



# Quality of Life, Anxiety, Depression and Psychological Distress in Patients with Cancer During the COVID 19 Pandemic: A Systematic Review

## Review

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## ABSTRACT

**Introduction and Objectives:** Quality of life (QOL) and psychological wellbeing deteriorate during the COVID 19 pandemic in patients with cancer. **Purpose:** This study aims to review the current evidence of QOL, anxiety, depression, psychological distress, and their inter-relationship in patients with cancer and survivors during the COVID 19 pandemic. Moreover, this study identifies factors associated with QOL and mental health in patients with cancer and survivors during the COVID 19 pandemic. **Methods:** An extensive electronic database search was conducted. Articles published in English assessing cancer patients and cancer survivors' QOL and psychological wellbeing. **Results:** Twenty-seven articles with 22,134 participants were included. Concerns related to contracting COVID 19, along with potential treatment plans were predictors of impaired QOL. Advanced age, family support, being identified as a male and having less comorbid conditions were associated with the high level of QOL. Delay or change in treatment plan, contact with COVID 19 positive individuals, and emotional vulnerability were found to be independently associated with high levels of anxiety, depression, and distress. **Conclusion:** Health professionals, caregivers and support services should pay more attention on QOL and psychological wellbeing of the patients with cancer. Counselling sessions, support services should be established to improve their life satisfaction and wellbeing.

## KEYWORDS

Cancer, COVID 19, Psychological Care, Quality of life

## INTRODUCTION

COVID 19 pandemic has been shown to affect patients with chronic conditions, specifically those diagnosed with cancer (Jammu et al. 2020; Seven et al. 2021). Cancer patients receiving chemotherapy experienced a higher number of adverse events related to the pandemic compared to the patients without anti-cancer treatments (Chavez-Macgregor et al. 2021). The immunocompromised state of cancer patients increases their risk of acquiring COVID 19 infection which has led to increased levels of stress and symptom burden (Pinato et al. 2021; Seven et al. 2021; Miaskowski et al. 2020). As well, lower levels of health-related quality of life (HRQOL) have been

shown to be a significant issue among patients living with cancer (Msaouel et al. 2017).

Also, depression and anxiety have been shown to be common psychological issues within this cohort during the pandemic (Hashemi et al. 2020; Pilevarzadeh et al. 2019).

HRQOL and psychological wellbeing drastically changed during the COVID 19 pandemic in patients with cancer and survivors; However, there does not appear to be any systematically collected data that identifies specific factors associated with quality of life (QOL) and mental health in patients living with and those who have been diagnosed with cancer. This study aims to review the current evidence of



QOL, anxiety, depression, and psychological distress in patients with cancer and survivors during the COVID 19 pandemic. Moreover, this study identifies the factors associated with QOL and mental health in patients with cancer and survivors.

## METHODS

This is systematic review contains a qualitative analysis. A study protocol was registered and approved in the International prospective register of systematic reviews (PROSPERO) CRD42021234446.

### Search Strategy

Two independent authors (KIPP and HDWTD) searched articles via four electronic databases; PubMed, WHO COVID 19 global research database, CINAHL, Cochrane COVID 19 study register, and the secondary search was done in Google Scholar. Reference lists, similar articles, and citations were evaluated to identify the additional relevant articles. The initial search was conducted on December 24, 2020 and continued until February 6, 2021. Keywords included in the search for articles consisted of: "quality of life", "health status indicator", "health outcomes", "anxiety", "depression", "distress", "mental\*" (Truncated), "psychology\*" (Truncated), "cancer\*" (Truncated), "malignan\*" (Truncated), "tumor", "neoplasm", "COVID 19", "corona" and "SARS CoV 2". Keywords were truncated and combined through Boolean operators ("AND", "OR"). The exact search string is identified in [Table 1](#). Definitive keywords, data bases and exact search string were determined during the study piloting period. Authors searched in Google-scholar via repetitive key word combination to collect all relevant studies.

### Inclusion and Exclusion Criteria

Original English publications: assessing the adult cancer patients (older than 18 years) or survivors (without time limits from the diagnosis) were included; study participants with other life limiting illnesses were excluded from the study. Observational studies: cross-sectional or cohort studies were included. All the studies need to be subjected to assess the QOL OR anxiety OR depression OR psychological distress OR all the outcomes during the COVID 19 pandemic period.

Authors excluded the viewpoints, abstracts, commentaries, pre-proof papers, books, opinions, editorials, qualitative studies, and conference proceedings.

### Assessment of Bias

Study identification, screening, study selection, and quality appraisal were conducted by two independent authors (KIPP and HDWTD). Duplications were removed after the study screening process ([Figure 1](#)). Abstracts and titles were evaluated twice to avoid premature elimination of the studies and assessed for the relevance to the study. According to the National Heart Lung and Blood Institute (NHLBI) quality assessment tool for cross-sectional and cohort studies (National Heart Lung and Blood institute 2020) (see supplementary table: 2), the quality appraisal was conducted. Studies with "good", "fair" quality were included, and articles with "poor" quality were excluded.

Good quality studies have minimum risk of bias, and the findings are valid; fair quality studies have some chance for the bias; but still the findings are valid to include for the systematic review. NHLBI quality appraisal tool for cohort and cross-sectional studies contains 14 questions; the response "No" for at least one question indicates the chance of bias. Answers as "Yes" for all the components with "non-reported" or "not-applicable" have good quality in Quality appraisal.

Two authors (KIPP and HDWTD) assessed each studies' quality, discussed the various discrepancies that were identified, and various study limitations encountered. We consider the term "quality" rather than the "risk of bias" which based on theoretical backgrounds (Liberati et al. 2009; Pocock et al. 2018). Authors assess the best methodological and reporting quality that researchers able to do for the study. Therefore, the quality of the included studies was rated based on both NHLBI tool components and the authors decision on the methodological quality

### Data Extraction

KIPP extracted the data from the selected studies and checked by HDWTD. A predefined data abstraction form was used for the data extraction process. Author, published year and country, study



design, study objectives, sample size, sample characteristics, study instruments, significant findings relevant to the study objectives, strengths and limitations of the studies were extracted. Then, studies were arranged according to the subheadings.

### *Data Synthesis and Analysis*

This study data synthesis was conducted according to the Campbell et al 2020; guidelines for reporting without meta-analysis in systematic reviews (Campbell et al. 2020). The steps include, grouping the studies for synthesis, describe the standardised metric used, describe synthesis method, prioritise results for summary and synthesis, identify heterogeneity of reported studies, findings, and characteristics, check the certainty of the evidence, results presentation, and reporting (Campbell et al. 2020).

Studies were grouped to according to the study objectives; studies assessed QOL, and psychological impact were grouped separately; studies that assessed anxiety, depression and psychological distress were again sub-grouped. The instruments used to assess QOL, anxiety, depression and psychological distress were encountered and assess their validity, reliability, and psychometric properties. In data synthesis, p values, odds ratios were considered; authors attentive on regression analysis to identify the independent associations with outcomes (QOL, anxiety, Depression and psychological distress). Non-significant findings also identified and interpreted with the sample characteristics. Sample size, statistical tests, quality of the data, and methodological quality were considered when study prioritizing. Also, studies were prioritized according to the directness in relation to the study objectives and strength of the study findings; Strong study findings ( $p < 0.0000$ ) via regression analysis were highlighted. Study findings with only descriptive statistics were also considered.

Due to the clinical heterogeneity of the studies, qualitative synthesis was undertaken. Certainty of the evidence was checked across all studies; quality of the studies, sample size and characteristics, strength of the effect estimate (p value, direction and strength of the correlation, odds ratio) were considered to ensure the certainty of the evidence. Studies that compare the QOL, anxiety, depression, and distress in

pre and during the COVID pandemic were used to identify how COVID 19 effect on cancer patients' living.

## **RESULTS**

### *Characteristics of Included Studies*

The study selection process is stated in the [Figure 1](#). Twenty-seven articles were selected for final review (Baffert et al. 2021; Bargon et al. 2021; Chapman et al. 2020; Charsoeui et al. 2021; X. Chen et al. 2021; Ciężyńska et al. 2020; Falcone et al. 2020; Ferrara et al. 2021; Frey et al. 2020; van Gorp et al. 2021; Greco et al. 2020; Gultekin et al. 2021; Hu et al. 2020; Jeppesen et al. 2020; Juanjuan et al. 2020; Karacin et al. 2020; Lou et al. 2020; Massicotte, Ivers, and Savard 2021; Musche et al. 2020; D. W. L. Ng et al. 2020; K. Y. Y. Ng et al. 2020; Van De Poll-Franse et al. 2020; Romito et al. 2020; Sigorski et al. 2020; Swainston et al. 2020; Wang et al. 2020; S. Yang et al. 2021; Yildiz Kabak, Atasavun Uysal, and Duger 2021). The study included 22,134; total population for the analysis; 9363 were males and 12,761 were females; 10 participants did not indicate their gender as male or female. This review includes the studies from Netherland (Bargon et al. 2020; Van De Poll-Franse et al. 2020a), Germany (Musche et al. 2020), Poland (Ciężyńska et al. 2020; Sigorski et al. 2020), China (X. Chen et al. 2021; Hu et al. 2020; Juanjuan et al. 2020; D. W. L. Ng et al. 2020; Wang et al. 2020; S. Yang et al. 2021), Canada (Massicotte, Ivers, and Savard 2021), France (Baffert et al. 2021), Denmark (Jeppesen et al. 2020), Turkey (Karacin et al. 2020; Yildiz Kabak, Atasavun Uysal, and Duger 2021), Italy (Falcone et al. 2020; Ferrara et al. 2021; Greco et al. 2020; Romito et al. 2020), Iran (Charsoeui et al. 2021), United Kingdom(UK), United States (US) (Chapman et al. 2020; Lou et al. 2020; Swainston et al. 2020), Singapore (K. Y. Y. Ng et al. 2020), and two online surveys conducted in multiple countries (Frey et al. 2020; Gultekin et al. 2021).

Fourteen studies assessed the anxiety, depression, and psychological distress among patients with cancer and survivors during the COVID 19 pandemic (Chapman et al. 2020; X. Chen et al. 2021; Frey et al. 2020; Gultekin et al. 2021; Hu et al. 2020; Juanjuan et al. 2020; Karacin et al. 2020; Lou et al. 2020; Massicotte, Ivers, and Savard 2021; D. W. L. Ng et al. 2020; K. Y. Y. Ng et al. 2020; Romito et al. 2020;



Sigorski et al. 2020; Swainston et al. 2020). Seven studies reported the both QOL and psychological impact (anxiety, depression, and psychological distress) (Baffert et al., 2021; Bargon et al. 2021; Musche et al. 2020; Van De Poll-Franse et al. 2020; S. Yang et al., 2021; Yildiz Kabak, Atasavun Uysal, and Duger 2021; Wang et al. 2020). QOL alone studied in six articles (Ciążyńska et al. 2020; Ferrara et al. 2021; Jeppesen et al. 2020; Falcone et al. 2020; Charsouei et al. 2021; Greco et al. 2020b). All the studies had used standard validated instruments to assess QOL, anxiety, depression, and psychological distress. The seventeen studies had reported the “fair” quality and ten articles had reported “good” quality in quality appraisal.

### ***QOL in Patients with Cancer and Survivors During COVID 19***

Seven studies used EORTC QLQ C30 questionnaire to assess (Bargon et al. 2021; Ciążyńska et al. 2020; Falcone et al. 2020; Jeppesen et al. 2020; Van De Poll-Franse et al. 2020a; S. Yang et al. 2021; Yildiz Kabak, Atasavun Uysal, and Duger 2021). EQ 5D 3L had used in one study (Musche et al. 2020). SF 12 was used in two studies (Baffert et al. 2021; Ferrara et al. 2021) and SF 36 had used in one study (Charsouei et al. 2021). Wang et al. 2020 had used WHOQOL BREF to assess QOL. Six studies had compared the QOL in pre pandemic QOL outcomes (Baffert et al. 2021; Bargon et al. 2021; Ciążyńska et al. 2020; Falcone et al. 2020; Jeppesen et al. 2020; S. Yang et al. 2021) and one study had compared with matched norm population (Van De Poll-Franse et al. 2020a).

### ***QOL Status in Patients with Cancer During the COVID 19 Pandemic***

EORTC QLQ C30 is widely used QOL assessment tool specially developed for the cancer patients. It contains five functional scales (physical, social, role, cognitive, and emotional functioning) and eight symptom scales including the symptoms of fatigue, nausea and vomiting, pain, dyspnea, sleep disturbances, appetite loss, constipation, and diarrhoea (Giesinger et al. 2016). EORTC QLQ C30 was consist of 30 items; 28 items have 4 likert scale responses (Not at All: 1, All Little: 2, Quite a Bit: 3, Very Much:4). Last two items assess the overall health and QOL; it has seven numerical scales to rate the participants overall QOL and health (Giesinger et al.

2016). According to the EORTC QLQ C30, global QOL ranged from 41.7 ±22.0 to 78.9± 16.6 in included studies. Domain score for physical functioning ranged from 68.3 ±21.5 to 88.6 ±15.5, role functioning from 66.9 ±30.1 to 82.6 ±24.8, emotional functioning from 68.4 ±25.6 to 85.2 ±17.3, cognitive functioning from 69.9 ±25.9 to 85.2± 17.3 and social functioning 67.1± 25.7 to 67.1± 25.7.

In addition, one study reported their domain scores as median and IQR s (Falcone et al. 2020). EQ 5D 3L is a valid reliable generic tool to measure QOL. It consists of 5 subscales; Mobility, self-care, usual activities, pain/discomfort, anxiety/depression; each subscale has 3 responses weighing the experience of the responder (EuroQol Research Foundation 2018). Musche et al., 2020 Was stated the EQ 5D 3L score as 66.05± 19.257 (Musche et al. 2020). SF 36 is a generic valid tool which can easily administered to assess QOL; it consists of eight subscales as physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health. Subscale scores were summarized as physical component summary (PCS), Role component summary (RCS) and mental component summary (MCS) (Mitoma et al. 2016). SF 12 is derived from SF 36, and it also contains PCS and MCS (Huo et al. 2018). In included 2 studies PCS mean scores ranged from 46.7 ± 12.4 to 51.4 ± 6.2 and MCS ranged from 36.1±14.3 to 50.1 ± 7.2 according to the SF 12. In QOL comparison with the norm population, patients with cancer were significantly affected by the COVID 19 (Musche et al. 2020; Van De Poll-Franse et al. 2020b). According to the Ciążyńska et al. 2020, global QOL, cognitive functioning, social functioning had significantly reduced; insomnia, appetite loss and financial difficulties had significantly exaggerated; Baffert et al. 2021 also indicated the significant impairment of Mental component summary scores in SF 36 after the lockdown, but not PCS (Baffert et al. 2021). Bargon et al. 2020 and S. Yang et al. 2021 had showed, Global QOL, physical functioning, role functioning, emotional functioning, cognitive functioning, and social functioning had significantly increased during the COVID 19 and insomnia was significantly reduced. Jeppesen et al. 2020 and Falcone et al. 2020 found the changes in QOL domains in EORTC QLQ C30 compared to the pre-pandemic, but it is not statistically significant (Falcone et al. 2020; Jeppesen et al. 2020).



### ***Factors associated with QOL in patients with cancer during the COVID 19***

Concerns related to COVID 19 and contracting COVID 19 were found to be strong independent predictors ( $p < 0.001$ ) of impaired emotional functioning, global QOL (Falcone et al. 2020; Jeppesen et al. 2020) and impaired social functioning in patients with cancer (Falcone et al. 2020).

As well, reducing treatment intensity was an independent predictor of low QOL in physical functioning, role functioning, emotional functioning, emotional functioning, cognitive functioning, social function; it worsens symptom scales in fatigue, nausea, vomiting, appetite loss, diarrhoea, pain, dyspnoea, insomnia, constipation and increased the financial difficulties (S. Yang et al. 2021). Difficulties of continuity of medical assistance is a significant independent predictor of QOL according to the SF 12 scale (Ferrara et al. 2021).

Advanced age significantly improved global QOL (Jeppesen et al. 2020), mental and emotional wellbeing (Baffert et al. 2021; Jeppesen et al. 2020) and low physical component summary scores (Baffert et al. 2021). Good family support and not living alone significantly and independently improve global QOL, and emotional functioning (Jeppesen et al. 2020; S. Yang et al. 2021). Male gender, fewer comorbid conditions improve the emotional functioning in patients with cancer; employment had positively influenced on global QOL (Jeppesen et al. 2020).

### ***Anxiety, depression, and psychological distress in patients with cancer and survivors during the COVID 19 pandemic***

Among included studies, twenty-two studies had used generic tools to measure anxiety, depression, distress and one study had used COVID 19 emotional impact scale. Hospital anxiety depression scale (HADS), General anxiety disorder-7 (GAD-7), Zung self-rating anxiety scale, beck anxiety inventory, state trait anxiety inventory-1 and 2 (STAI 1 and 2) were used scales to assess anxiety in included studies. Depression was assessed via HADS and Patient health questionnaire (PHQ), distress thermometer and Impact of event scale- Revised (IES-R) were used to assess the psychological distress. HADS is a widely used generic questionnaire that assess both anxiety

and depression; it consists of 14 items and cut-off scores determine the level of anxiety; score 0-7: mild, 8-10: Borderline and 11-21 indicate the severe anxiety (Crawford et al. 2001; Skapinakis 2014). GAD-7 contains the seven items which intended to measure generalized anxiety disorder in four-point Likert scale: it measures the anxiety symptoms within previous two weeks. Higher scores indicate the severity of the disease (Crawford et al. 2001). Zung self-rating anxiety scale was developed to assess both psychological and somatic symptoms of the anxiety (Dunstan and Scott 2020). Beck anxiety inventory consist of 21 items; item responses are recorded according to the four-point Likert scale; thirteen questions assess the physical aspect, five questions assess the cognitive aspect, and three items have both physical and cognitive aspects of the anxiety (Fydrich, Dowdall, and Chambless 1992). STAI is a self-reported questionnaire consists of 20 items; STAI 1 and 2 assessed via each 10 questions in the 20-item scale according to the 4-point Likert scale (Ilardi et al. 2021). PHQ-9 is 9 item questionnaires; it measures the symptoms and their frequency during the past two weeks (Kroenke, Spitzer, and Williams 2001). IES-R was designed to assess the subject distress response to a specific event, it consists of 22 items and assess the responses based on three main subscales namely avoidance, intrusion, and hyperarousal (Ilardi et al. 2021). Mean anxiety score ranged from  $3.20 \pm 3.23$  to  $9.5 \pm 4.1$  in HADS score. In GAD it ranged from  $3.2 \pm 4.5$  to  $6.01 \pm 5.35$ . PHQ depression scores ranged from  $3.45 \pm 3.61$  to  $8.1 \pm 2.4$ . one study had reported the mean  $\pm$ SD for distress via distress thermometer; two studies reported the mean values for distress via IES-R ( $19.7 \pm 13.9$  to  $28.17 \pm 18.23$ ).

Anxiety scores were compared with the norm population; patients with cancer had experience significantly worst anxiety scores compared to the norm (D. W. L. Ng et al. 2020; Van De Poll-Franse et al. 2020a; S. Yang et al. 2021). Depression also significantly exaggerated during the pandemic than the pre-pandemic period (Bargon et al. 2021). There are no studies with the comparison of distress levels of pre and during the COVID 19 period.

### ***Factors associated with anxiety, depression, and psychological distress during COVID 19***



Delay in treatment/ care or change in treatment plan independently influenced their anxiety and depression level (Chen et al. 2021; Frey et al. 2020; Gultekin et al. 2021; Juanjuan et al. 2020; Lou et al. 2020; Massicotte, Ivers, and Savard 2021; Swainston et al. 2020; S. Yang et al. 2021). Patients who had postponed their chemotherapy sessions due to COVID 19 reported significantly high anxiety scores compared to the chemotherapy postponements due to other reasons ( $18.9 \pm 9.4$  vs  $3.3 \pm 1.6$ ,  $P < 0.001$ ) (Karacin et al. 2020). Concerned on not being able to meet an oncology doctor during the pandemic period independently impact on anxiety (OR: 1.94, CI: 1.35- 2.8,  $P < 0.001$ ) (Gultekin et al. 2021). COVID 19 related stressors significantly increase the levels of anxiety and depression in patients with breast cancer; difficulty in obtaining medicine and essentials was a prominent concern for anxiety and depression; The higher degree of concern significant with a higher degree of anxiety and depression (Massicotte, Ivers, and Savard 2021).

Close contact with COVID 19 is another independent risk factor for deteriorated psychological wellbeing (Juanjuan et al. 2020; D. W. L. Ng et al. 2020); Chinese patients with breast cancer and survivors reported that they have significantly high levels of anxiety following close contact with COVID 19 [OR: 3.178 (1.404-7.144),  $p = 0.005$ ] (Juanjuan et al. 2020).

COVID 19 EMV is another factor that independently influenced anxiety, depression, and psychological distress in patients with cancer (Chapman et al. 2020; Swainston et al. 2020). High levels of COVID 19 EMV significantly predict the high levels of general anxiety ( $\beta$ : 0.41,  $P < 0.001$ ) and depression ( $\beta$ : 0.24,  $P < 0.001$ ) (Swainston et al. 2020) and emotional distress ( $\beta$ : 0.34,  $p < 0.05$ ) (Chapman et al. 2020).

The living status of the cancer patients during the COVID 19 pandemic significantly affects their anxiety, depression, and psychological distress; living alone significantly increases the anxiety (X. Chen et al. 2021; Frey et al. 2020; Hu et al. 2020; K. Y. Y. Ng et al. 2020); Living with family independently reduces the risk of depressive symptoms (Hu et al. 2020). Women with ovarian cancer, and breast cancer who are living alone reported higher levels of depression (Chen et al. 2021; Frey et al. 2020); Moreover, patients with

breast cancer who live alone reported high anxiety levels (OR: 3.86, CI: 1.9-7.86) (Chen et al. 2021).

Good family support independently reduces the incidence of anxiety (Bargon et al. 2021). Young age is an independent predictor of high anxiety and depression levels (Frey et al. 2020). A high level of job security significantly reduced the level of depression and emotional distress (Chapman et al. 2020). Presence of comorbidity significant with high depression (X. Chen et al. 2021; Gultekin et al. 2021), and anxiety scores (see supplementary table: 1) (X. Chen et al. 2021). Female gender was a strong negative independent predictor of COVID 19 related anxiety (Sigorski et al. 2020) and general anxiety (Baffert et al. 2021; Romito et al. 2020; S. Yang et al. 2021); Female patients who had postponed their chemotherapy sessions had significantly high COVID 19 related fear and anxiety than the females who had postponed due to other reasons (Karacin et al. 2020).

Good QOL strongly and independently significant with low anxiety ( $p < 0.001$ ) and depression ( $p < 0.001$ ) scores (Wang et al., 2020); anxiety scores negatively correlated with general QOL in patients with cancer (Yildiz Kabak, Atasavun Uysal, and Duger 2021).

## DISCUSSION

This study found the significant impact of COVID 19 on QOL, anxiety, depression, and psychological distress in patients with cancer; psychological health and QOL had drastically changed during the pandemic period.

Being concerned about COVID 19 and contact with COVID 19 are strong independent predictors of low QOL and deteriorated psychological health in patients with cancer during the COVID 19 pandemic. Reduced treatment intensity and high evaluation of online projects are independently influenced on QOL. While delay in treatment care/plans and COVID 19 EMV are negatively influenced on the psychological health. Moreover, living situation, age, female gender, and presence of comorbid conditions are effect on both QOL and psychological health.

General population and the patients with non-infectious chronic illnesses are experiencing low QOL and high psychological burden during this pandemic;



anxiety, depression, distress, stress, and post-traumatic stress disorder reported in general population (Xiong et al. 2020; Wu et al. 2021). Female gender, young age, chronic illnesses, and frequent information concerning the COVID 19 showed independent associations with the high psychological burden (Xiong et al. 2020; Yeli Wang, Kala, and Jafar 2020). Being with chronic illnesses, anxiety, depression and stress are independently effect on low QOL in general population (Algahtani et al. 2021).

Patients with cancer are mainly concerned about treatment delays, cancellations, diagnosis delays, and treatment interruptions (Moraliyage et al. 2020). Both healthcare-related factors and patient-related factors influenced their treatment delays; Lockdowns and travel issues, financial problems, travel distance to treatment places, accommodation and food accessing difficulties are patient-related issues; and surgery delays, inadequate personal protective equipment and ventilators, and manpower shortage are the most common healthcare-related issues that causes treatments delays in cancer care (Kumar and Dey 2020). Patients with active treatments had postponed or cancelled their treatments if they are treated with immunotherapy, hormone therapy, or active surveillance (Van De Poll-Franse et al. 2020a). As well, a four-week treatment delay results in increased mortality in patients with cancer (Luisa et al. 2020). Prioritization and triage are essential concepts to limit the cancer-related mortality in patients with cancer during the pandemic. COVID 19 fear is a prominent cause for psychological health deterioration in patients with cancer (Momenimovahed et al. 2021). COVID 19 related fear and anxiety exaggerate the worst cancer-related outcomes; It influence the decisions on treatment interruptions and cancellations (Sutcuoglu et al. 2020; Vanni et al. 2020).

Social isolation leads to decreased social functioning and psychological wellbeing (Jammu et al. 2021; Miaskowski et al. 2020); Loneliness occurs due to the lockdowns, fear of contact with COVID 19 and lack of social interactions, and limited visitors (Murayama, Okubo, and Tabuchi 2021; Schellekens and van der Lee 2020; Yan et al. 2020). It is essential to implement interventions to overcome loneliness and loneliness associated psychological impact in patients with cancer.

Even in the non-pandemic time, some demographic variables had an independent impact on QOL and psychological wellbeing (Bradley et al. 2006; Dieperink et al. 2012; Laghousi et al. 2019; Morrison et al. 2017; Parker et al. 2003; Zou, Hu, and Mccoy 2014). Female gender and young age are negative independent predictors of low QOL and mental health (Bradley et al. 2006; Geue et al. 2014; Laghousi et al. 2019; Morrison et al. 2017). Old, aged cancer patients who are receiving satisfiable social support experience good QOL in the mental health domain and less anxiety and depression (Parker et al. 2003; Zou, Hu, and Mccoy 2014). Moreover, living alone significantly reduced the QOL in patients with cancer during the pandemic and non-pandemic periods (Dieperink et al. 2012) This finding showed that the factors associated with QOL, anxiety, depression and distress in non-pandemic period similarly effect in the pandemic time.

Online events and treatments significantly influenced QOL in patients with cancer. COVID 19 related thoughts and views lead to cancer treatment interruptions. Continued treatments via a virtual environment is better than interruptions. Treating in virtual environment is common in this pandemic. It reduces public exposure and risk of the contract with COVID 19 (Loree et al. 2021). To work with distant learning methods, health care workers need more training; telehealth is a convenient intervention to overcome COVID 19 associated barriers to continue patient care (Mink et al. 2021; Paterson et al. 2020). The effect of treating for cancer patients in virtual environment on their QOL and psychological health was not studied yet. It is recommended to vaccinate the cancer patients against the COVID 19 (National Comprehensive Cancer Network 2021); however, the impact of COVID 19 vaccination on QOL and psychological wellbeing in patients with cancer was not studied yet.

### **STRENGTH AND LIMITATIONS**

This study is the first attempt to provide more generalized knowledge on QOL, anxiety, depression, and psychological distress in patients with cancer during the COVID 19 Pandemic. This study followed systematic review standard guidelines, protocols exclusively. Search techniques, designed to collect all the relevant evidence. Quality appraisal of selected articles before inclusion ensure the minimum bias of



the study. However, accessible databases are limited for this study. Moreover, representation of evidence in the African and Asian regions are negligible due to lack of studies, especially in developing and middle-developed countries. It was difficult to compare the studies due to the inconsistent scales used across the included studies; QOL, anxiety, depression and psychological distress were reported in different ways by using different scales.

## CONCLUSION

QOL and psychological wellbeing are significantly deteriorated among patients with cancer due to the COVID 19 pandemic. COVID 19 related events adversely influenced patients' wellbeing. Treatment delay/change/postponement/ cancellation, concerns of COVID 19: contact with COVID 19, female gender, advanced age, living alone, presence of comorbid conditions, good family support are factors that independently influenced QOL and psychological wellbeing of the patients with cancer. Online events improve patients' satisfaction, reduce anxiety and depression. Oncologists and other health professionals should design appropriate interventions to improve the life satisfaction and mental health in patients with cancer. Moreover, research field on QOL, and psychological impact due to COVID 19 should be extended in African, Asian regions due to lack of evidence. Oncologists and Onco-researchers in those regions should make evidence, research to fact find and evaluate the psycho-behavioural interventions to upgrade the life satisfaction in patients with cancer during the pandemic. Virtual counselling sessions, psychological support is crucial during this pandemic for the patients with cancer.

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**Table 1. Search String Truncated Keywords, Booleans Operands**

<b>Search</b>	<b>Keyword combination and filters</b>
<b>No</b>	
<b>#1</b>	Search: ((quality of life [Title/Abstract]) OR (health status indicator[Title/Abstract])) OR (health outcomes[Title/Abstract])
<b>#2</b>	Search: ((anxiety [Title/Abstract]) OR (depression [Title/Abstract])) OR (distress[Title/Abstract])
<b>#3</b>	Search: ((psychology*[Title/Abstract])) OR (mental*[Title/Abstract])
<b>#4</b>	Search: (((cancer*[Title/Abstract]) OR (tumor [Title/Abstract])) OR (neoplasm [Title/Abstract])) OR (carcinoma*[ Title/Abstract])) OR (malignan*[Title/Abstract])
<b>#5</b>	Search: (((((covid 19[Title/Abstract]) OR (coronavirus [Title/Abstract])) OR (SARS CoV 2[Title/Abstract]))) OR (novel corona virus [Title/Abstract])
<b>#6</b>	#1 AND #4 AND #5
<b>#7</b>	#2 AND #4 AND #5
<b>#8</b>	#3 AND #4 AND #5

(Study identification was conducted until 06/02/2021)



Figure 1. PRISMA 2009 Study Identification and Select

