extracted from the articles, which met the eligibility criteria independently by two reviewers. A validated data extraction form was used to maintain consistency in including the data from different research articles. The data on authors of the publication, title of the publication, journal in which it was published, year of publication, geographical area of the study conducted, study design, selection of the sample, sample size, data collection instruments, and the outcomes were extracted. The reviewers contacted the corresponding authors for clarifications, additional and/or missing data whenever required.

Quality Assessment

After a full-text review, the quality assessment of included studies was done by using Newcastle

Ottawa Scale adapted for cross-sectional and cohort studies (Herzog et al., 2013). Representativeness, sample size, comparability, non-response, ascertainment of the outcome, and statistical analysis were the main parameters for the quality check. Quality score was assigned to each study after reviewing independently.

Data Synthesis

Data extraction was done by two reviewers independently as per the review's objectives and based on the extraction tool prepared by the review team. Systematic review experts validated the data extraction tool before starting the data extraction. The data extracted were authors of the publication, geographical area of the study conducted, journal in which it was published, year of publication, study design, selection of the sample, sample size, data collection instruments used to identify the psychosocial distress, data collection time points in the course of treatment and the findings on the prevalence of psychosocial distress among HNC receiving radiotherapy. Studies were tabulated based on whether they included the required data or not. Findings of psychosocial distress, various measurement tools used, and associated factors were synthesized and summarized descriptively as measurements were not homogenous. Prevalence estimates of depression or depressive symptoms were calculated by pooling the study-specific estimates using random-effects meta-analysis. Binomial proportion confidence intervals for individual studies were calculated. Maximum percentage of depression was considered from the studies reported depression more than once during the course of radiotherapy. The total percentage of depression was considered from the studies reported mild moderate and severe depression. Between-study heterogeneity was assessed by standard $\chi 2$ tests and the I 2 statistic.

Results

Out of 782 articles, eleven records that met the eligibility criteria (Figure 1) were included in the final review. The data from 776 HNC patients receiving radiotherapy were pooled in the review, the smallest of 20 HNC participants from an individual study to the largest of 194 in another study. Among the included studies, subjects were recruited from radiotherapy units of oncology hospitals, private tertiary care hospital, HNC outpatient clinic and inpatient wards, oncology outpatient clinic, and radiation oncology clinics. The retrieved articles were published between 2003 and 2020. The essential study characteristics have been summarized in Table 2. All studies have reported depression, and three studies have reported depression along with anxiety. The tools used to measure the outcome variable varied between the studies and included Center for Epidemiologic Studies Depression (CES-D) scale, Patient Health Questionnaire-9 (Joseph et al., 2019), Taiwanese depression questionnaire (Lee et al., 2020), Beck's depression inventory (BDI) (Paula et al., 2012), Beck Depression Inventory-II (Chen et al., 2009; Haisfield-wolfe et al., 2012), Beck Anxiety Inventory (Lee et al., 2020), Hospital Anxiety and Depression Scale (HADS) (Chen et al., 2009; Chen et al., 2010; Kelly et al., 2007; Kohda et al., 2005) and Self-Rating Depression Scale (Sehlen et al., 2003).

Prevalence of depression and anxiety among HNC

Two studies reported the percentage of patients suffering from depression (Lee et al., 2020) and depressive symptoms (Astrup et al., 2015), another two studies reported the severity in terms of mean and standard deviation (SD) of depression (Chen et al., 2009; Joseph et al., 2019). Chen et al., (2009) also reported overall prevalence of of mild to severe depression on the last day of radiotherapy with HADS-D was 75% and BGI-II was 60%. Joseph et al., (2019) also reported the depression in terms of mild, moderate and severe. Sawada et al., (2012) reported only the mean depression among HNC on three different observations. In contrast, Paula et al., (2012) reported the percentage of depression on three different observations. Mean and SD of depression at baseline and week five and nine were reported in a study conducted to find the prevalence and correlates of symptoms and uncertainty in illness among head and neck cancer patients. Depression was among 34% at the fifth week of treatment,

Table 1. Search Terms

Population (P)	Exposure (E)	Outcome (O)
["head and neck neoplasms" OR "mouth neoplasms" OR "lip neoplasms" OR "tongue neoplasms" OR "pharyngeal neoplasms" OR "oropharyngeal neoplasms" OR "nasopharyngeal neoplasms" OR "hypopharyngeal neoplasms" OR "laryngeal neoplasms" OR ("paranasal sinuses AND "neoplasms") OR "nose neoplasms"]	"radiotherapy"	("prevalence" OR "incidence") and ("depressive disorder" OR "depression" OR "anxiety" OR "psychosocial distress" OR "social distress" OR "social isolation")

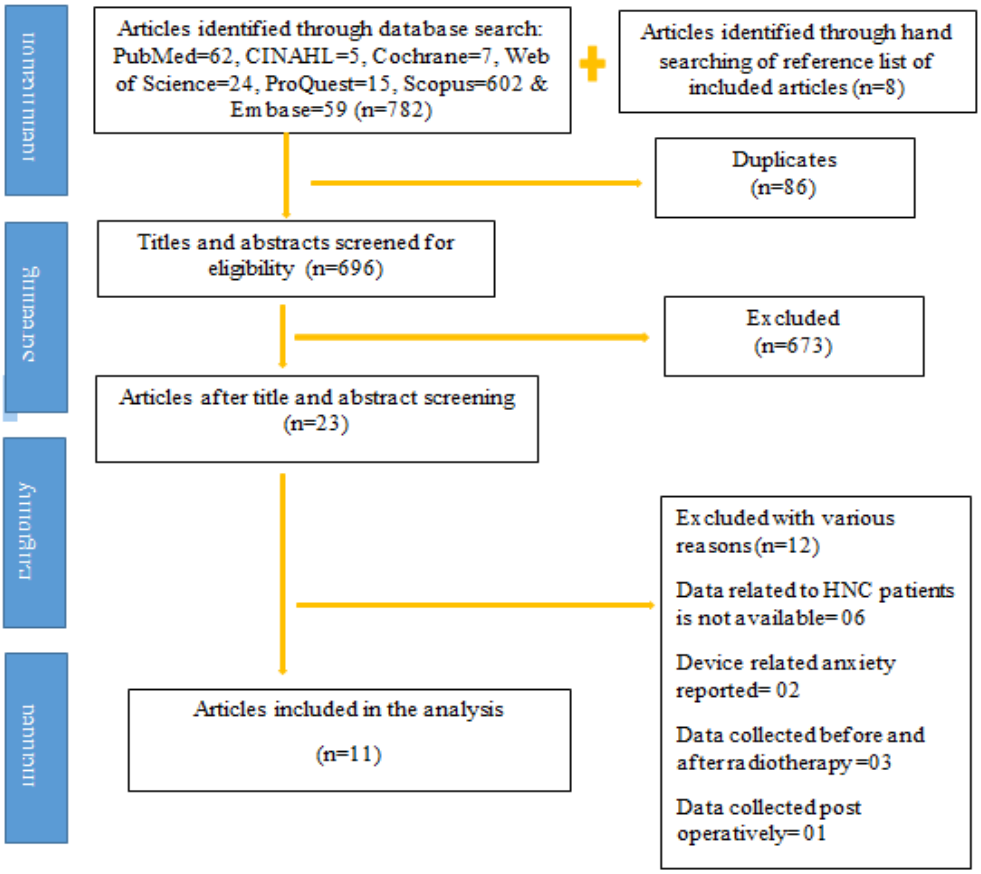

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) Diagram Representing the Search Outcome

24% at ninth and 12th week of treatment (Haisfield-wolfe et al., 2012). Mean and SD of depression was reported approximately one and two months after commencement of radiotherapy in two studies (Chen et al., 2010; Kohda et al., 2005) and the anxiety in one (Kohda et al., 2005). A study by Kelly et al., (2007) reported a percentage of depression and anxiety in terms of mild, moderate, and severe at the first week, middle, and end of the treatment (Kelly et al., 2007). In contrast, Sehlen et al., (2003) reported only a percentage of depression at the beginning and end of radiotherapy (Table 3).

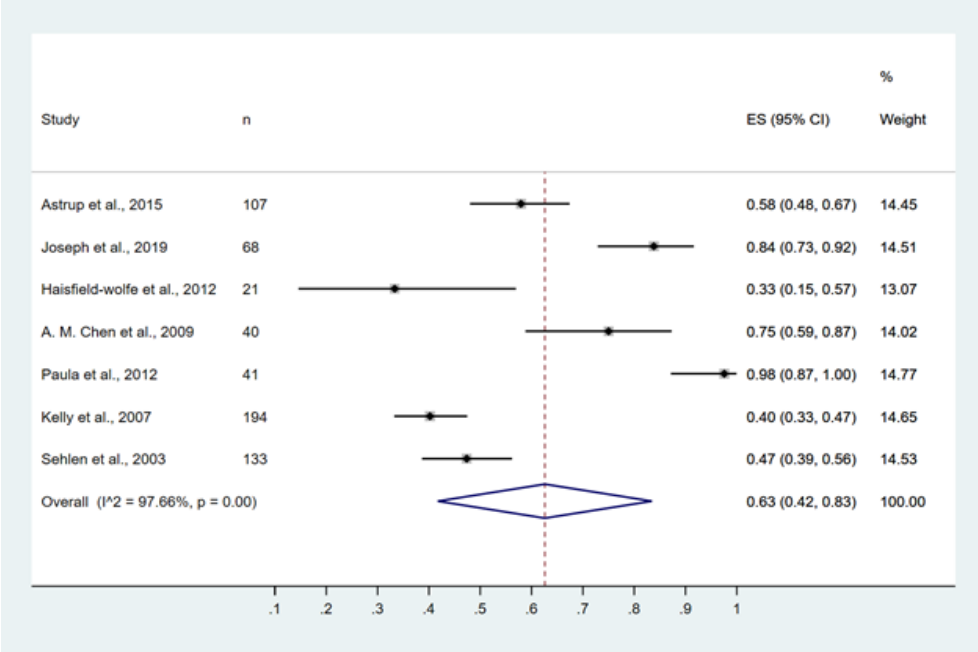

Figure 2. Forest Plot on Prevalence of Depression or Depressive Symptoms among HNC Patients Receiving Radiotherapy, a Meta Analysis

Table 2. The Study Characteristics of Systematic Review of the Prevalence of Psychosocial Distress among HNC Patients Receiving Radiotherapy

Sl. No	Authors/year	Geographical area of study	Study design	Sample size	Data collection instruments	Quality score
1	(Astrup, RustLen, Miaskowski, Paul, & Bjordal, 2015)	Norwegian Radium Hospital, Oslo University Hospital	Longitudinal study	107	Center for Epidemiologic Studies Depression (CES-D) scale	6
2	(Joseph et al., 2019)	Karnataka India	Comparative controlled cohort study	68	Patient Health Questionnaire-9	6
3	(Lee, Lin, Lu, & Chen, 2020)	Southern Taiwan	Cross-sectional design	35	Taiwanese Depression Questionnaire (TDQ) Beck Anxiety Inventory	7
4	(Sawada et al., 2012)	Ribeirão Preto, Brazil.	Exploratory and prospective quantitative study	41	Beck's depression inventory (BDI).	7
5	(Haisfield-wolfe, Mcguire, Soeken, & Geiger-brown, 2012)	Eastern United States.	Repeated measures, prospective study	21	Beck Depression Inventory-II	7
6	(A. M. Chen et al., 2009)	Not stated	Prospective study	40	Hospital Anxiety and Depression Scale (HADS) and Beck Depression Inventory-II (BDI II)	6
7	(Paula, Sonobe, Nicolussi, Maria, & Zago, 2012)	Beneficência Portuguese Hospital of Ribeirão Preto	Prospective exploratory quantitative study	41	Beck Depression Inventory instrument	6
8	(Kohda et al., 2005)	Japan	Prospective study	20	Hospital Anxiety and Depression Scale (HADS)	6
9	(S. Chen, Lai, Liao, Lin, & Chang, 2010)	Taiwan	Prospective panel study	76	Hospital Anxiety and Depression Scale (HADS)	8
10	(Kelly, Paleri, Downs, Shah, & Tyne, 2007)	Not stated	Prospective study	194	Hospital Anxiety and Depression Scale	6
11	(Sehlen et al., 2003)	Munich	Prospective study	133	Self-Rating Depression Scale	6

Metal analysis: Prevalence of depression or depressive symptoms among HNC patients receiving radiotherapy

Seven studies that reported the prevalence of depression or depressive symptoms among HNC patients receiving radiotherapy were included in the final analysis (Table 3). Based on the results of the random-effects meta-analysis model, the pooled estimated prevalence of depression or depressive symptoms among HNC patients receiving radiotherapy 63% (95% CI 42-83). We found significant heterogeneity for this analysis and pooled prevalence is 0.63 (I^2 =97.66%, p<0.001) (Figure 2).

Depression and anxiety on follow up

There was variation between the research reports concerning the time points of reporting. One article reported a follow-up of approximately 30 days after the start of radiotherapy (Sawada et al., 2012), while another reported at week 12 from the time of recruitment (i.e., with the first post-treatment visit with radiation oncologist) (Haisfield-wolfe et al., 2012). Chen et al., (2009) reported the follow-up with the participants at the first follow-up visit (generally three weeks after completion of radiotherapy) (Chen et al., 2009). Chen et al., (2010) reported the follow-up at three months after receiving the radiotherapy. Data collection was limited to the course of treatment in four articles (Joseph et al., 2019; Kelly et al., 2007; Kohda et al., 2005; Paula et al., 2012), and only in two articles the follow up with participants was done six months post completion of treatment (Astrup et al., 2015; Sehlen et al., 2003).

Predictors of depression among HNC

In this review, seven studies reported the predictors and correlating factors of depression among HNC patients, whereas one study reported the predictors of post-radiotherapy depression. Physical symptoms, dissatisfaction with cosmetic outcomes, and diminished social support were corroborated as the predictors of depressive symptoms among HNC patients (Astrup et al., 2015). Likewise, a positive correlation was found among symptom distress, the number of symptoms, and depressive symptoms, which was statistically significant (p<0.05) (Haisfield-wolfe et al., 2012). Fatigue was another factor, and there was a significant positive correlation (P<0.001) between fatigue and depression (r = 0.698) during concurrent radiotherapy (Joseph et al., 2019). Sawada et al. also reported fatigue-related symptoms to significantly correlate with anxiety and depression (Sawada et al., 2012). Pretreatment levels of depression were found to influence the levels of depression developed by the end of concurrent radiotherapy (Joseph et al., 2019). Lee et al., (2020) reported that a history of self-harm, being elderly, having a lower educational level, the severity of resilience, and severity of anxiety are significantly associated with depressive disorder among HNC patients. Changes in radiation dose (ß = 0.000,

Table 3. Description of Measurement and Prevalence of Psychosocial Distress among HNC Patients Receiving Radiotherapy

Sl. No	Authors	Outcome variable (psychosocial distress) measured	Data collection points considered in this review	Prevalence of outcome
1	(Astrup et al., 2015)	Depressive symptoms	Approximately one month after the enrollment (enrollment was approximately 8 days before the initiation of radiotherapy)	Depressive symptoms-58%
2	(Joseph et al., 2019)	Depression	During fourth week of concurrent chemo radiotherapy	Depression Distribution during 4th week 4.6±5.0 Mild- 20 (29.4%) Moderate- 34 (50%) Severe- 3 (4.4%)
3	(Lee et al., 2020)	Depressive disorder & Anxiety	During radiotherapy	Depression 14.3%
4	(Sawada et al., 2012)	Depression	Patients undergoing radiotherapy treatment : - At the start of treatment - Approximately 15 days after the start of treatment. - At the end of treatment	Depression, Mean of first application 9.44, second application, 11.61 and third application 12.32 The BDI index showed no presence of depression.
5	(Haisfield-wolfe et al., 2012)	Depressive symptoms	-At baseline which was after the initiation of the first radiation treatment (week 1) -Week 5 -Week 9 (end of treatment)	Depression baseline mean (SD) 7.5 (5.14), at week 5, 11.2 (5.8), and at week 9, 11.8 (7.12) Depression- seven (34%) at week 5, and five patients (24%) at weeks 9 and 12.
6	(A. M. Chen et al., 2009)	Depression and anxiety	On the last day of radiotherapy	Depression: HADS-D, Mean and (SD)- 11.2 and (5.5) Depression: BDI-II Mean and (SD)- 18 and (12.2) Anxiety: HADS-A Mean and (SD) 6.9 and (5.0) Overall prevalence of mild to severe depression on the last day of RT with HADS-D- 75% and BGI-II is 60%
7	(Paula et al., 2012)	Symptoms of depression	-at the initiation (baseline), -middle (approximately the 15th session) and -termination of radiotherapy treatment (after the 30th session)	Depression first application 7.3%, second application 9.7%, and third application 9.8%
8	(Kohda et al., 2005)	Anxiety and depression	-Approximately one month (4 weeks) and two months (week 8) after commencement of radiation therapy	At week 4: Depression: HADS-D, Mean and (SD)- 5.2 and (3.5) Anxiety: HADS-A Mean and (SD) 4.8 and (3.7). Depression score deteriorated at week 4 (week 0 vs week 4, $p<0.05$) Anxiety score significantly increased at week 4, indicating worsening anxiety (week 0 vs week 4, $p<0.01$). At week 8: Depression: HADS-D, Mean and (SD)- 5.4 and (3.7) Anxiety: HADS-A Mean and (SD) 3.7 and (3.0). Increased anxiety returned to baseline by week 8 (week 4 vs week 8, $p<0.05$; week 0 vs week 8, $p>0.10$). Depression remained remarkable even at week 8 (week 4 vs week 8, $p>0.10$; week 0 vs week 8, $p<0.05$).
9	(S. Chen et al., 2010)	Depression	-1, 2 month from first receiving RT or concurrent chemoradiation therapy (CCRT)	-At month 1 (T2): Mean and (SD) 7.61 and (4.19). -At month 2 (T3): Mean and (SD) 9.70 and (4.06)
10.	(Kelly et al., 2007)	Depression and anxiety	-First week of treatment (N=194)	First week of treatment Anxiety: Mild: 28 (14.43%) Moderate: 28 (14.43%) Severe: 10 (5.15%) Depression: Mild: 20 (10.30%) Moderate: 18 (9.28%) Severe: 09 (4.64%)

Table 3. Continued

Sl. No	Authors	Outcome variable (psycho-social distress) measured	Data collection points considered in this review	Prevalence of outcome
10	(Kelly et al., 2007)	Depression and anxiety	-Mid treatment (N=110) -End of treatment (N=65)	Mid-treatment: Anxiety: Mild: 21 (19.09%) Moderate: 13 (11.82%) Severe: 04 (3.64%) Depression: Mild: 14 (12.73%) Moderate: 18 (16.36%) Severe: 03 (2.73%) End treatment: Anxiety: Mild: 10 (15.38%) Moderate: 09 (13.84%) Severe: 03 (4.61%) Depression: Mild: 11 (16.92%) Moderate: 10 (15.38%) Severe: 05 (7.69%)
11	(Sehlen et al., 2003)	Depression	-At the beginning and at the end of radio-therapy	At the beginning: Mild depression: 19.4% Marked depression:14.9% Severe depression: 0% At the end: Mild depression: 32.9% Marked depression: 9.2% Severe depression: 5.3%

p = 0.000) was positively correlated with level of depression (ß = 0.179, p = 0.000) (Chen et al., 2010). Hyperfractionated-accelerated radiotherapy regimen was another correlating factor of depression compared to conventional regimens (Sehlen et al., 2003). There was also severity of symptoms (fatigue, cough, pain, poor appetite) reported along with peaked depression level (S. Chen et al., 2010). Interestingly, higher education level was negatively associated with depression (Lee et al., 2020; Sehlen et al., 2003).

Discussion

Our comprehensive systematic review of research studies for identifying the prevalence of psychosocial distress among HNC patients yielded seven studies published between 2009 and 2020. Review findings showed varying degrees of depression and anxiety. From this systematic review, the predictors of depression and anxiety among HNC patients were genuinely multidimensional. This multidimensional (extrinsic and intrinsic variables) model of depression predictors identifies areas where individuals, families, communities, and the health sector can work towards eradicating the primary concern of depression among HNC patients.

In this review, depression was measured in all the included articles, and in addition, four of them also measured anxiety. However, the measurement tools used to collect the data among these studies are varied, and all of them were diagnostic instruments for common mental disorders. Several factors contribute to distress, including declining functional status that interferes with daily living, the physical burden of the symptoms, and the social and emotional changes wrought by cancer (Howell and Olsen, 2011). For clinical application, the tools chosen should be reliable, valid, and brief. They should distinguish individuals in distress based on a reliable cut-off score to optimize case detection (Howell and Olsen, 2011). From a psycho-oncological point of view, patients with HNC present unique challenges, and there is a need for adequate assessment of psychosocial burden (Kunz et al., 2021), which emphasizes the necessity of developing a unique tool for measuring the psychosocial distress of HNC patients. Though the primary objective of the review was to identify the prevalence of psychosocial distress among HNC patients receiving radiotherapy, our review identified only one study being titled as measuring psychosocial distress (Chen et al., 2009), and the outcome measured was depression and anxiety. Because of the stigma associated with the latter terminology, the NCCN recommends using the term “distress” rather than “anxiety and depression”(Howell and Olsen, 2011). The present understanding of cancer-related distress is not based on modern conceptualizations of emotions and mental illnesses. Hence, there is a need for reconsidering the conceptualization of cancer-related distress (Dekker et al., 2017).

Attrition and non-respondents data were reported in seven articles (Astrup et al., 2015; Chen et al., 2010; Haisfield-wolfe et al., 2012; Joseph et al., 2019; Kelly et al., 2007; Kohda et al., 2005; Sehlen et al., 2003); but the reason for dropout was reported only in three studies (Chen et al., 2010; Kohda et al., 2005; Sehlen et al., 2003). Higher depression scores before starting treatment were more likely to result in dropouts (p=0.0005) (Kelly et al., 2007). However, none of the studies reported on disruption in the treatment sessions though there is evidence on distress causing disruptions in the treatment sessions (Clover et al., 2011). Another three articles reported that all enrolled respondents fully answered the instruments at the stipulated time according to the study protocol (Chen et al., 2009; Paula et al., 2012; Sawada et al., 2012).

Chen et al., (2009) reported in their study that during their radiotherapy treatment, five patients started using an antidepressant. Because of their psychosocial functioning, no patient expressed suicidal thoughts or required inpatient hospitalization. Other articles included in this review did not report any association between distress and suicidal ideations. However, the published evidence demonstrates that patients with HNC and treated with radiotherapy are found to have a higher incidence of suicide ideation when depressed (Chang et al., 2019; Kam et al., 2015).

In this review, from two of the included articles, the trend of increase in depression is observed, which is also not returned to the baseline levels (Astrup et al., 2015; Sehlen et al., 2003). However, long-term consequences of depression were not reported in any of the articles. Thus, the present review summarized the prevalence of psychosocial distress descriptively, although there was heterogeneity in the presentation of findings in different studies and its predictive factors. Depression was reported in all articles, and the majority reported the predictors and correlating factors of depression among HNC patients.

This systematic review has a few limitations. The wide methodological heterogeneity of the included papers was the systematic review's main limitation. Furthermore, the heterogeneity of the included research papers made a meta-analysis unfeasible. The sample size from included articles is less, and the low methodological quality of the research presented makes it difficult to create high levels of evidence. We have included only studies published in the English language, which may not be representative globally.

This systematic review among HNC patients revealed psychosocially distressed during radiotherapy. The review also identified several predictive factors that could serve as potential intervention and supportive therapy areas during radiotherapy. Our review generated minimal evidence despite its limitations, which calls for conducting further research to explore the psychosocial distress during radiotherapy in a larger sample with more specific measurement tools; that will facilitate the initial detection and referral for distressed patients.

Author Contribution Statement

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE)

• Substantial contributions for the conception and design of the systematic review.

• Drafting the article or revising it critically for important intellectual content.

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Conflict of Interest

All authors declared that there are no conflicts of interest.

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