

Original Article

Psychological distress and fear of COVID-19 in cancer patients and normal subjects—A cross-sectional study

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ABSTRACT

Objectives: The aim of this study is to evaluate fears, worries, and anxiety among cancer patients and healthy subjects.**Material and Methods:** The current study included two study groups (SGs) with 195 respondents, 93 colorectal patients (CCSG-1) and 102 control subjects (CSSG-2). The purpose of this study was to estimate the levels of post-traumatic symptoms, depression, anxiety, and fear of COVID-19 during the pandemic.**Results:** In our analysis, we found a slightly higher level of anxiety, depression, and post-traumatic stress disorder in the cancer group than in the control group. Furthermore, we showed no significant difference between the two groups in terms of the impact of fear of COVID-19 infection. Then, we evaluated the relationship among the anxiety, depression and posttraumatic-stress disorder (PTSD) (scales) with the total score fear of COVID-19 scale (FCV-19S) in both groups through a multiple linear regression analysis. We reported that each explicative variable had a moderate influence on the fear of COVID-19 in the cancer group, while in the control group, anxiety and PTSD had a significant influence on the fear of COVID-19 in comparison with depression.**Conclusion:** Our results indicate a significant psychological vulnerability in both groups during the strict lockdown. Specifically, we highlight that the control group suffers a negative impact on their mental state. With regard to cancer group, we noted that anxiety, depression, and distress and fear of COVID-19 levels did not increase in significant manner during the pandemic. A possible explanation can be that they are more worried about the delay of their treatment due the COVID-19 emergency. However, more efforts are necessary to better understanding of the mental well-being of the cancer patients and healthy subjects to improve psychological interventions and treatments, during this public health emergency.**Keywords:** COVID-19, PTSD, FCV-19S, Colorectal cancer, Patients

INTRODUCTION

After the first report of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) at the end of December 2019, this virus had infected about 560 million individuals around the world by the middle of February 2021.^[1,2] On March 17, 2024, data obtained revealed that since the start of the outbreak, 774,954,393 individuals have been diagnosed with SARS-CoV-2 infection globally, and 7,040,264 deaths have been reported by the WHO.^[1] (<https://data.who.int/dashboards/covid19/cases?n=c>). This pandemic has caused a strong trauma in the general population due to its effect on daily life and relationships, deteriorating the quality of life.^[2-4] The physical, emotional and social insecurities and the loss

of thousands of lives had a strong impact on mental health, which increased levels of stress, anxiety and depression in the medium and long term. During the pandemic, many cases of the coexistence of cancer and SARS-CoV-2 infection were described by preliminary studies. In this regard, Liang *et al.* (2020)^[5] observed that the rate of COVID-19 infection among cancer patients was higher than in the general population. In addition, in a retrospective study on cancer patients with infection, Zhang *et al.* (2020)^[6] showed a high susceptibility to infection in these patients. As demonstrated by Lee *et al.* (2021)^[7] in a large trial with more than 20,000 cancer patients, there was a significant risk of COVID-19 infection among cancer patients, specially in older and male patients.

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In this context, several studies have reported an increase in mental health symptoms (e.g., anxiety, depression, distress, post-traumatic stress disorder) among cancer patients.^[3,8-11] Specifically, Ng *et al.* (2020)^[10] observed that 66% of cancer patients had a high level of fear of COVID-19. Furthermore, at the beginning of the pandemic, the results of qualitative studies showed that cancer patients were exposed to high fears about potential infection when they received health care.^[12] In this regard, psychological distress can increase along with worsening symptoms and poor quality of life in cancer patients.^[13] In addition, these patients experienced a very anxious period due to several reasons, such as other concomitant diseases, taking immunosuppressive treatment, increased risk of infection, postponing surgical interventions, switching health service personnel to other areas, or absence of a health provider, not being able to use systems such as telemedicine exclusively.^[14] Moreover, restrictions due to the pandemic caused a sudden change in the normal population's habits with an increase in mental health distress, as reported by different studies.^[15,16] Brooks *et al.* (2020)^[17] studied the psychological effects of quarantine during the pandemic, indicating the psychological burden on individuals who are unable to participate in public life. Threatening events or extraordinary situations, such as the pandemic can trigger emotional states like fear.^[18] In these cases, fear works as a defense mechanism, but if excessive, it can cause increased anxiety that in turn, can negatively impact both the symptoms of cancer and the effect of therapy.^[19,20] Furthermore, some measures, such as delays in surgeries and chemotherapy treatments, hospital bed shortages, online appointments, and the prescription of oral antineoplastic drugs, have increased levels of distress and fear in patients during their chemotherapy treatment.^[21,22] In this context, we carried out a cross-sectional study of the psychological status of outpatients with colorectal cancer (CRC) and healthy people during lockdown at our non-COVID Cancer Center Institute in southern Italy. The goals of our study were: (i) to measure the levels of post-traumatic symptoms, depression, and anxiety during the pandemic in the cancer and control group and (ii) to investigate the fear of COVID-19 infection by using the FCV-19S in both groups.

MATERIAL AND METHODS

Recruitment and Data Collection

The study was conducted from February 12 to the end of April 2020, during the strict lockdown measures in Italy. The population of the study consisted of two study groups: 93 colorectal cancer patients, colorectal cancer study group 1 (CCSG-1) who attended our oncology outpatient before the lockdown and 102 control subjects, control subjects study group-2 (CSSG-2). Ninety-three cancer patients (48 females and 45 males) and 102 normal subjects (57 females and 45

males) aged 18 and over were recruited and able to use social networks and volunteers to participate in the study. Data were collected via online survey systems due to the ongoing pandemic during the study period, and no face-to-face interviews were conducted to collect data. Impact of event scale-revised (IES-R), the hospital anxiety and depression scale (HADS), and the fear of COVID-19 scale (FCV-19S), were used for data collection. The study was approved by the Ethics Committee of the Medical Faculty of the University of Campania "Luigi Vanvitelli (Prot. Number 297)." Informed consent was obtained online from all individual participants in accordance with the Declaration of Helsinki, included in this study.

Instruments

A brief questionnaire was administered online to all participants, cancer patients and normal subjects, which consisted of two parts: the first, asking general information about the age, sex, education level and marital status, and job. Furthermore, clinical data that include the date of primary cancer diagnosis, tumor location, stage at diagnosis, primary treatment received, and time since diagnosis were obtained through linkage with the Oncology Department. The control population was matched to the colorectal cancer (CRC) population based on a frequency distribution over age and sex strata to maximize the number of both groups. Then, the impact of event scale-revised (IES-R)^[23] and the hospital anxiety and depression scale (HADS)^[24,25] were administered to all participants. The first questionnaire measures a person's subjective reaction after a traumatic event, leading to the diagnosis of posttraumatic-stress disorder (PTSD). The IES-R is composed of 22 items divided into three subscales measuring avoidance, intrusion, and hyperarousal. Answers ranged on a scale from 0 (not at all) to 4 (extremely). The second questionnaire has been developed to estimate the state of anxiety and depression in non-psychiatric patients with organic disease. The HADS is composed of 14 items, seven of which measure anxiety (HADS-Anxiety, HADS-A) and the other seven measure depression (HADS Depression, HADS-D) on a four-point Likert scale. The scale has demonstrated satisfactory psychometric characteristics in both cancer patients and normal subjects, and, in addition, it has been translated and validated in the Italian population.^[24,25] Furthermore, the test of FCV-19S was used by considering that of Ahorsu *et al.* (2022)^[26] (developed in 2022 and translated into an Italian version). According to Ahorsu *et al.* (2022),^[26,27] the response for each item was recorded according to a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), allowing respondents to express their level of agreement concerning the psychological object surveyed. All questionnaires were sent to all subjects online and then

collected. Besides, this study was conducted on a voluntary basis for all participants and without incentives.

Statistical analysis

Descriptive statistics, including means and central tendency measures, were used to explore sample populations and item characteristics. The PTSD according to gender, age, education, employment, anxiety, and depression were analyzed by the Chi-square method in both groups. To explore the relationship between the Fear of COVID-19 and PTSD, Anxiety and Depression scales, correlation analyses (Pearson correlation) were performed in both groups. Moreover, a linear multiple regression test was used to analyze the dependence of FCV-19S on the following variables: gender, age, education, employment PTSD, anxiety and depression in both groups. Statistical analysis was carried out using IBM SPSS (Version 25.0. Armonk, NY: IBM Corp) and GraphPad Prism software version 6.0 for Windows (GraphPad Software, San Diego, California, USA).

RESULTS

Socio-demographic characteristics of colorectal cancer patients and normal subjects

The participants of both groups filled out a brief socio-demographic questionnaire. The mean age scores of cancer and control groups were 53 years (S.D. 9.41; range = 30–81) and 50 years (S.D. 11.16; range = 33–77), respectively. In addition, in both groups, there were more females (48 cancer pts 51.61%; 57 healthy subjects, 55.8%) than males (45 cancer patients, 48.38%; 45 healthy subjects, 44.11%), respectively. 63.44% of cancer patients were employed, and 36.55% were not employed, while in the control group, 50.98% of participants were employed, and 49.01% were not employed. Furthermore, in group 1 (cancer patients) 37.63% had low education, and 62.36% had high education, while in group 2 (healthy subjects) 34.31% had low education, while 65.68% had high education. Most patients were diagnosed with early-stage colorectal cancer (I, II 63.43%), while 35.55% of patients were diagnosed with third-stage colon cancer. In addition, they had received surgical (4.30%), surgical/chemotherapy (58.05%) or chemotherapy (37.63%) treatment. Clinical and sociodemographic characteristics of all the participants are reported in Table 1. No statistically significant difference was detected between the two groups in terms of marital status, education, and employment.

Levels of the HADS in both colon cancer patients and normal subjects

In the analysis of HADS-General Scale score (HADS-GEN) in Group 1, the mean score was 16.65 (SD \pm 3.97). We observed

Table 1: Characteristics of all participants. [Cancer Patients (CPs) Group 1 -93 pts and Healthy Subjects (HSs) Group 2 -102 HSs]

Characteristic	Cancer Patients (Group 1)	Control Group (Group 2)
Age/years	Age/years	Age/years
Mean	53.82	50.13
S.D.	9.41;	11.16
30-50 (range)	35 (37.63%)	59 (57.84%)
50-70 (range)	58 (62.35%)	43 (42.15%)
Sex	48 (51.61)	57 (55.80%)
Female	45 (48.38%)	45 (44.11%)
Male		
Marital Status		
Unmarried	47 (50.53%)	48 (27.05%)
Married	39 (41.93%)	41 (40.10%)
Divorced	7 (7.5%)	13 (12.74%)
Education		
Less than high school	35 (37.63%)	35 (34.31%)
High school and above	58 (62.36%)	67 (65.68%)
Employment		
Yes	59 (63.44%)	52 (50.98%)
No	34 (36.55%)	50/49.02
Cancer type	93 (100%)	
Colon Rectum		
Tumor stage at diagnosis		
Stage I	6 (6.45%)	
Stage II	53 (56.98%)	
Stage III	34 (35.55%)	
Current Treatment		
Surgery	4 (4.30%)	
Surgery+Chemotherapy	54 (58.06%)	
Chemotherapy	35 (37.63%)	

SD: standard deviation.

that 78.49% of patients (n = 73), were above the cut-off (score 13), while 21.50% (n = 20) were in the range (score 9–13) for the general scale. Specifically, we found that 64.51% (n = 60) of cancer patients were above the cut-off range (score 8) for HADS-A scale and 61.29% (n = 57) were above the cut-off range (score 8) for HADS-D scale [Table 2]. In the control group, we found that the mean HADS-General Scale score (HADS-GEN) was 14.83 (SD \pm 5.35) and 59.80% of the respondents (n = 61) were above the cut-off (score \geq 13), while 40.19% (n = 41) were in the range (score 9–13) for the general scale. Meanwhile, 49.01% (n = 50) of control respondents were above the cut-off range (score: 8) for HADS-A scale and 50.97% (n = 52) were above the cut-off range (score: 8) for HADS-D scale [Table 2]. The Chi-Square test for HADS-General scale's mean between cancer and normal groups was significant at 5% [Table 3].

Levels of the IES-R in cancer patients and normal subjects

In the cancer group, the mean IES-R score of patients was 39.80 (SD \pm 1175), and in addition, 9.67% of them (n = 9) did

Table 2: Analysis of anxiety, depression and PTSD for CPs (Group 1) and HSs (Group 2).

HADS Gen	Mean (±SD)	N (93)	% (100)	
Group 1 (CPs)	16.65 (±3.97)			
	Score range (9–13)	20	21.50	
	Score >13	73	78.49	
		N (102)	% (100)	
Group 2 (HSs)	14.83 (±5.35)			
	Score range (9–13)	41	40.19	
	Score >13	61	59.80	
HADS-A				
Group 1 (CPs)		N (93)	% (100)	
	8.32 (±2.37)			
	Score range (0–7)	33	35.48	
	Score range (8–10)	43	46.23	
		17	18.27	
Group 2 (HSs)		N (102)	% (100)	
	7.28 (±2.66)			
	Score range (0–7)	52	50.90	
	Score range (8–10)	41	40.19	
		9	8.82	
HADS-D				
Group 1 (CPs)		N (93)	% (100)	
	8.39 (±2.32)			
	Score range (0–7)	36	38.70	
	Score range (8–10)	48	51.61	
		9	9.67	
Group 2 (HSs)		N (102)	% (100)	
	7.44 (±3.01)			
	Score range (0–7)	50	49.01	
	Score range (8–10)	43	42.15	
		9	8.82	
IES-R				
Group 1 (CPs)		N (93)	% (100)	
	39.80 (±11.75)			
	Score (<24) no diagnosis of PTSD	9	9.67	
	Score range (24–33) Mild PTSD	22	23.65	
	Score range (33–37) Moderate PTSD	15	16.12	
	Score (>37) Severe PTSD	47	50.53	
	IES-R Intrusion			
	IES-R Avoidance			
	IES-R Hyperarousal			
		N (102)	% (100)	
		31	30.39	
		11	10.78	
		14	13.72	
		46	45.09	
IES-R Intrusion				
IES-R Avoidance				
IES-R Hyperarousal				

PTSD: Posttraumatic-stress disorder, CPs: Cancer patients, HS: Healthy subjects, HADS-A: Hospital anxiety and depression scale-anxiety, HADS-D: Hospital anxiety and depression scale-depression, IES-R: Impact of event scale-revised, N: number of patients, SD: Standard deviation.

Table 3: Analysis of the relationship between the HADS-Gen and IES-R in the colorectal cancer and control groups. Data were expressed as mean±standard deviation (SD), * =Chi-Square test.

	Colorectal cancer patients	Control Group	χ ²	P-Value
HADS Gen	16.65 (±3.97)	14.83 (±5.35)	4.827	0.0280*
IES-R	39.80 (±11.75)	35.17 (±11.27)	13.44	0.0003***

HADS-D: Hospital anxiety and depression scale-depression, IES-R: Impact of event scale-revised.

*P ≤ 0.05

***P ≤ 0.001

not show a PTSD diagnosis (score range < 24) while. 23.65% (n = 22, score range: 23–33), had mild PTSD. Furthermore, 16.12% (n = 15) and 50.5% (n = 47) had moderate (score range 33–37) and severe levels (score >37), respectively [Table 2]. Mean scores for the IES-R subscales were: avoidance 14.64 (SD ± 3.60), intrusion 14.25 (SD ± 5.03), and hyperarousal 10.77 (SD ± 4.06) [Table 2]. In the control group (Group 2), the mean IES-R score of these respondents was 35.17 (SD ± 11.27). In these participants, 30.39% (n = 31) of them did not show a PTSD diagnosis (score <24), while 10.78% (n = 11, score range: 23–33) had mild PTSD. Moreover, 13.72% (n = 14) and the 45.09% (n = 46) had a moderate (score range 33–36) and a severe level (score >37) for PTSD, respectively. Mean scores for the IES-R subscales were: avoidance 12.94 (SD ± 3.72), intrusion 13.30 (SD ± 4.68), and hyperarousal 9.01 (SD ± 3.45) [Table 2]. In this case, the Chi-Square test was highly significant at 1% between the two groups [Table 3].

Fear of COVID-19 on traumatic distress in cancer patients and normal subjects

This study that used the FCV-19S showed that 16.12% of cancer patients and only 4.9% of the control group reported that they strongly agreed with the statement: “I am very afraid of the SARS-CoV-2 virus.” The second option, “agree” was chosen by 60.12% of cancer patients and 53.92% of control respondents, respectively. In the second question on feelings of anxiety at the thought of the virus, 7.52% and 44.08% of cancer patients reported to strongly agree or agree on this topic, respectively. In the control group, 53.92% of respondents reported to agree on their feelings on the virus. The statement “My hands become clammy when I think of coronavirus” was disagreed with in 20.43% of oncology patients and almost the same percentage in the control group (21.56%). Moreover, 34.4% (agree 31.18% and 3.22% strongly agree) of cancer patients reported that they were afraid to lose their life and, while 20.58% (agree 15.68 and strongly agree 4.90%) of normal respondents were afraid of losing their lives due to the virus.

A greater impact of pandemic information from social media was observed in both groups. In this regard, 43% of cancer patients agreed or strongly agreed with the statement, “When I watch the news and learn about coronavirus-related stories on social media, I get nervous or feel anxious,” compared with 20.58% of normal respondents. Then, 58.05% of patients agreed (52.68) or strongly agreed (5.37) with the statement that they could not sleep for fear of SARS-CoV-2 infection, whereas in the control group, 45.09% people marked this response (agreed 40.19% or strongly agreed 4.90%). At the end, the last statement of the questionnaire was, “My heart beats rapidly when I think of a coronavirus infection.” In

this regard, 38.70% of the cancer patients agreed with this statement, along with 18.62% of the control group [Table 4 and Figure 1]. In addition, we noted no significant difference between the two groups in terms of the impact of fear of COVID-19 infection [Table 4 and Figure 1]. Next, to better understand the impact of fear of COVID-19 infection in both groups, we analyzed the correlations (Pearson analysis) between the constructs considered in the study. In group 1 (cancer patients), there was a positive correlation between FCV19 scale and PTSD scale ($r = 0.8003$, $p = 0.0001$), while there was a slightly lower correlation between FCV19 scale and Anxiety scale ($r = 0.6087$, $p = 0.0001$) and FCV19 scale

Table 4: Analysis of the relationship between the FCV-19S scale (Q 1-7) in the colorectal cancer group and control group.

Items	Groups	N. tot (%)					Total	Mean (±SD)	P-value
		Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5			
QF.1 I am most afraid of Corona	Cancer Group (1)	0 (0%)	4 (4.30%)	18 (19.35%)	56 (60.21%)	15 (16.12%)	93 (100%)	3.88 (±0.72)	0.1723
	Control Group (2)	4 (3.92%)	22 (21.56%)	16 (15.68%)	55 (53.92%)	5 (4.90%)	102 (100%)	3.34 (±0.95)	
QF.2 It makes me uncomfortable to think about Corona	Cancer Group (1)	0 (0%)	9 (9.67%)	36 (38.70)	41 (44.08%)	7 (7.52%)	93 (100%)	3.49 (±0.77)	0.5731
	Control Group (2)	0 (0%)	26 (25.49%)	21 (20.58)	55(53.92%)	0 (0%)	102 (100%)	3.28 (±0.84)	
QF.3 My hands become clammy when I think about Corona	Cancer Group (1)	0 (0%)	19 (20.43%)	37 (39.76%)	31 (33.33%)	6 (6.45%)	93 (100%)	3.25 (±0.85)	0.7941
	Control Group (2)	0 (0%)	22 (21.56%)	47 (46.07%)	28 (27.45%)	5 (4.90%)	102 (100%)	3.15 (±0.81)	
QF.4 I am afraid of losing my life because of Corona	Cancer Group (1)	0 (0%)	14 (15.05%)	47 (50.53%)	29 (31.18%)	3 (3.22%)	93 (100%)	3.22 (±0.73)	0.4068
	Control Group (2)	0 (0%)	34 (33.33%)	47 (46.07%)	16 (15.68%)	5 (4.90%)	102 (100%)	2.92 (±0.82)	
QF.5 When I watch news and stories about Corona on social media, I become nervous or anxious.	Cancer Group (1)	0 (0%)	20 (21.50%)	33 (35.48%)	37 (39.78%)	3 (3.22%)	93 (100%)	3.24 (±0.82)	0.4089
	Control Group (2)	0 (0%)	34 (33.33)	47 (46.07%)	16 (15.68%)	5 (4.90%)	102 (100%)	2.94 (±0.94)	
QF.6 I cannot sleep because I'm worrying about getting Corona.	Cancer Group (1)	0 (0%)	5 (5.37%)	34 (36.55%)	49 (52.68%)	5 (5.37%)	93 (100%)	3.58 (±0.68)	0.3533
	Control Group (2)	4 (3.92%)	19 (18.62%)	33 (32.35%)	41 (40.19%)	5 (4.90%)	102 (100%)	3.23 (±0.94)	
QF.7 My heart races or palpitates when I think about getting Corona.	Cancer Group (1)	0 (0%)	6 (6.45%)	48 (51.61%)	36 (38.70%)	3 (3.22%)	93 (100%)	3.38 (±0.65)	0.0974
	Control Group (2)	0 (0%)	42 (41.17%)	41 (40.19%)	19 (18.62%)	0 (0%)	102 (100%)	2.77 (±0.74)	

FCV-19S Fear of COVID-19 scale, N: Number of cancer patients percentage (%) and mean±standard deviation (SD), P-value = Chi-Square test, QF: Question fear.

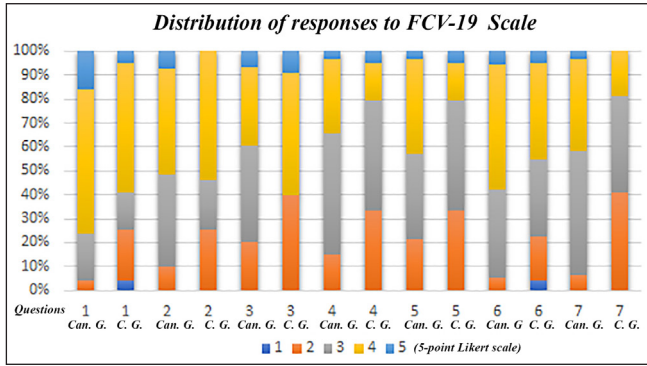


Figure 1: Distribution of responses on Fear of COVID-19 items between Cancer Group (1) and Control Group (2).

and depression scale ($r = 0.5997, p = 0.0001$) [Table 5 and Figure 2], while in group 2 (control group) there was a high significant correlation between FCV19 scale and PTSD scale ($r = 0.9166, p = 0.0001$), while there was a slightly lower correlation between FCV19 scale and Anxiety scale ($r = 0.6641, p = 0.0001$) and FCV19 scale and Depression scale ($r = 0.7565, p = 0.0001$) [Table 5 and Figure 2]. Based on these correlations, further investigation highlighted the factors affecting Fear of COVID-19, PTSD, Anxiety and Depression in both groups. The stepwise model selection in multiple linear regression analysis, which considered FCV19 as a dependent variable, is presented in Table 6. The model had $R^2 = 0.83$ (adjusted $R^2 = 0.70$) which means that 70% of the variance in the FCV19 is explained by the model. In the cancer group, PTSD seems to be the lowest predictor ($b = 0.20, p < 0.001$), while Anx ($b = 0.30, p < 0.01$) and the Dep ($b = 0.33, p < 0.013$) were moderate predictors. Furthermore, in the control group, the model had $R^2 = 0.93$ (adjusted $R^2 = 0.86$) which means that 86% of the variance in the FCV19

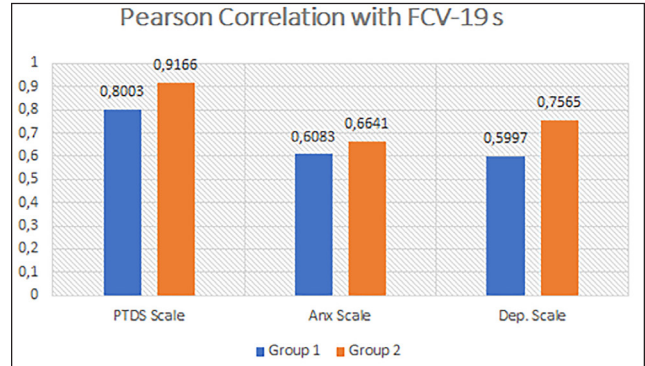


Figure 2: Pearson correlations between Fear of Covid-19 (FCV-19 scale) and posttraumatic-stress disorder (PTSD) scale, FCV-19 scale and anxiety scale, and FCV-19 scale and depression scale in Cancer Group (1) and Control Group (2).

Table 6: Linear Multiple Regression model: Fear of COVID-19 as dependent variable in Group 1 and Group 2 (SE= Standard Error).

Group 1					
Variables	B	SE	Beta	t	R ²
					0.70
PTSD	0.200	0.025	0.596	7.924	
A	0.304	0.120	0.183	2.522	
D	0.337	0.128	0.188	2.269	
Group 2					
Variables	B	SE	Beta	t	R ²
					0.86
PTSD	0.472	0.032	1.010	14.70	
A	0.497	0.119	0.252	4.180	
D	-0.530	0.149	-0.304	3.557	

PTSD: Posttraumatic-stress disorder, A: Anxiety, D: Depression, B: unstandardized beta, SE: Standard error, t-value in logistic regression, R²: R-squared.

Table 5: Pearson correlations between Fear of COVID-19 (FCV-19 scale) and PTSD Scale, Covid-19 (FCV-19 scale) and Anxiety Scale and Covid-19 (FCV-19 scale) and Depression scale in Cancer Group (1) and Contro Group (2).

Groups	Pearson' Correlation	r	P-value
Cancer Group (1)	FCV-19s vs PTSD scale	0.8003	$p = 0.0001^{***}$
Control Group (2)	FCV-19 S vs PTSD scale	0.9166	$p = 0.0001^{***}$
Cancer Group (1)	FCV-19s vs Anxiety S scale	0.6083	$p = 0.0001^{***}$
Control Group (2)	FCV-19s vs Anxiety scale	0.6641	$p = 0.0001^{***}$
Cancer Group (1)	FCV-19s vr Depression scale	0.5997	$p = 0.0001^{***}$
Control Group (2)	FCV-19s vr Depression scale	0.7565	$p = 0.0001^{***}$

FCV-19: fear of COVID-19, PTSD: Posttraumatic-stress disorder, $^{***}P \leq 0.001$.

scale is explained by the model. PTSD ($b = 0.472, p < 0.001$), Anxiety ($b = 0.497, p < 0.01$) seem to be more significant predictors when compared to Depression ($b = -0.530, p < 0.01$) [Table 6].

DISCUSSION

During the pandemic, the Italian population faced a dramatic situation due to a forced lockdown. This situation, as shown by the data of our study, negatively influenced its inhabitants. Here, we analyzed the psychological status of cancer patients and healthy people through the administration of validated questionnaires to estimate their Anxiety, Depression, PTSD. In this regard, we built a procedural sample including most patients with colorectal cancer at stages I and II and a small percentage of patients at stage III, in order to better estimate and compare their fear of the virus during the pandemic. Data collected online in cancer patient samples reported

that 64.50% of them were above the cut-off range (score 8) for HADS-A scale and 61.28% were above the cut-off range (score 8) for HADS-D scale. Meanwhile, in the control group, 49.01% of control respondents were above the cut-off range (score: 8) for HADS-A scale and 50.97% were above the cut-off range (score: 8) for HADS-D scale. Furthermore, we noted that 9.67% of cancer patients did not show a PTSD diagnosis (score range < 24), while 23.65% had mild PTSD. In addition, 16.12% and 50.53% of them had moderate (score range 33–37) and severe levels (score > 37), respectively. In the control group (Group 2), 30.39% of them did not show a PTSD diagnosis (score < 24), while 10.78% (score range: 24–33) had mild PTSD. Moreover, 13.72% and 45.09% of them had a moderate (score range 33–36) and a severe level (score > 37) for PTSD, respectively. Moreover, we observed a minimal difference in HADS General scale and a moderate difference in PTSD scale when we compared the cancer and control groups. The number of studies that evaluated and compared anxiety, depression and PTSD levels in oncological patients during the pandemic had different outcomes. For example, among ovarian cancer patients receiving treatment or who had ended it, HADS levels were comparable with other previously published results.^[28] In another study, Rodrigues-Oliveira *et al.* (2022)^[29] observed that the anxiety, depression, and PTSD levels in head and neck cancer patients undergoing radiotherapy did not increase during the pandemic. In contrast, breast cancer patients and survivors presented significant levels of anxiety and depression symptoms during the COVID-19 pandemic when compared with other published data.^[30] Our study reported that the estimated anxiety, depression and PTSD levels had a moderate difference from those of the control group. In this regard, in the case of cancer patients the level of anxiety, depression and PTSD could increase and then, be associated with the fact that during the pandemic they can be considered very vulnerable due to the biological and psychological burdens of their disease.^[30,31] Besides, in the normal participants, the psychological effects during the pandemic had a significant impact as shown by the high level of Anxiety and PTSD. Our results agreed with previous Italian studies that showed how COVID-19 pandemic and strict lockdown had a negative effect on its citizens. In particular, the data underlined the significant impact on anxiety and depression in both men and women.^[32,33] Furthermore, in another study from Spain, the authors reported elevated anxiety levels following COVID-19 news.^[34] In this regard, the growing threat of the pandemic around the world, as well as social isolation and the overload of media information have led to additional distress, generating a vicious cycle. Naturally, these methods and the pandemic itself often disrupt psychosocial life, thereby creating a sense of approaching fear, which may cause mental problems.^[35–38] Furthermore, we noted no statistically significant difference in favor of colorectal cancer patients, as

compared to the control group, regarding the level of fear of COVID-19 infection. In this context, we performed a Pearson correlation to better investigate how anxiety, depression and PTSD could affect the fear of COVID-19 in both groups. In line with the literature,^[39,40] our results confirmed the strict relationship between PTSD and FCV-19 in both groups. Interestingly, we observed a lower association between PTSD and FCV-19 ($r = 0.8003$, $p = 0.0001$) in the cancer patient group than in the control group ($r = 0.9166$, $p = 0.0001$), as also shown in another paper by Musche *et al.* 2020.^[41] In this study, Musche *et al.* (2020)^[41] reported that levels of distress or fear related to COVID-19 in cancer patients were lower than healthy controls. This result might be explained by the fact that cancer patients had more details on virus to prevent infection than normal individuals. Furthermore, it is possible that the experience of being diagnosed with cancer acts as a psychological protective factor, and additionally, cancer patients needed a constant monitoring through telemedicine during the pandemic with adequate psychological support.^[42] Furthermore, we investigated the relationship among the levels of Anxiety, Depression and PTSD in cancer patients and healthy subjects with the total score of the FCV-19 scale through a multiple linear regression analysis. We found that each explicative variable had a moderate influence on the Fear of COVID-19 in the cancer group, while in control group, Anxiety and PTSD had a significant influence on the fear of COVID-19 in comparison with depression, as shown by other studies.^[40,43–49] Specifically, we found that the fear of COVID-19 infection was influenced by higher levels of PTSD and Anxiety in the control group than in cancer patients. This could be due to different reasons. First, there is an increase in insecurity and/or the fear of losing loved ones. Furthermore, the fear of getting infected could lead to a destructive psychological burden, with high mental disorders, weakening the immune system and reducing the body's ability to fight disease in people. Moreover, cancer patients are more able to cope with the infection than the normal participants because they are more resilient and in addition, they believed that their cancer treatment was more important than the risk of having the infection and severe complications. One study showed that resilience was often correlated with mental well-being.^[48] In another study, Seiler and Jenewein (2019)^[49] found that resilience worked as a protective factor against psychological distress. Moreover, resilience has been found to be associated with personal factors such as optimism,^[50,51] self-esteem and self-efficacy.^[52] In other words, a person can utilize personal resources to steer toward a certain outcome.^[53–55] In this context, resilience can improve personal strength to confront future events, a phenomenon referred to as post-traumatic growth.^[56,57] In summary, our study confirms the need to address the potential long-term consequences of COVID-19 for the mental health of cancer patients and normal people.

CONCLUSION

In this scenario, further investigations should involve longitudinal studies exploring the long-term effects of the virus outbreak and lockdown on cancer patients and normal population in order to discover the ways in which COVID-19 has permanently affected the psychological functioning of these populations. Moreover, new developments could focus on examining other anxiety-related conditions resulting from the pandemic, such as obsessive-compulsive disorder or social anxiety. Further research would allow a better understanding of the mental well-being of these populations and improve psychological interventions and treatments.

Data availability

The author confirms that the data supporting the findings of this study are available within the article and Supplementary Material. Row data that support the finding of this study available from corresponding author, upon reasonable request

Author contributions

MGC and GM conceived and planned the project. GM, CDS, SP and AH participated in study design in development of methods for data collection and analysis. All authors contributed to the refinement of the study protocol and approved the final manuscript.

Ethical approval

The study was approved by the Ethics Committee of the Medical Faculty of the University of Campania “Luigi Vanvitelli (Prot. Number 297)

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of Artificial Intelligence (AI)-Assisted Technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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