Cancer patients attending treatment during COVID-19: intolerance of uncertainty and psychological distress

Miri Cohen[1] · Dana Yagil[2] · Ariel Aviv[3] · Michal Soffer[1] · Gil Bar-Sela[4,5]

Abstract

Purpose The COVID-19 pandemic presents specific challenges for cancer patients attending oncology treatment. Using a mixed-methods design (convergent parallel design), we aimed to assess the experience, perceptions, and reactions of cancer patients during the COVID-19 pandemic.

Methods Participants were cancer patients receiving treatment at the hospital during the pandemic (July to August 2020). In study 1, 95 participants filled out a questionnaire measuring COVID-19 experiences and perceptions, psychological distress, and intolerance of uncertainty. In study 2, in-depth interviews were conducted with 10 cancer patients, probing their experience during the COVID-19 period.

Results Most participants experienced the COVID-19 pandemic as a major threat that would affect future health, most attended all or most of their scheduled treatments, and their mean level of psychological distress was low. A mild decrease in social support was reported, and remote contacts and support from the community had not compensated for decreased person-to person contacts. In addition, intolerance of uncertainty was related to higher psychological distress, which was partially mediated by perceptions of threat. The analysis of in-depth interviews strengthened the quantitative findings by elucidating the experience of fear of contagion alongside determination to continue treatment.

Conclusions and Implications for Cancer Survivors The mixed-methods design enabled us to examine the responses of cancer patients attending treatment. The findings suggest that in times of extreme uncertainty such as COVID-19, health experts need to screen cancer patients and survivors for emotional and instrumental support needs and identify patients and survivors with high intolerance of uncertainty as a risk factor for psychological distress.

Keywords COVID-19 · Intolerance of uncertainty · Psychological distress · Perceived threat · Social support · Remote contact

Introduction

The COVID-19 pandemic outbreak has caused a severe disruption in many aspects of life worldwide. Vulnerable groups, such as individuals with chronic conditions or those with compromised immune system, are at high risk of adverse physical and mental health consequences due to the pandemic [1–3]. For cancer patients, the COVID-19 pandemic presents specific challenges [4]. The present study aims to better understand the experience of cancer patients during the COVID-19.

Individuals with cancer, especially those receiving treatment, have a compromised immune system due to cancer and its treatment [1, 4–8], but they are more exposed to the virus due to the need to regularly access hospitals for treatment [9, 10]. Even those not receiving regular treatment

✉ Miri Cohen
  mcohen2@univ.haifa.ac.il

1 School of Social Work, University of Haifa, 199 Aba Khoushy Ave., Mount Carmel, 3498838 Haifa, Israel

2 Department of Human Services, University of Haifa, Haifa, Israel

3 Hematology Unit, HaEmek Medical Center, Afula, Israel

4 Rappaport Faculty of Medicine, Technion-Israel Institute of Technology, Haifa, Israel

5 Cancer Center, Emek Medical Center, Afula, Israel

need to attend follow-ups and periodical tests. Thus, visiting the hospital for regular care may elevate anxiety and fear [4], whereas not attending treatment or follow-up appointments may increase anxiety and fear of neglecting their health [4]. Additionally, many cancer patients experience increased social isolation and loneliness due to the need to keep social distance from family members and friends [11]. Many cancer patients experience additional stressors, such as transportation restrictions or economic strains [12]. In addition, due to the need to protect patients and staff from the COVID-19 contagion, the procedures of hospital visits changed, such as the use of masks, temperature checks, social distancing, and not being escorted by a caregiver [1]. All this adds to the pre-existing psychological burden of coping with cancer, its treatments, and its physical and mental consequences [13, 14] and can result in high levels of various emotional and mental symptoms [1, 15, 16].

Only a few studies have assessed the psychological impact of the COVID-19 pandemic on cancer patients. Studies showed high levels of perceived risk of contracting COVID-19, fear, and social isolation [9]. Studies found high psychological distress [17], including anxiety, depression [9, 17–19], and insomnia [17]. For example, an online survey of 603 women with a current or previous diagnosis of ovarian cancer reported that 89% of women experienced high levels of worry about their cancer during the pandemic, 51% reported borderline or severe anxiety, and 27% experienced borderline or severe depression [15].

Several studies reported that patients experienced a delay in receiving cancer treatment due to COVID-19 [1, 15, 19], which was related to higher COVID-19-related emotional vulnerability, depression, and anxiety [19]. In contrast, other studies reported low worries [9] and no differences in levels of distress, or anxiety, compared to healthy controls [20] and most patients wished to continue their treatment plan [9]. Therefore, inconsistency among study results regarding the impact of the COVID-19 pandemic is evident in the emotional and behavioral reactions of cancer patients. Psychosocial factors (e.g., decreased social contacts and support) and personal tendencies (e.g., uncertainty intolerance) may affect this variability in individuals' reactions to the pandemic.

Uncertainty intolerance

A prominent feature of the COVID-19 pandemic is a continuous state of uncertainty combined with fear of contracting the virus [21]. Especially during the first months of the pandemic outbreak, it was characterized by lack of clarity regarding the virus contagion patterns and its short- and long-term effects. This uncertainty was expressed in confusion among governments and health authorities, contradictory and often changing instructions, and initial lack of vaccines. The uncertainty was exacerbated among cancer patients due to their increased vulnerability and the need to be exposed to risk of contagion due to hospital visits [9, 10].

A relevant construct in this relation is intolerance of uncertainty (IU), which is a risk factor for anxiety in times of uncertainty [22]. IU was defined as a personal tendency to consider the possibility of a negative event occurring, irrespective of the probability of occurrence [22]. High IU affects cognitive evaluations of new or stressful situations and leads to overestimation of situations as more threatening than the true threat possibility and severity [21] and is associated with worry and increased anxiety in clinical and nonclinical populations [21, 22]. A few studies assessed IU in relation to cancer diagnosis. One study found higher IU among prostate cancer that predicted higher anxiety over time [23].

Decrease in social support, remote social contacts, and support from community

Decreased personal contact and support is especially critical in light of the vast evidence of the role of social support as a buffer of stress and facilitator of better quality of life and better survival [24]. Thus, social distancing and decreased social contacts due to closures and social distancing guidelines during the COVID-19 pandemic outbreak severely limited available support from family and friends [25]. A possible response to the lack of support may be the use of remote social contacts that became salient during the COVID-19 pandemic [26]; intensity of these contacts was found to be associated with reduced loneliness and symptoms of depression in several studies (e.g., [27]). However, other researchers attested that remote social contact cannot fully compensate for person-to-person contact [28], and studies reported that remote social contacts do not decrease loneliness, particularly among older adults [26, 28]. Another resource of support is communities and social networks that organize volunteering networks to aid vulnerable individuals, such as older adults or individuals with severe diseases or disability, in times of crisis [29].

Study context

The present study took place at a main hospital in northern Israel, the Emek Medical Center, that serves a wide urban and rural population in the Israeli geographic periphery. In contrast to reports from other countries [1, 15, 17], oncology treatments, including chemotherapy, radiotherapy, and immunotherapy, continued as originally scheduled in hospitals across Israel. In addition to providing continuous oncology treatment during COVID-19 closures, about 90% of clinical and follow-up visits continued as scheduled.

In summary, the COVID-19 pandemic has imposed extreme feelings of uncertainty for people worldwide, with

an increased effect on cancer patients. Psychological reactions to uncertainty are affected to a great extent by the IU tendency of individuals. To the best of our knowledge, no study to date has assessed the role of IU in psychological reactions to COVID-19 among cancer patients. Therefore, the overall aim of the study was to gain knowledge on the experience of cancer patients during the COVID-19 pandemic and their perceptions of the unique threats they face as cancer patients, perceptions of social support, and ways of adjusting to the ongoing pandemic. To accomplish these aims, using a multi-methods approach, we conducted two studies. Specifically, we used a concurrent parallel design that aimed to integrate two strands of data to expand knowledge [30].

Study 1: quantitative exploration

Aims

This study aimed to (1) assess self-reported changes in attendance of treatment or clinical visits of cancer patients during COVID-19 and appraisals of the COVID-19 threat and its effects on future health; and (2) assess the association between IU and psychological distress and whether cognitive appraisals mediate the associations between IU and psychological distress.

Methods

Participants and procedure

The study was approved by the ethics board of the Emek Medical Center (#0073-20EMC). The day care clinic in the oncology department at Emek Medical Center treats patients with hematologic and solid cancers, 5 days per week (8:00 a.m. to 3 p.m.), serving about 100 to 120 patients per month. Some patients attend treatment once a week or more, and others visit once every few weeks. Participants consisted of a convenience sample of 95 cancer patients receiving radiation, chemotherapy, immunotherapy, or biological treatment. Patients were eligible if they were aged 18 or older and could answer the questionnaire in Hebrew. Patients were approached during the morning or after-noon of varying days during the week, signed an informed consent form, and responded to the questionnaire items with the interviewer. About 30 patients declined to participate or left the study during the interview. Another 12 participants were not included due to partial responses. Participants were interviewed between May 11 and August 25, 2020, starting after the end of the first closure and during a significant increase in the rate of newly diagnosed COVID-19 cases, followed

by the reinstatement of strict limitations of social distancing and partial closure [31].

Participants' demographic and medical background details are shown in Table 1. The mean age of participants was 63, the sample consisted of more men than women, they had a wide range of years of education, and most were married. A majority (86%) reported average and high income, and most were secular. About 80% were Jews and the rest

Table 1 Background characteristics of the participants

Age, years (*M*, *SD*, range)	63.21	13.77	29–88
Gender (*N*, %)			
Men	50	53.8	
Women	43	46.2	
Education, years (*M*, *SD*, range)	13.24	3.411	2–24
Family status (*N*, %)			
Married or partnered	76	81.7	
Single, divorced, widowed	17	18.3	
Children (*M*, *SD*, range)	3.56	1.83	0–10
Income (*N*, %)			
Low	13	14.0	
Average/medium	41	44.1	
High	39	41.9	
Ethnicity (*N*, %)			
Jewish	75	80.6	
Arab	18	19.4	
Religiosity	3.67	0.99	1–6
Very religious	11	11.8	
Religious	28	30.1	
Secular	54	58.1	
Type of cancer			
Breast	20	21.5	
Lung	14	15.1	
Gastrointestinal	15	16.1	
Genitourinary	4	4.3	
Melanoma and skin cancers	7	7.5	
Myeloma	15	16.1	
Other solid tumors	5	5.4	
Other hematology malignancies	13	14.0	
Time since diagnosis, *N* (%)	30.29	42.88	1–189
Current treatment			
Chemotherapy	67	72.0	
Radiotherapy	2	2.2	
Immunotherapy or biologic therapy	11	11.8	
Other	13	14.0	
Frequency of hospital visits per weeks	2.12	1.20	1–8
Once a week	33	35.5	
Twice a month	28	30.1	
Every 3–4 weeks	30	32.3	
Other	2	2.1	

were Arabs, similar to the distribution of ethnic groups in Israel [32].

Regarding cancer-related data, most prevalent diagnoses were breast, lung, gastrointestinal, and myeloma cancers. Time since diagnosis ranged from 1 month to more than 15 years. Most participants were receiving chemotherapy at the time of the study, and most of them visited the hospital once a week or semiweekly (Table 1).

Measures

Background details included age, sex, marital status, education, ethnic group, religiosity, and income; cancer-related information included type of cancer, time since diagnosis, type of current treatment, and frequency of visits to the hospital.

COVID-19 behaviors and perceptions included three items: (a) whether participants missed visits for treatment, follow-up, or other scheduled appointments in the hospital since the COVID-19 outbreak, scored on a scale ranging from 1 (did not attend most visits) to 3 (attended all visits); (b) perceived COVID-19 threat due to visiting the hospital; and (c) perceived impact of COVID-19 on future health outcomes, with the latter two items scored on a scale ranging from 1 (not at all) to 4 (very much).

The short Intolerance of Uncertainty Scale [22] is a 12-item shortened version of the original 27-item scale [33, 34] that assesses reactions to uncertainty, ambiguous situations, and the future (e.g., "Unforeseen events upset me greatly"). Items are scored on a Likert scale ranging from 1 (not at all) to 5 (entirely characteristic of me). High reliability was previously reported (Cronbach's $\alpha = .96$; [22]). It was translated to Hebrew using the back-translation method. Internal consistency in the present study was good (Cronbach's $\alpha = .86$).

Social support included (a) two items assessing perceived decrease in emotional and practical support from family and friends due to the closure and social distancing (a mean score was calculated); (b) use of remote contacts; and (c) perceived support from community and social networks.

The items scored on a scale ranging from 1 (not at all) to 4 (very much).

The Brief Symptom Inventory [35] was used to assess psychological distress. The measure originally included dimensions of depression, anxiety, and somatization, but the somatization dimension was omitted due to similarity with cancer and treatment symptoms. Therefore, the questionnaire consisted of 12 items that assessed emotional distress (anxiety and depression) during the last month. Items are scored on a scale ranging from 0 (strongly disagree) to 4 (strongly agree). Mean scores were calculated, with higher scores indicating more intense symptoms. Items included "feeling blue" and "feeling fearful." Previous studies using the Hebrew version reported high reliability (Cronbach's $\alpha = .85$ to .92), and the internal consistency was high at the present study (Cronbach's $\alpha = .91$).

Statistical analysis

Descriptive statistics were calculated. Pearson correlations between the study variables were assessed, followed by multiple regression analysis. Multiple mediation analysis was conducted using PROCESS with 5,000 bootstrap sampling.

Results

COVID-19 behaviors, perceptions, and reactions

Most participants ($n = 86$, 92.5%) attended all scheduled appointments in the oncology or hematology unit; the rest attended some of their appointments. Thirty-two participants (34.4%) were very much afraid to come to the hospital, 45 (48.4%) were mildly afraid, and 16 (17.2%) reported no fear. Table 2 shows that mean levels of perceived COVID-19 threat and its future implications for health were medium to high (possible range = 1–4) and mean levels of psychological distress were low (possible range = 1–5).

Participants were asked whether they experienced a decrease in emotional and practical support due to social distancing guidelines and closures; 79.6% ($n = 74$) reported no change in emotional support, whereas the others were

Table 2 Correlations among the study variables

	M	SD	Range	1	2	3	4	5	6	7
1. Intolerance of uncertainty	3.05	0.75	1.42–4.92							
2. Psychological distress	1.05	0.83	0.00–3.50	34***						
3. Perceived COVID-19 threat	2.81	1.39	1.00–4.00	31**	.34**					
4. Perceived impact on health	2.23	1.23	1.00–4.00	.41***	38***	48***				
5. Decrease in support	1.33	0.65	0.50–3.50	−.03	.32***	.10	−.15			
6. Use of remote contact	2.63	1.03	1.00–4.00	.12	−.14	.21*	.07	−.16		
7. Support from community	2.13	1.20	1.00–4.00	−.21*	−.26*	−.16	.19	.13	.10	–

$^*p < .05.$ $^{**}p < .01.$ $^{***}p < .001$

distributed between reporting a mild decrease ($n = 8$, 8.6%) and a large decrease ($n = 11$, 11.8%) in practical support. Similarly, most participants had not experienced any change in practical support ($n = 80$, 86.1%). Most participants communicated with family members and friends via remote contact means, including a low degree of participation in remote contacts ($n = 24$, 25.8%), a high degree ($n = 31$, 33.3%), and a very high degree ($n = 23$, 24.7%). Fifteen participants (16.1%) had no remote social contacts. Participants were also asked if they received aid from individuals in the community or social networks during the closure; 52.7% ($n = 49$) responded that their community provided help, ranging from mild to very intensive assistance.

Associations between study variables

Table 2 shows the associations between study variables. IU was relatively high and positively associated with higher perceptions of COVID-19 threat and its impact on future health. Psychological distress was associated with a decrease in perceived social support due to social distancing, with higher perceptions of COVID-19 threat and impact on future health; it was also negatively associated with support from the community and not significantly associated with remote social contact. Perceived impact on health was negatively associated with remote social contact and positively associated with perceived COVID-19 threat. These variables did not differ between degree of attending treatment and medical appointments.

Correlations were followed by a multiple regression to assess the rate of explained variance of psychological distress. None of the background variables or attendance of treatment and medical appointments was significantly associated with psychological distress; hence, they were not entered in the regression model. The multiple regression analysis was conducted in two steps. In step 1, IU was entered and was significantly associated with psychological distress ($\beta = 0.34$, $p < 0.01$) and explained 12% of the variance of psychological distress, $F(1,91) = 13.47$, $p < .001$. In step 2, social support, remote social contact, support from the community, perceived COVID-19 threat, and perceived effect on health were entered and explained an additional 24% of the variance of psychological distress, $F(5,86) = 9.84$, $p < .001$. Significant predictors of distress were IU ($\beta = 0.24$, $p < .05$), degree of decreased support ($\beta = 0.25$, $p < .05$), perceived COVID-19 threat ($\beta = 0.29$, $p < .01$), and perceived impact of COVID-19 on future health ($\beta = 0.29$, $p < .01$). Support from the community and degree of remote social contact were not significant predictors of emotional distress in this model.

Multiple mediation analyses

A multiple mediation model was estimated to examine the indirect effect of IU on psychological distress as mediated by perceived COVID-19 threat, perceived COVID-19 impact on health, and decrease in social support during COVID-19 closures (Table 3 and Fig. 1). The three mediators were entered simultaneously, allowing investigation of the indirect effects of each mediator while controlling for the effect of other mediators. The results indicated a significant direct effect of IU on psychological distress. The three mediators were positively associated with psychological distress. In addition, IU was positively associated with perceived threat and perceived impact on health, but no significant association was found between IU and decreased social support. The bootstrapping results yielded a significant total indirect effect of all mediators, but only perceived threat and perceived impact on future health had a significant indirect effect. In addition, the results indicated that IU still had a significant effect on psychological distress after controlling for the mediators, suggesting that although casual links cannot be established, perceived threat

Table 3 Summary of multiple mediator model analyses ($N = 83$)

IV	Mediating variables (MED)	DV	Effect of IV on MED (path A)	Effect of MED on DV (path B)	Direct effect (path C, 95% CI)	Indirect effect C' (path, 95% CI)	Indirect effects (paths a*b, 95% CI)	Total indirect effect (95% CI)	R^2
Uncertainty intolerance		Psychological distress			.43 (.20, .65)	.24 (.01, .48)		.18 (.07, .32)	.26** ($F_{(3,89)} = 10.23$)
	Perceived COVID-19 threat		.66**	.21*			.16 (.10, .28)		
	Perceived COVID-19 effect on health		.61**	.18*			.11 (.07, .24)		
	Decrease in support		.03	.38**			.01 (−.08, .13)		

IV, independent variable; *MED*, mediators; *DV*, dependent variable

*$p < .01$. **$p < .001$

Fig. 1 Multiple mediation model depicting direct and indirect effects of intolerance of uncertainty on psychological distress. Notes: C, direct effect of intolerance of uncertainty on psychological distress; C', indirect effect of intolerance of uncertainty on psychological distress after including mediators. Values represent unstandardized regression coefficients (B). *$p < .05$. **$p < .01$. ***$p < .001$
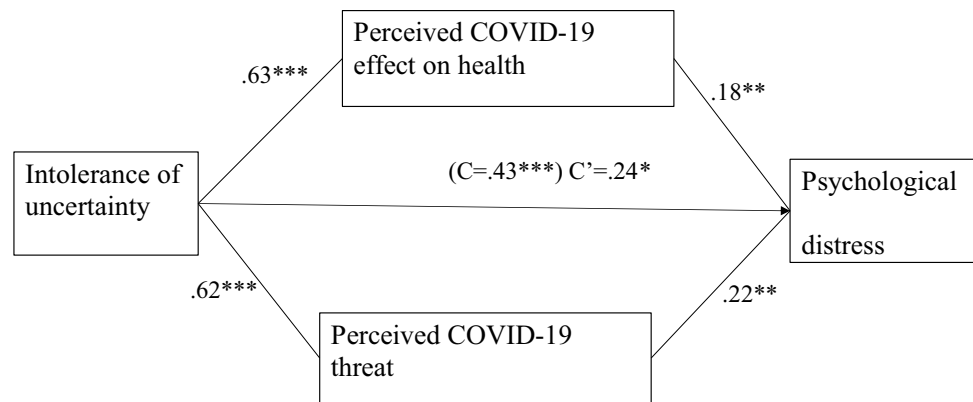
and perceived impact on health partially mediated the association between IU and psychological distress.

Study 2: qualitative exploration

Aims

This study used qualitative methods to gain an in-depth understanding of cancer survivors' experiences during the COVID-19 pandemic. Such a research method is useful when studying topics wherein theoretical support is scarce and requires additional development [36].

Participants and procedure

Participants were 10 cancer patients visiting Emek Medical Center. The sample was composed of six women and 4 men. Their age range was 29 to 72 ($M = 56$, $SD = 13.47$). Participants were recruited after consulting nurses in the department about their ability to participate in an interview in terms of sufficient language fluency and energy level. Participants were selected among patients who attended the oncology department for chemotherapy, immunotherapy, and biological treatment. An effort was made to achieve variety in terms of gender, age, and religiosity. Cancer types were breast, melanoma, prostate, lung, and kidney.

Data collection

Data for this study were collected during June to August 2020 through in-depth semistructured individual interviews, directed at studying the participants' unique narratives of their experiences, emotions, and behaviors related to being cancer patients in active treatment during the COVID-19 period. The interviewer encouraged participants to recount their stories from a reflective position [37]. The semistructured interview guide was composed of open questions that covered several key topics associated with respondents' experiences, thoughts, and emotions during the pandemic.

Questions included: "Tell me about your experience during the COVID-19 period: How did you and your family organize life at a social distance?; How was it for you to get to the hospital for treatments?; What did you think and how did you feel inside the hospital?; Did you hesitate about whether to go to the hospital?; Tell me about it: What does it mean for you to be sick with cancer during the COVID-19 pandemic?".

The interviews were conducted by a professional trained for this study and guided by the first author. Interviews lasted approximately 30 min, were audio recorded, and were later transcribed verbatim.

Data analysis

Data analysis was performed by the first two authors. To safeguard coding reliability, we independently conducted thematic content analysis of the data, separately analyzed each interview transcript, and discussed personal views of the topics under study [38]. After performing the separate data analysis, we discussed gaps and looked for agreement regarding theme content and interpretation of meaning [39]. Then, we organized the data based on themes that came up in the participants' narratives [40]. Therefore, these themes were assumed to represent participants' experiences, rather than the authors' a priori perspectives [41].

Findings

Anxiety and extra-strict practices to prevent contagion

Most participants reported that they are aware that COVID-19 is highly risky for them, due to their compromised immune system. Thus, they consistently took extra caution to prevent contagion: "I have to distance myself from people much more strictly than others" (Male, 74); "When it [the pandemic] started, I came [to the hospital] with gloves as well as a mask" (Female, 68). Participants reported that they stayed at home most of the time and let others do their

shopping. Most of them left their home only for visits to the hospital.

For some, the realization of the risks of contagion involved excessive anxiety and taking extreme measures of caution: "I keep washing my hands. When I get home, I take off my clothes at the door, put them into the washing machine, take a shower, and only then meet my children" (Female, 29). Due to constant alertness to the risk of contagion, exposure to others' less cautious behaviors stimulated stress: "This week I came for a blood test and someone kept sneezing, did not cover her mouth, and she didn't have her mask on. I shook all over, actually wanted to leave the clinic" (Female, 49). "I didn't know what the symptoms were and suddenly I felt that my nose was running and I said—is it the coronavirus" (Male, 57).

The anxiety and the need for caution were generalized to close others who participants felt should also avoid contagion: "When my husband goes out, I keep saying, 'Did you wear a mask? Do you have a mask?' I direct all my stress towards him" (Female, 68). Furthermore, most participants felt that their family members constantly reminded them to be careful: "They [family members] worry all the time. They say, 'Try to go with a mask all the time'" (Female, 47). Family members were also very cautious and took great care not to come close to participants. Sometimes family members were viewed as being the cause of social distance, even though the respondents would have liked closer and more frequent contact:

> I wish I could convince my daughter to come home more often. … We see her very infrequently and always with a mask. … My brother said to me: "If you go out and meet someone and something happens to you, it is your fault, but if it is because of them, they will not be able to live with themselves." (Female, 51)

However, some participants felt that over time, the uncertainty and anxieties about the pandemic have receded and consequently, they take less extreme measures of prevention: "Previously, it was 'Disinfect,' 'Don't sit,' 'Be careful.' … My wife would also caution me, 'Don't touch the window, don't touch the door.' … But now it is different" (Male, 57). "My wife wouldn't let anyone into the house, and now we are slowly letting go" (Male, 58).

Uncertainty and concerns about impaired cancer treatment and recovery

In any stage of the COVID-19 outbreak, respondents had never considered not attending treatments. They all stated that the treatments are a priority. For example, "No one is forcing me to come for treatment, I owe it to myself" (Female, 57). Their main concern, particularly at the beginning of the pandemic outbreak, was that the pandemic would affect the capacity of the hospital to provide the needed treatment. Respondents worried that there would be a shortage of medicine due to canceled flights, that hospitals would not be able to provide treatment due to shortage of clinical staff, that physicians would be infected and unable to treat them, or that health care priorities would change and they would be neglected. "At the beginning of the pandemic, one of my greatest fears was that suddenly I will be told, 'Don't come to the hospital.' What will I do? Who will take care of me?" (Male, 58).

Some respondents also felt that the pandemic interfered with their efforts to adjust to life with cancer. Those who did not work and found alternative activities and hobbies were forced to stop their activities due to the pandemic. "The pandemic came and stopped everything. … I felt that I am doing some work and suddenly everything stopped. … I felt that everything was taken from me" (Female, 51).

Limited social contact at a time of need

The major outcome of preventive measures was a reduction in the frequency and quality of social interactions. Almost all participants reported that they felt a lack of social connection: "A neighbor can't talk to you, visit you. People talk to you from a distance, as if you were a leper" (Male, 57). Interactions that were conducted through video conferences or meeting in open air were experienced as insufficient: "It is about touching. … I miss the physical hug" (Female, 51). "It was very difficult for me that I can't be with her [granddaughter], hug her" (Male, 72). Although most participants felt that they received a lot of support from family members and friends, they also felt lonely and some of them came alone to treatments in the hospital to protect family members from potential contagion. "I didn't want family members to get infected in the department, but they constantly keep in touch, never leave me alone. … I felt lonely" (Female, 68). "Of course it is more pleasant to come here with my wife … but I don't want her to be in any risk, and here you can get all sorts of things" (Male, 74). Thus, at a time when participants felt that they needed a lot of support and social contact due to cancer, social interactions were severely limited due to the pandemic: "It is as if all these people [family members] disappeared when I needed them the most" (Female, 29).

To summarize, in light of the uncertainty posed by COVID-19 that threatened the continuity of their care plan, participants experienced a double risk, due to their weakened immune system and the need to get to the hospital, two factors that set them apart from the healthy population. Thus, they also experienced loneliness as a result of social distance, when social distance was forced on them or they forced it on their relatives to protect their health. In parallel, the possibility of not coming to the hospital for treatment never arose; it was clear to everyone beyond a doubt that they would come for treatment in any situation.

Discussion

This study showed that although participants experienced the COVID-19 pandemic as a major threat to their present and future health and were afraid coming to the hospital, most attended all or most of their scheduled treatments. In addition, IU was related to higher psychological distress, and this association was partially mediated by perceptions of threat to their health. Analysis of in-depth interviews strengthened the quantitative findings by highlighting how the experience of fear was outweighed by a determination to continue treatment and the experience of managing life with a continuous sense of uncertainty.

The high attendance rate despite the risk of being exposed to COVID-19 contagion is in contrast to a few previous studies reporting substantial rate of non-attendance. In contrast, similar to our findings, an Irish study reported that 92% of patients wanted to continue treatment as originally planned [9]. The high attendance rate in the present study may be related to relatively low levels of psychological distress reported by the participants.

Similar to previous studies on reactions of cancer patients to challenges imposed on them since the outbreak of the COVID-19 pandemic [9, 16–19], participants in the present study reported high perceptions of risk of COVID-19 contagion and the specific implications for them. Most of them reported experiencing being afraid when coming to the hospital.

Study 2 strengthened these findings by pointing to the experience of being trapped in a dual threat—the threat of possible severe effects of the virus due to their compromised immune system and the exacerbation of this threat due to the need to continue visiting the hospital, where the risk is substantially heightened. A specific aspect of the threat of COVID-19 is its possible implications for future health. Indeed, participants perceived that the threat to future health was medium to high. Two sources of these perceptions were revealed in the qualitative study: the fear that the hospital would not be able to provide the needed oncology treatments, appointments, and tests, which may delay treatment [19], and the fear of the possible serious effect of contagion in light of their compromised immune system [4, 9, 10, 16].

Despite these feelings and perceptions, the level of psychological distress was markedly low. It was even lower than in previous studies prior to the pandemic outbreak in Israel with similar cancer patient groups [42, 43]. It was also lower than in other previous studies conducted in the USA, Canada, and Singapore during the current pandemic [10, 15, 16], although a precise comparison is impossible due to use of different tools and scoring. It should be noted that the study was conducted 3 to 8 months after the outbreak and first closure; thus, an effect of adjustment likely occurred. The participants in the qualitative study explained that as they got used to the situation, their level of anxiety due to contagion risk decreased together with the intensity of taking extreme preventive steps. In addition, as the participants conveyed, the main stressor was the fear of delay in treatment and its effects on their future health. Once patients realized that their care continued as usual, their level of distress decreased. This coincides with studies that showed a delay in treatment was connected to high distress [15, 19]. However, sampling bias due to the small sample cannot be ruled out. Nevertheless, scores of psychological distress were spread over a wide range from no distress to very high distress, indicating that a portion of participants did experience moderate to high distress. Thus, screening and identification of these individuals are necessary to provide professional support.

Perceived social support, one of the most essential resources for coping with cancer and its treatments and a major buffer of stress [24], only mildly decreased during the pandemic in the present study. This contrasts with a previous study reporting a substantial decrease in social support [25]. However, during in-depth interviews, participants shared that they insisted on keeping social distance from their families to protect their health, although they missed person-to-person contacts. Others have suggested that the high use of remote contacts and community aid could compensate for the lack of direct contacts [28, 29], but it was not significantly associated with psychological distress in the current study. Although support from the community (but not remote contact) was significantly correlated with psychological distress, the association ceased to be significant in the regression analysis. Possibly, these modes of support could not substantially compensate for loss of person-to-person contact. This finding was supported by the in-depth interviews that revealed how participants missed and longed for person-to-person and physical contact and were not satisfied by remote contact. Moreover, although family members kept supporting the patients in various ways, the participants described feelings of loneliness.

Psychological reactions in times of uncertainty, such as the COVID-19 pandemic, are especially affected by high IU [22], but to our knowledge, IU was not studied previously in relation to COVID-19. Individuals with high IU react with excessive anxiety and preventive behaviors [21, 22] that may even increase anxiety. In support of the theoretical conceptualization of IU and previous findings [21, 22], in the present study, the main variable associated with psychological distress was IU. It remained a main predictor after controlling for background and other study variables. The in-depth interviews strengthened these findings regarding feelings of uncertainty created by COVID-19 and its specific implications for participants' health.

According to theories of coping with stressors [44], personal characteristics affect the perceptions and interpretations of the threat or harm in a specific situation and may affect the level of psychological distress. In line with this theoretical view [44], higher IU was associated with higher perceived threats of COVID-19 and stronger perceived impact of COVID-19 on future health. Moreover, these perceptions partially mediated the association between IU and psychological distress.

Clinical implications

This study has significant implications for the practice of treating cancer patients during the COVID-19 period and possible future pandemics. First, the findings regarding concerns about the continuity of treatment and the resulting sense of uncertainty indicate the importance of ensuring continuity of treatment and providing information that will reduce worry about delays. Another implication is the need for awareness among health care professionals of patients' stressors, concerns, and reactions and to develop means to respond to these concerns and identify patients with high psychological distress. Moreover, it is important to prepare for the prolongation of the pandemic and for future emergencies, including developing working models of providing optimal treatment under the limits of social distancing and other preventive precautions. It is recommended to screen patients when they arrive at the clinic about needs arising from a combination of cancer and the risk of infection, their emotional reactions, and perceptions of the threat to their health. In light of the findings regarding the central role of IU tendency in psychological distress in times of uncertainty, it is recommended to screen and identify individuals with high IU and provide them with more intense support.

Limitations

The main limitation of the study is the relatively small number of participants, especially compared to the volume of patients receiving treatment at the medical center, and recruitment of participants through convenience sampling. In addition, the sample consisted of patients who came to the clinic during COVID-19. However, according to the hospital and national figures, more than 90% of patients kept all appointments. Moreover, postponements mainly involved follow-up visits, not treatment. Nevertheless, this limitation should be considered when generalizing findings to other patient groups. Another limitation is that the variables of perceived COVID-19 threat and perceived impact on future health were composed of one item each, which may limit the measurement validity. In addition, the study was conducted at a single point and did not examine changes in patients' responses to the ongoing COVID-19 pandemic, nor did the study capture patients' responses in the first days of the pandemic outbreak or closures.

Conclusions

This study is among a few that examined perceptions and reactions of cancer patients who attended hospitals for treatment during the COVID-19 pandemic and the unique risks they faced. The strength of the study is the use of the mixed-methods design, wherein the qualitative findings strengthened and expanded the understanding of the quantitative findings.

The study findings suggest low psychological distress, along with substantial fear of infection and high perceptions of the threat and impact on future health of COVID-19. In addition, the study points to the importance of locating patients with high IU, which may represent a risk factor for emotional distress in a period of extreme uncertainty such as COVID-19. Further research, especially longitudinal studies and studies with diverse patient groups, is necessary to create a broader body of knowledge on how cancer patients cope with ongoing pandemic situations.

Declarations

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