

# Assessment of Additional Anxiety Caused by COVID-19 in Cancer Patients During the Pandemic Using the Hamilton Anxiety Scale

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## ABSTRACT

**Purpose:** The COVID-19 pandemic has led to substantial psychological distress, particularly among vulnerable populations such as cancer patients. This study aimed to assess anxiety levels in cancer patients during the pandemic using the Hamilton Anxiety Rating Scale (HAM-A) and to investigate their relationship with demographic and clinical variables.

**Methods:** This prospective, observational, cross-sectional study was conducted with institutional ethics committee approval. Between June and August 2020, 157 cancer patients receiving active treatment or under routine follow-up were enrolled. Demographic and clinical characteristics were recorded, and anxiety levels were evaluated by trained clinicians using the HAM-A. Appropriate parametric and non-parametric statistical analyses were performed, with statistical significance set at  $p < 0.05$ .

**Results:** Of the participants, 57% were female ( $n = 89$ ) and 43% were male ( $n = 68$ ), with a mean age range of 19–87 years. The most common cancer types were breast, colorectal, lung, and gastric cancers. Based on HAM-A scores, 79% of patients demonstrated low anxiety, while approximately 21% exhibited moderate-to-very high anxiety levels. Correlation analyses showed no significant associations between anxiety levels and age, gender, or cancer type. A strong correlation was observed between gender and cancer type, reflecting expected clinical distributions.

**Conclusion:** These findings suggest that the psychological burden associated with cancer may outweigh the additional impact of the pandemic; however, as no pre-pandemic comparative data were available, this interpretation should be considered a plausible explanation based on the present findings rather than causal inference.

**Keywords:** Anxiety, Cancer, COVID-19, Hamilton Anxiety Rating Scale, Psychosocial support

## ÖZET

**Amaç:** COVID-19 pandemisi, özellikle kanser hastaları gibi savunmasız gruplarda önemli düzeyde psikolojik sıkıntıya yol açmıştır. Bu çalışmanın amacı, pandemi sürecinde kanser hastalarında anksiyete düzeylerini Hamilton Anksiyete Ölçeği (HAM-A) kullanarak değerlendirmek ve anksiyete ile demografik ve klinik değişkenler arasındaki ilişkiyi incelemektir.

**Yöntem:** Bu prospektif, gözlemsel ve kesitsel çalışma, kurum etik kurul onayı alınarak yürütülmüştür. Haziran–Ağustos 2020 tarihleri arasında aktif tedavi görmekte olan veya klinik takip altında bulunan 157 kanser hastası çalışmaya dahil edilmiştir. Hastaların demografik ve klinik özellikleri kaydedilmiş, anksiyete düzeyleri eğitimli klinisyenler tarafından HAM-A kullanılarak değerlendirilmiştir. Uygun parametrik ve parametrik olmayan istatistiksel analizler yapılmış,  $p < 0.05$  anlamlı kabul edilmiştir.

**Bulgular:** Katılımcıların %57'si kadın ( $n = 89$ ), %43'ü erkekti ( $n = 68$ ) ve yaşları 19–87 yıl arasında değişmekteydi. En sık görülen kanser türleri meme, kolorektal, akciğer ve mide kanserleriydi. HAM-A sonuçlarına göre hastaların %79'unda düşük düzeyde anksiyete saptanırken, yaklaşık %21'inde orta ile çok yüksek düzey arasında değişen anksiyete gözlemlendi. Anksiyete düzeyleri ile yaş, cinsiyet veya kanser tipi arasında anlamlı bir ilişki bulunmadı. Cinsiyet ile kanser tipi arasında ise beklenen klinik dağılımla uyumlu güçlü bir ilişki saptandı.

**Sonuç:** Bu bulgular, pandeminin psikolojik etkisinin kanserin kendi duygusal yükü tarafından büyük ölçüde gölgelendiğini düşündürmektedir; ancak çalışmada pandemi öncesine ait karşılaştırmalı veriler bulunmadığından, bu yorum nedensel bir çıkarım olarak değil, mevcut bulgulara dayanan olası bir açıklama olarak değerlendirilmelidir.

**Anahtar Kelimeler:** Kanser, COVID-19, Anksiyete, Hamilton Anksiyete Ölçeği, Psikososyal destek

The novel coronavirus disease (COVID-19), first identified in Wuhan, China, in December 2019, was declared a global pandemic by the World Health Organization on March 11, 2020 (1). Beyond the physical health threat, the pandemic caused profound psychological effects worldwide, increasing fear, uncertainty, social isolation, and overall distress. Vulnerable populations—particularly cancer patients—faced heightened challenges due to compromised immunity, treatment disruptions, and increased risk of infection (2–4).

Cancer is a multidimensional health problem with physical, psychological, and social components. Treatment side effects, prolonged disease burden, and reduced quality of life may contribute to anxiety, depression, and adjustment difficulties (5–7). The literature consistently reports that the prevalence of depression and anxiety is significantly higher in cancer patients compared with the general population. During the pandemic, cancer patients faced both an increased susceptibility to COVID-19 infection and the risk of interruptions in their treatment plans (8–10).

In the early months of the pandemic, many cancer patients postponed their treatments or avoided surgical procedures due to concerns about infection risk. These delays negatively affected not only treatment outcomes but also the psychological well-being of patients. Treatment postponements have been associated with reduced quality of life, decreased motivation to cope with the disease, and increased anxiety levels (11,12).

Psychiatric research suggests that crises such as pandemics may intensify anxiety levels in cancer patients. However, some studies propose that the primary psychological burden stems from cancer itself rather than external stressors such as COVID-19 (13,14).

The Hamilton Anxiety Rating Scale (HAM-A) is a clinician-administered assessment tool used to measure psychological and somatic anxiety symptoms across 14 items, each scored between 0 and 4, with total scores ranging from 0 to 56. This scale allows for a comprehensive evaluation of both physical and psychological manifestations of anxiety (15).

This study assessed the anxiety levels of cancer patients undergoing active treatment or follow-up during the COVID-19 pandemic using the HAM-A and explored associations with demographic and clinical factors.

## Materials and Methods

### Statistical Analysis

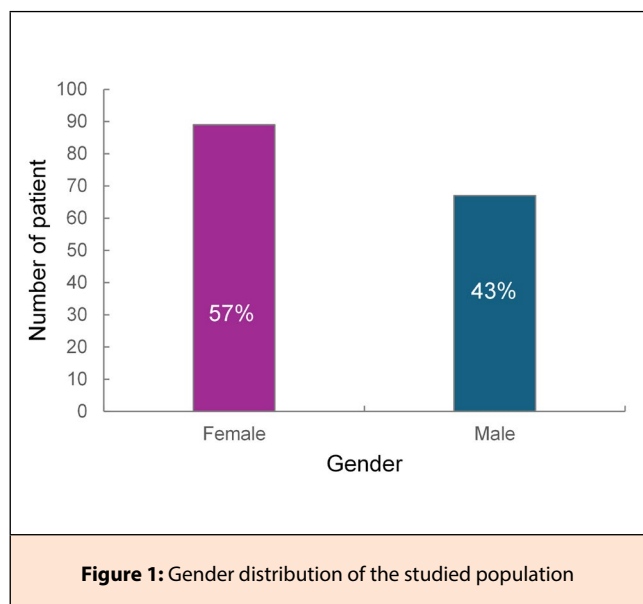
Data for the study was obtained from a total of 157 patients diagnosed with cancer. The demographic and clinical characteristics of the sample (age, gender, cancer type, and anxiety scores) were summarized using descriptive statistics.

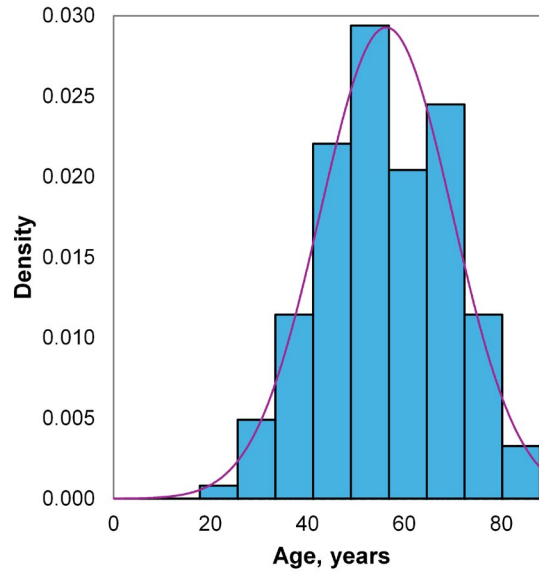
The normality of continuous variables was evaluated using the Kolmogorov–Smirnov test. For the age variable, the test indicated a normal distribution ( $D = 0.046$ ,  $p = 0.878$ ). To further substantiate the assumption of normality, skewness (0.001) and kurtosis (–0.419) coefficients were also examined.

Associations between variables were explored using Pearson's correlation analysis, and the findings were presented in a correlation matrix. For all statistical procedures, a significance level of  $p < 0.05$  was considered statistically significant.

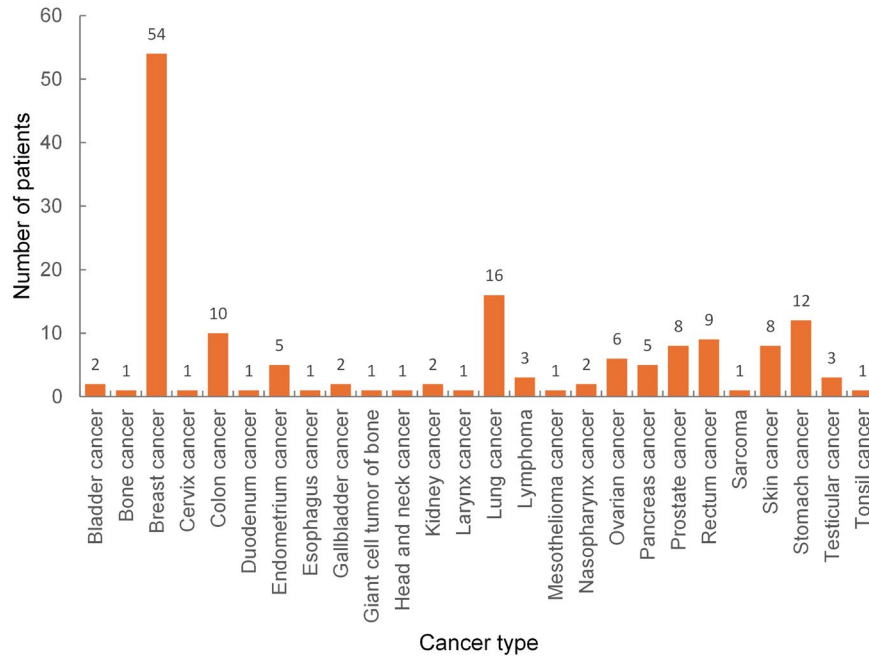
## Results

A total of 157 cancer patients were included in the study. Of the participants, 57% were women ( $n = 89$ ) and 43% were men ( $n = 68$ ) (Fig.1), with ages ranging from 19 to 87 years (Fig.2). This wide age distribution allowed for the examination of anxiety levels across different age groups (Table 1).





**Figure 2:** Histogram and density curve of patient ages (skewness = 0.001; kurtosis = -0.419; Kolmogorov-Smirnov test,  $D = 0.046$  and  $p = 0.878$ )



**Figure 3:** Patient distribution by cancer type in the research group

Table 2 presents the patient distribution with respect to cancer type and anxiety score ranges. The patients represented 26 different types of cancer. The most common cancer type was breast cancer ( $n = 54$ , 34%), followed by colorectal cancer ( $n = 19$ , 12%), lung cancer ( $n = 16$ , 10%), and gastric cancer ( $n = 12$ , 8%). Bladder,

bone, cervical, duodenal, and esophageal cancers were represented by only one or two patients. Female-specific cancers (breast, cervical, ovarian, endometrial) were present at a high rate in the sample, while male-specific cancers (prostate, testicular) were relatively limited (Fig.3).

Table 1. Demographic and clinical characteristics of patients participating in the study

Number of patients			Age range	Number of cancer types	Range of anxiety score
All	Female	Male			
157	89	68	19-87	26	0-39

Table 2. Patient distribution by cancer type and anxiety score ranges

Cancer type	Male n (%)			Age range (years)	Anxiety score range
	All	Female	Male		
Breast cancer	54 34%	53 98%	1 2%	29-87	0-38
Colorectal cancer	19 12%	10 53%	9 47%	32-69	0-18
Lung cancer	16 10%	2 13%	14 87%	36-71	0-29
Stomach cancer	12 8%	3 25%	9 75%	50-76	1-24
Prostate cancer	8 5%	0 0%	8 100%	68-80	0-12
Skin cancer	8 5%	2 25%	6 75%	26-64	0-23
Ovarian cancer	6 4%	6 100%	0 0%	56-70	5-25
Endometrial cancer	6 4%	6 100%	0 0%	46-73	1-24
Pancreatic cancer	5 3%	1 20%	4 80%	42-87	1-28
Other cancers*	23 15%	7 30%	16 70%	19-80	0-39

\*Other cancers include cancer types represented by ≤2 patients each (e.g., bladder, bone, cervix, esophagus, tonsil, sarcoma). Results for these subgroups are descriptive only.

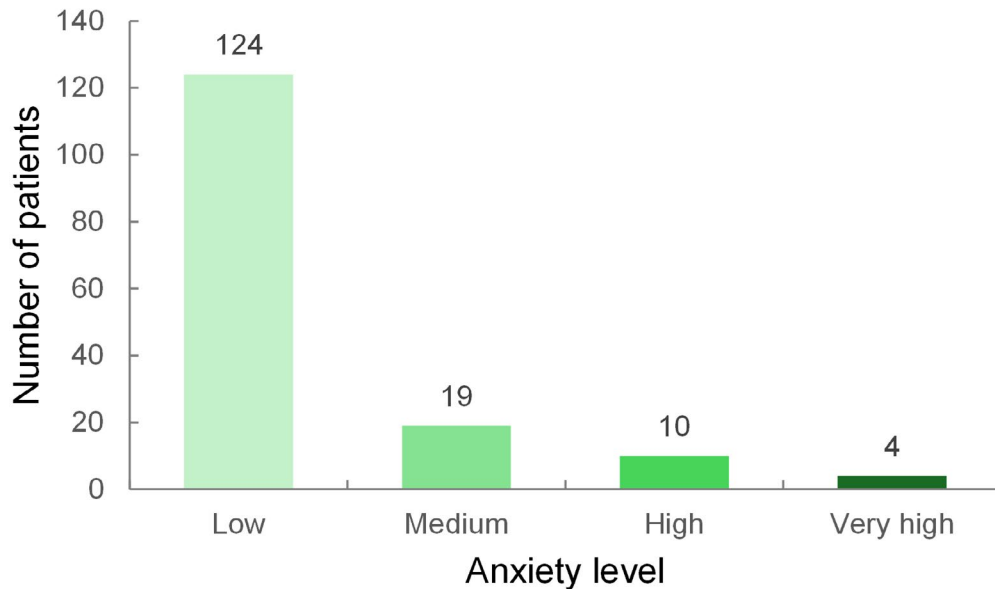
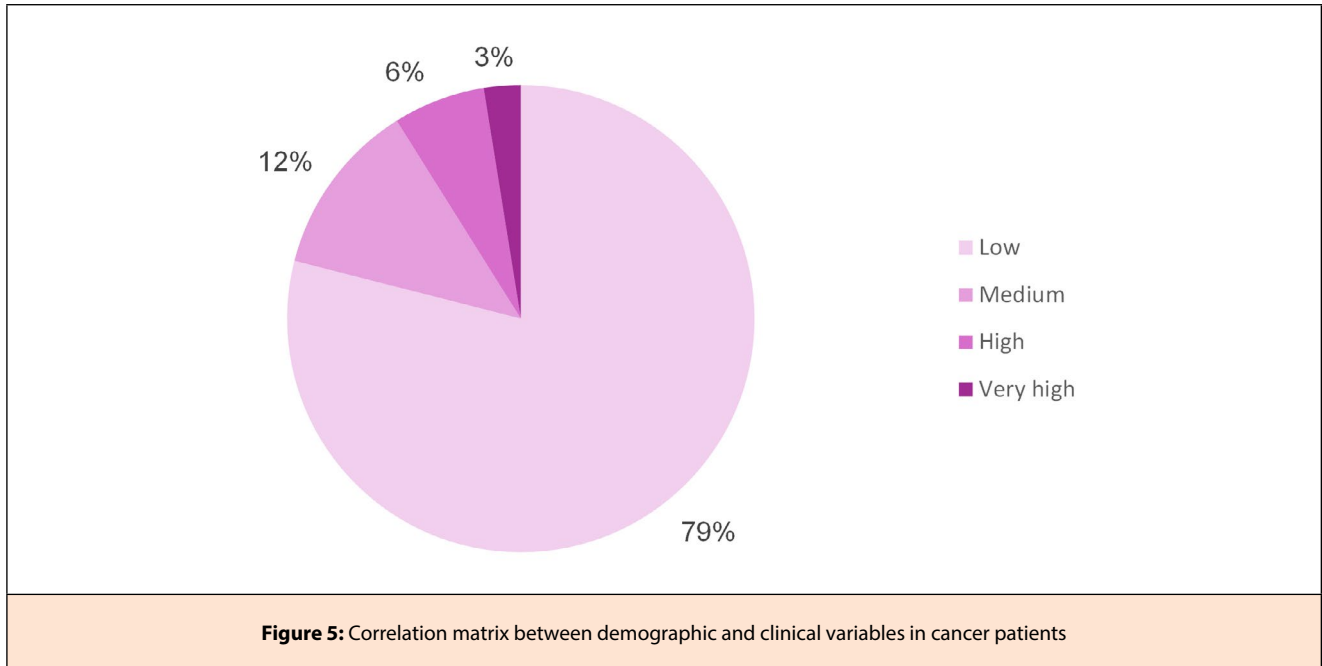


Figure 4: Distribution of anxiety levels among patients in the study group: (a) number and (b) percentage

HAM-A scores ranged from 0 to 39, with scores of  $\geq 30$  considered indicative of very high anxiety. Among the participants, 79% ( $n = 124$ ) had low, 12% ( $n = 19$ ) had moderate, 6% ( $n = 10$ ) had high, and 3% ( $n = 4$ ) had very high anxiety levels, as shown in (Fig. 4a, b)

As can be seen in Fig.5, a moderate positive correlation was found between gender and cancer type ( $r = 0.584$ ),

confirming the gender-specific distribution of cancers (e.g., breast/gynecological cancers in women and lung/colorectal cancers in men). The relationships between age and gender ( $r = 0.214$ ) and between age and cancer type ( $r = 0.205$ ) were weak. No significant association was found between anxiety scores and age ( $r = -0.023$ ), gender ( $r = -0.038$ ), or cancer type ( $r = 0.023$ ).



## Discussion

In this study, the anxiety levels of cancer patients were prospectively assessed during the COVID-19 pandemic. Anxiety constitutes a major psychological concern frequently observed among cancer patients throughout the diagnostic and therapeutic trajectory. Previous meta-analyses have reported that anxiety, depression, and adjustment difficulties occur at rates ranging from 30% to 50%, particularly within oncology and palliative care settings (16,17). Although the proportion of patients exhibiting moderate to high anxiety in our study was 21%—a figure below the upper range reported in the literature—it remains broadly consistent with the established trend. This discrepancy is presumed to arise from differences in sample characteristics, timing of data collection, and the assessment instruments employed.

Although the proportion of female patients (57%) was higher than that of male patients (43%), this difference is primarily attributable to the overrepresentation of

cancer types more prevalent among women, particularly breast and gynecological cancers. While previous studies have suggested higher anxiety levels among women, no statistically significant association between gender and anxiety was observed in the present study. Accordingly, gender-based interpretations of anxiety should be avoided, and findings should be interpreted within the context of cancer type distribution and sample characteristics.

No significant association was identified with respect to age. This finding suggests that anxiety is linked not to basic demographic indicators such as age, but rather to clinical and psychosocial factors including disease stage, symptom burden, functional impairment, and social support (22,23).

The distribution of cancer types was heterogeneous, with breast cancer constituting the largest group with 54 patients. This allowed for the comparison of general anxiety levels across different diagnostic categories.

The wide range of anxiety scores observed in the breast cancer group (0–38) highlights substantial individual variability even among patients with the same diagnosis. High scores in malignancies such as esophageal, tonsillar, and cervical cancers—known for their poor prognosis or rarity—may reflect the psychological burden associated with uncertainties around diagnosis and treatment. In contrast, the limited sample size in groups such as prostate and testicular cancer restricts the generalizability of the findings.

When interpreted within the context of the COVID-19 pandemic, the present findings should be approached with methodological caution. An important limitation of this study is the absence of a control group, such as a non-cancer population or patients with chronic non-malignant diseases, together with the lack of pre-pandemic baseline data. As a result, it cannot be determined whether the observed anxiety levels are specific to cancer patients or reflect a broader psychological response to the pandemic. Accordingly, the interpretation that the psychological burden associated with cancer may outweigh the additional impact of the pandemic should be regarded as hypothesis-generating rather than definitive. Future studies incorporating appropriate control groups and longitudinal designs are needed to clarify the relative contributions of cancer-related distress and pandemic-related stressors.

When considered specifically within the context of the pandemic, COVID-19 does not appear to have led to a marked increase in anxiety levels. This finding suggests that the substantial psychosocial burden associated with cancer alone may have overshadowed the additional stressors introduced by the pandemic. Although our results differ partially from some studies reporting elevated anxiety levels during the early stages of the pandemic (24), they generally support the notion that the chronic psychological impact of cancer remains predominant. Nonetheless, the uncertainty generated by the pandemic, difficulties in accessing healthcare services, and the weakening of social support networks (25) may have contributed to heightened stress levels in certain subgroups of patients.

The single-center design of this study and the limited sample size in certain subgroups restrict the generalizability of the findings. Anxiety was assessed solely using the Hamilton Anxiety Rating Scale (HAM-A). Although this scale has high validity, the influence of

self-reported responses cannot be fully excluded. In addition, some patients who experienced high levels of anxiety during the pandemic may not have presented to the hospital, which could have introduced selection bias. An important methodological limitation of this study relates to selection bias. The study population consisted exclusively of patients who were either receiving active treatment or attending routine follow-up visits during the peak phase of the COVID-19 pandemic. Patients with high levels of health anxiety or pronounced fear of COVID-19 infection may have deliberately avoided hospital visits during this period and therefore were less likely to be included in the sample. Consequently, the finding that 79% of patients exhibited low anxiety levels may reflect an overrepresentation of relatively resilient individuals or those compelled to attend healthcare facilities due to treatment necessity, rather than the true anxiety distribution among the broader cancer patient population. This sampling bias substantially limits the generalizability of the results, and the reported prevalence of low anxiety should therefore be interpreted with caution.

In addition, although the overall sample size was 157 patients, the distribution across 26 different cancer types resulted in substantial heterogeneity. Several cancer subtypes were represented by only one or two patients (e.g., bladder, bone, cervical, esophageal, tonsillar, and laryngeal cancers). Such limited subgroup sizes preclude reliable statistical comparisons and prevent meaningful inferential conclusions for these specific malignancies. Therefore, findings related to these underrepresented cancer types should be interpreted as descriptive observations rather than generalizable results. Future studies with larger and more homogeneous samples, or with broader categorical grouping of malignancies (e.g., gastrointestinal, thoracic, gynecological), are warranted to enhance statistical power and improve the external validity of subgroup analyses.

Nevertheless, the prospective collection of data and the use of face-to-face interviews constitute important strengths of the study. The high proportion of women in the sample reflects the greater representation of cancer types that are more common in women (such as breast cancer).

As a result, our study revealed that the majority of cancer patients experienced mild levels of anxiety during the COVID-19 pandemic; however, approximately 20% exhibited clinically significant anxiety. Although no

statistically significant association was identified between anxiety levels and gender or cancer type ( $p>0.05$ ), women and patients with poor prognoses or gynecological cancers were observed to display relatively higher anxiety scores descriptively. Therefore, the identification of these groups as “high-risk” should be interpreted as a clinical observation rather than a statistically supported inference. This distinction should be clearly acknowledged to avoid overstating the analytical findings. These findings underscore the necessity of multidisciplinary psychosocial support programs in oncology practice.

Importantly, although earlier literature has reported higher anxiety levels among female cancer patients, the present study did not identify any statistically significant association between anxiety levels and gender, age, or cancer type. Therefore, interpretations suggesting gender-based or diagnosis-specific vulnerability are not supported by the current data. This finding highlights the importance of avoiding overgeneralization and reinforces that psychosocial risk should be evaluated on an individual basis rather than inferred from demographic characteristics alone.

An important consideration in the interpretation of these findings is the timing of data collection. The study was conducted between June and August 2020, corresponding to the very early phase of the COVID-19 pandemic. Therefore, the reported anxiety levels represent a historical snapshot of early pandemic-related psychological responses and should not be interpreted as reflecting long-term or current anxiety patterns.

The assessment of anxiety in the present study relied solely on the Hamilton Anxiety Rating Scale (HAM-A). While the use of a clinician-administered instrument represents an important methodological strength by reducing self-report bias and allowing for a more objective evaluation of anxiety symptoms, the absence of complementary self-reported measures constitutes a relevant limitation. In oncology settings, self-administered instruments such as the Hospital Anxiety and Depression Scale (HADS) or quality-of-life measures like the EORTC QLQ-C30 are commonly used and allow for a broader assessment of patients' subjective psychological distress and functional well-being. The lack of triangulation with a quality-of-life or self-reported anxiety scale may therefore limit the interpretation of the findings, particularly with respect to the impact of anxiety on daily functioning and overall quality of life. Future studies would benefit from

a multimodal assessment approach combining clinician-rated and patient-reported outcome measures to provide a more comprehensive evaluation of psychosocial burden in cancer patients.

### Study Limitations

Despite its strengths, several limitations of this study should be acknowledged. First, the prospective design and face-to-face data collection by trained clinicians significantly enhanced the reliability and precision of the clinical data. However, the study was conducted as a single-center investigation, which may limit the generalizability of the findings to different clinical settings or broader populations.

Furthermore, a potential selection bias must be considered; patients with extreme levels of anxiety or specific phobias related to medical environments may have avoided hospital admission altogether, potentially excluding a high-symptom subgroup from the study. Future multi-center studies with community-based recruitment strategies are needed to validate these results across more diverse and inclusive patient cohorts.

### Conclusion

This study indicates that although the majority of cancer patients exhibited low levels of anxiety during the COVID-19 pandemic, approximately 20% experienced clinically significant anxiety. The findings suggest that anxiety may be attributable primarily to cancer itself and related psychosocial factors rather than to the pandemic. However, given the absence of a control group and pre-pandemic comparative data, conclusions regarding the relative impact of COVID-19 should be interpreted cautiously and considered descriptive rather than confirmatory.

Importantly, no statistically significant associations were found between anxiety levels and gender, age, or cancer type. Therefore, the present data do not support the identification of female patients or any specific diagnostic subgroup as inherently high-risk based on anxiety levels alone. Although previous literature has suggested that women and patients with certain gynecological malignancies may represent psychologically vulnerable groups, such interpretations were not statistically confirmed in the current dataset and should be regarded

as literature-based clinical considerations rather than conclusions derived from the present findings.

Accordingly, psychosocial screening and supportive interventions should be offered broadly to all cancer patients based on individual clinical need rather than demographic or diagnostic characteristics alone.

## Declarations

### Funding

This research received no external funding.

### Conflict of Interest

The authors declare that they have no competing interest.

### Ethics approval

This study was obtained from the Clinical Research Ethics Committee of the Health Sciences University Şişli Hamidiye Etfal Training and Research Hospital (Approval No: 2814, Date:02/06/2020).

### Availability of data and material

The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

### Authors' contributions

All authors contributed to the study conception and design, data collection, analysis, and interpretation. All authors revised the manuscript critically for important intellectual content and approved the final version of the manuscript.

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