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Impact of COVID-19 pandemic on cancer care: A cross-sectional study of Egyptian patients' perspectives and concerns

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ABSTRACT

Background: Worldwide, COVID-19 greatly reduced healthcare accessibility and utilization by non-COVID patients including cancer. This study aimed to quantify and characterize cancer care adjustments experienced by cancer patients/survivors; and to explore their concerns, beliefs, and knowledge regarding COVID-19.

Methods: A cross-sectional study was conducted using a questionnaire distributed through social media patients' groups (June–December 2020). Questionnaire included basic information, care adjustments (in “care provision” and in “treatment plan”), and patients' concerns, beliefs, and knowledge. Data description and analysis were done.

Results: Out of 300 participants, there were 68.0% on-treatment and 32.0% in follow-up stage. Care adjustments were reported by 29.7%; mostly in care provision (27.3%) rather than treatment plan (4.9%). Adjustments were less likely to occur when healthcare facility was in governorate other than that of residence (OR:0.53, 95% CI:0.30–0.96, $P = 0.037$) and more likely with long-standing diagnosis (≥ 12 months) compared with recent (< 3 months) (adjusted-OR:4.13, 95%CI:1.19–14.34, $P = 0.026$). Lower proportion of on-treatment patients used remote consultation than patients in follow-up [4.4% versus 17.7%, $P < 0.001$].

Patients were concerned about fulfilling their care visits more than the probable COVID-19 infection (72.3%). It was uncommon to feel that the risk of COVID-19 infection is higher in care places than in the community (27.3%) or to feel safe with remote consultations (34.3%). However, patients increased their infection control practice (64.0%) and the majority were aware of their increased susceptibility to complications (86.0%). Somewhat, they were also concerned about the care quality (57.3%). Many had adequate access to COVID-19 information (69.0%) and their main sources were the Ministry of Health webpage and ordinary media (radio/TV).

Conclusion: Cancer patients were primarily concerned about fulfilling their planned care and COVID-19 infection was less appreciated.

Policy summary: Launching of a policy for enhancement of telemedicine experience through more patients' engagement—as essential stakeholders—may be required. To heighten pandemic resilience for cancer care in Egypt, more investment in establishing specialized end-to-end cancer care facilities that ensure continuity of care may be justified.

1. Introduction

In December 2019, coronavirus disease 2019 (COVID-19) caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-

2) was first identified as pneumonia of unknown etiology in Wuhan, China [1]. On the 14th of February, Egypt reported its first COVID-19 case [2]. Then on March 11th, WHO declared the outbreak of COVID-19 disease as a pandemic [3]. In response to this, Egypt has

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scaled up its preventive measures to minimize the virus spread in the population. Among the measures taken, were the partial lockdown declared on March 25th, stay-at-home instructions, and reduction of elective and non-emergency healthcare services [4].

Healthcare accessibility for other non-COVID-19 cases—particularly cancer patients—has been challenged by many constrains. First, a reduced availability due to reduction of non-emergency services in addition of turning of more than 300 public hospitals in Egypt—including some cancer care institutes—into isolation hospitals for COVID-19 patients [5]. Second, the potential risk of unfavorable outcome with delaying diagnosis and/or treatment. Third, the fear of infection and its complications given the increased vulnerability of cancer patients; for whom a high COVID-19 case fatality rate—up to 25.6%—was reported [6]. Hence, treatment modifications were proposed by cancer societies and associations to help oncologists provide the optimal patients' care with safety and protection whenever possible. [7–11]. Consequently and according to the US Medicare data [12] and a multicenter Indian study [13], marked reduction in service utilization by cancer patients has occurred in the peak of pandemic that ranged from above 50% in the regular treatment visits to 85% in some cancers screening services. In Egypt and based on data reported from a large university hospital, reduction of oncology service utilization in 2020 and 2021 respectively—compared to 2019—was 36.2% and 31.4% for therapeutic, 44.8% and 45.4% for diagnostic, and 71.2% and 58.2% for screening services [14]. However, the mentioned Egyptian study was limited by its descriptive nature of aggregated data with no participating patients. Also, it did not provide detailed explanation of the kind of such reduction—whether it was due to rescheduling or cancelation of appointments—or describe the changes in the plan of treatment.

In clinical practice however, beside the noticed reduction in seeking medical care during this pandemic, we realized the psychological stress and uncertainty feelings expressed by some patients about their management plan and treatment outcome. Exploring the impact of pandemic from the patients' perspective as important stakeholders in the medical care process is mandatory for better understanding of such an impact. Due to the cultural and healthcare differences between regions, studies that have investigated the patients' perspective from some countries [15,16] may not be indicative of the situation in another. Hence, this study aimed to quantify and characterize the cancer care adjustments experienced by a group of Egyptian cancer patients and survivors; and to explore their concerns, beliefs, and knowledge regarding COVID-19 pandemic.

2. Patients and methods

2.1. Study design and population

In this cross-sectional study, patients were reached through an online questionnaire that was shared through cancer patients' groups on social media (Facebook, Twitter, and WhatsApp) over six months; from the beginning of June to the end of December 2020. All adult patients ≥ 18 years were invited to participate in the survey. We intended to recruit as many participants as possible within the study period.

2.2. Study tool

A self-administered questionnaire was designed consisting of 28 items covering three subheadings. First: basic information including patients' demographics, disease characteristics (cancer type, duration, and intervention stage), and information about the healthcare facility providing patient's services (location, specialization, and type). Second: information about patients' care adjustments categorized as adjustments related to the provision of care (rescheduling or cancelation of appointments and replacement by remote consultation) and adjustments in the treatment plan (stopped, reduced doses, and changed protocol of chemotherapy; changed protocol of radiotherapy; and started

prophylactic colony stimulating factors). Third: inquiry about patients' concerns, beliefs, and adequacy of access to knowledge regarding COVID-19 pandemic using 5-point Likert scale questions ranging from strongly disagree to strongly agree. Concerns were about contracting COVID-19 infection during medical care (4 items) and the negative effect on the care quality and care outcome (2 items). Beliefs were about their increased liability to unfavorable outcome (3 items). COVID-19 knowledge accessibility, sources, and topics of interest that were searched for were also asked about. The questionnaire was designed in Arabic and pilot tested on 20 respondents for clarity; then the recommended changes were made, retested, and the final version was used.

2.3. Statistical analysis

For description of the study sample, we calculated the frequencies and proportions. Factors that might have contributed to the occurrence of care adjustments were tested using bivariable logistic regression analysis. Factors were patients' demographics, healthcare facility characteristics, and disease characteristics (duration, intervention stage and treatment status). Odds ratios (OR), their 95% confidence intervals (95% CI), and exact *P*-values were presented. Accounting for the intervention stage as a potential confounder, the relationship between care adjustment and the duration from diagnosis was further tested using multivariable logistic regression. Adjusted OR, 95% CI, and the exact *P*-value were presented. According to the patients' intervention stage, proportions of patients reported each type of care adjustments were compared using Chi Square test. All analyses were performed using SPSS version 25 and for all statistical tests, the level of significance was considered at *P*-value ≤ 0.05 .

2.4. Ethics statement

Institutional Review Board approval was obtained by IRB of the Egyptian ministry of health (Com. No/Dec. No: 15–2020/3) according to the principles of the Declaration of Helsinki, and the study was registered on ClinicalTrials.gov, NCT04382495.

3. Results

This study included 300 cancer patients, mostly women (84.7%, 254/300), in the age groups of > 30 –50 years (45.0%, 135/300) and > 50 –70 years (39.0%, 117/300), and almost half of them attained high education [university 41.3% (124/300), postgraduate studies 9.3%, (28/300)]. Patients were either in the treatment stage (68.0%, 204/300) or in the follow-up stage (32.0%, 96/300) and the common durations from diagnosis were 6 – < 12 months (17.0%, 51/300) and ≥ 12 months (62.7%, 188/300) (Table 1). The frequently diagnosed cancers were breast (63.3%, 190/300), lung/pleura (6.3%, 19/300), and lymphomas (6.0%, 18/300) (Supplementary Figure. 1).

3.1. Care adjustments

The reported adjustments made to medical care were depicted in Fig. 1. Care adjustments were reported by a total of 29.7% (89/300) of participating patients. Adjustments related to the provision of care were reported by 27.3% (82/300) of patients while the treatment plan adjustments were mentioned by only 4.9% (10/204) of the on-treatment group. Adjustments to the provision of care were in the form of rescheduling of investigations, surgeries, and/or sessions of radiotherapy and intravenous chemotherapy (17.3%, 52/300); and cancelation of routine clinical examinations or prescription refill visits to be replaced by remote consultations and home delivery of oral treatment (8.7%, 26/300). Changing healthcare facility that provides care was also reported (4.7%, 14/300). The commonly reported adjustment in treatment plan was the start of prophylactic Granulocyte Colony-Stimulating Factor (G-CSF) as immunostimulant (2.9%, 6/204).

Table 1
Medical care adjustment: association of demographics, care facility, and intervention stage factors.

	Total n= 300 (%)	Care adjustment n = 89 (%)	Odds Ratio 95% CI ^a	P-value	Care adjustment (Row %)
Patients' demographics					
Age (years)					
18–30	25 (8.3)	8 (9.0)	Ref		32.0
> 30–50	135 (45.0)	38 (42.7)	0.83 (0.33–2.09)	0.696	28.1
> 50–70	117 (39.0)	30 (33.7)	0.73 (0.29–1.87)	0.516	25.6
> 70	23 (7.7)	13 (14.6)	2.76 (0.85–8.97)	0.091	56.5
Gender					
Men	46 (15.3)	17 (19.1)	Ref		37.0
Women	254 (84.7)	72 (80.9)	0.68 (0.35–1.30)	0.241	28.3
Level of education					
Basic or less	68 (22.7)	15 (16.8)	Ref		22.1
Intermediate	80 (26.7)	25 (28.1)	1.61 (0.76–3.38)	0.211	31.3
University	124 (41.3)	40 (44.9)	1.68 (0.85–3.34)	0.137	32.3
Postgraduate	28 (9.3)	9 (10.1)	1.67 (0.63–4.45)	0.302	32.1
Working status					
Not working	228 (76.0)	62 (69.7)	Ref		27.2
Working	72 (24.0)	27 (30.3)	1.61 (0.92–2.81)	0.097	37.5
Governorate of residence classification					
Greater Cairo	204 (68.0)	60 (67.4)	Ref		29.4
Lower Egypt	36 (12.0)	10 (11.2)	0.92 (0.42–2.03)	0.842	27.8
Upper Egypt	60 (20.0)	19 (21.3)	1.11 (0.60–2.07)	0.737	31.7
Healthcare facility characteristics					
Location					
Same Governorate of residence	214 (71.3)	71 (79.8)	Ref		33.2
Other Governorate	86 (28.7)	18 (20.2)	0.53 (0.30–0.96)	0.037	20.9
Specialization					
Cancer specialized hospital	176 (58.7)	48 (53.9)	Ref		27.3
All speciality hospital	124 (41.3)	41 (46.1)	0.76 (0.46–1.25)	0.280	33.1
Type					
Governmental	145 (48.3)	43 (48.3)	Ref		29.7
Charity	70 (23.3)	21 (23.6)	1.02 (0.55–1.90)	0.959	30.0
Private	85 (28.3)	25 (28.1)	0.99 (0.55–1.78)	0.969	29.4
Disease characteristics					
Duration from diagnosis (months)					
< 3	30 (10.0)	3 (3.4)	Ref		10.0
3 - < 6	31 (10.3)	6 (6.7)	2.16 (0.49–9.57)	0.311	19.4
6 - < 12	51 (17.0)	14 (15.7)	3.41 (0.89–13.03)	0.074	27.5
≥ 12	188 (62.7)	66 (74.2)	4.13 (1.19–14.34) ^b	0.026	35.1
Intervention stage					
Follow up	96 (32.0)	38 (42.7)	Ref		39.6
Treatment	204 (68.0)	51 (57.3)	0.61 (0.36–1.06) ^b	0.082	25.0
Treatment status					
Receiving	173 (84.8)	42 (82.4)	Ref		24.3
Waiting	22 (10.8)	6 (11.8)	1.17 (0.43–3.18)	0.759	27.3
Not specified	9 (4.4)	3 (5.9)	1.56 (0.37–6.51)	0.542	33.3

^a Bivariable logistic regression was used

^b Adjusted OR (95% CI) calculated by multivariable logistic regression including duration from diagnosis and intervention stage variables.

Care adjustments were less likely to occur when the location of healthcare facility was in a governorate other than that of patients' residence (OR: 0.53, 95%CI: 0.30–0.96, $P = 0.037$). Conversely, the likelihood of care adjustments was higher when the duration from diagnosis was ≥ 12 months than when was < 3 months (adjusted OR: 4.13, 95%CI: 1.19–14.34, $P = 0.026$), independent on the intervention stage (adjusted OR: 0.61, 95%CI: 0.36–1.06, $P = 0.082$) (Table 1). None of the other demographic or healthcare facility factors showed significant relation with the reported care adjustment. Comparison of detailed adjustment items according to patients' stage of interventions was shown in Fig. 2 and illustrated a significantly lower proportion of remote consultation among on-treatment patients than patients on follow-up [4.4% (9/204) versus 17.7% (17/96), $P < 0.001$].

3.2. Patients' concerns, beliefs, and knowledge

Patients' concerns and beliefs were depicted in Fig. 3. As an expression of concern about catching COVID-19 infection during medical care, a relatively low proportion of patients agreed/strongly agreed about believing in the higher probability of contracting COVID-19 infection from the care place than from the community (27.3%, 82/

300) and feeling safer with remote consultation than with hospital visits (34.3%, 103/300). On the other hand, a relatively high proportion agreed/strongly agreed about the greater importance of treatment visits than social distancing or self-isolation (72.3%, 217/300), and their increased concerns of infection control with the pandemic more than after cancer diagnosis (64.0%, 192/300). Concerns about cancer care provision were expressed as the proportions who agreed/strongly agreed with the negative impact of the pandemic on the quality of care that would be provided (57.3%, 172/300) and on the treatment outcome in terms of personal cure/favorable response (37.7%, 113/300). Patients' belief of increased liability to unfavorable outcome was shown as the proportion who agreed/strongly agreed that they are more susceptible to COVID-19 complications than others (86.0%, 258/300), contracting COVID-19 is more dangerous than cancer (46.0%, 138/300), and their concern about their health and survival increased with the pandemic more than after cancer diagnosis (40.7%, 122/300).

Adequate access to COVID-19 information was agreed/strongly agreed by 69.0% (207/300) of patients. The commonly reported sources of information were the Ministry of Health webpage (42.0%, 126/300), the ordinary mass media including radio, TV, and newspapers (40.7%, 122/300), social media posts (33.7%, 101/300), Google (21.7%, 65/

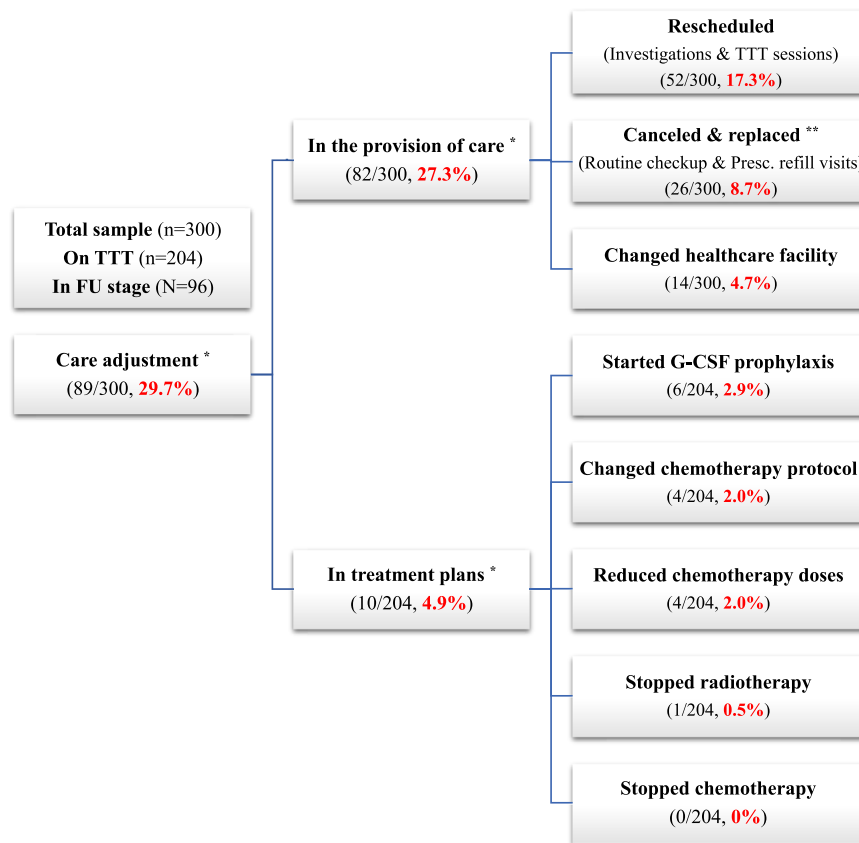


Fig. 1. Proportions of patients reported various adjustments made to their medical care *Multiple responses were allowed. **Remote consultations replaced routine clinical check-up and oral treatment was delivered to patients at home. Abbreviation: TTT: treatment, FU: Follow-up, Presc.: Prescription.

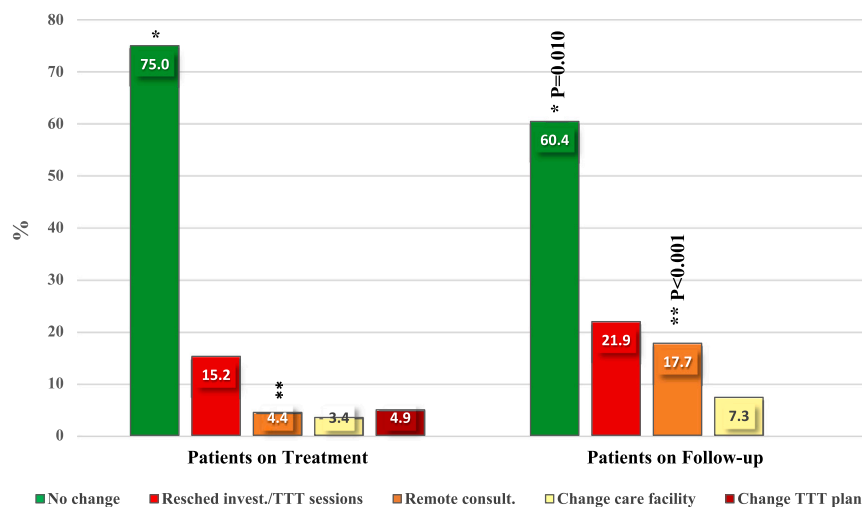


Fig. 2. Detailed care adjustments: comparison according to patients' intervention stage. Patients on treatment: n = 204. Patients on follow-up: n = 96 Abbreviation: Resched invest.: Rescheduled investigations, TTT: treatment, consult.: consultations. * and ** indicate compared groups with significant differences.

300), and World Health Organization website (21.3%, 64/300) (Fig. 4-A). Subjects that were commonly searched for were nutrition and immune boosting (51.7%, 155/300), COVID-19 transmission and infection control methods (45.0%, 135/300), effect of COVID-19 on cancer patients (43.0%, 129/300), and the daily reports of new cases and deaths (32.3%, 42/300) (Fig. 4-B).

4. Discussion

4.1. Main findings

Not much adjustment has occurred in the care of cancer patients despite that the period of this survey—June to December 2020—included the peaks of the first and second waves of COVID-19 pandemic in Egypt [17]. Almost a third of patients (~30%) reported adjustment that occurred mostly in the care provision (~27%) rather

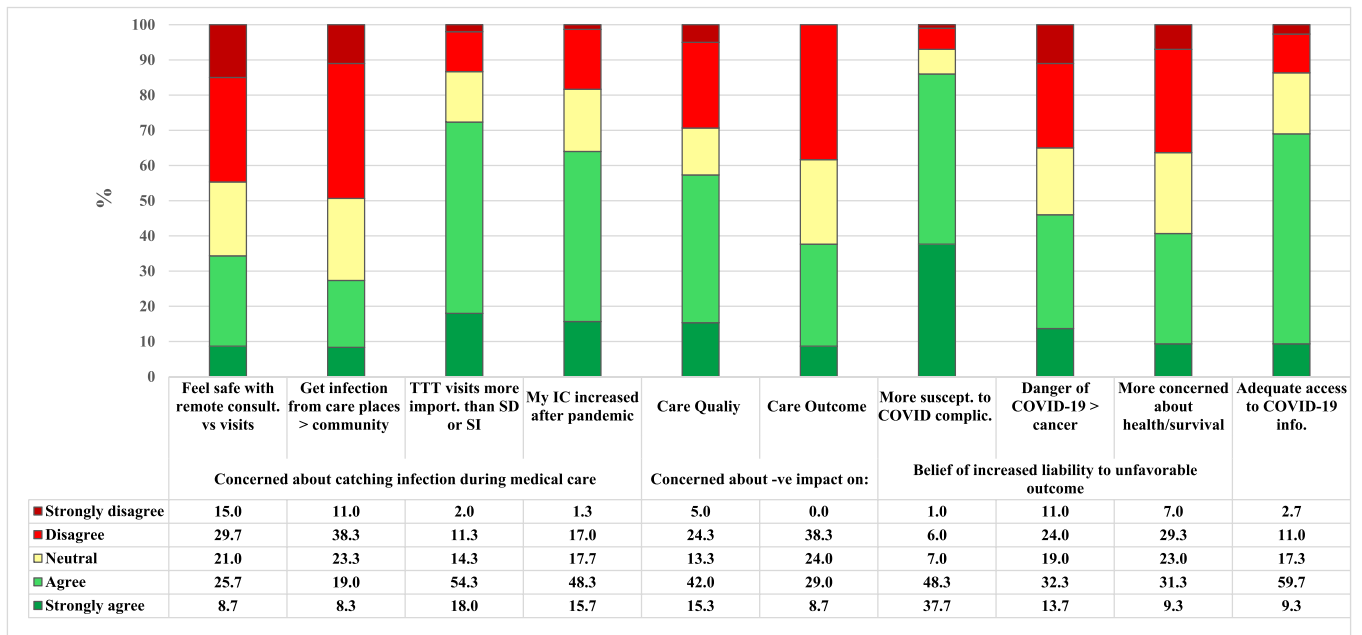


Fig. 3. Patients' concerns about medical care, catching COVID-19 infection, and their belief of increased liability to unfavorable outcome (n = 300) **Abbreviations:** vs: versus, consult.: consultations, TTT: treatment, SD: social distancing, SI: self-isolation, IC: infection control practice, suscept.: susceptible, complic.: complications, info.: information.

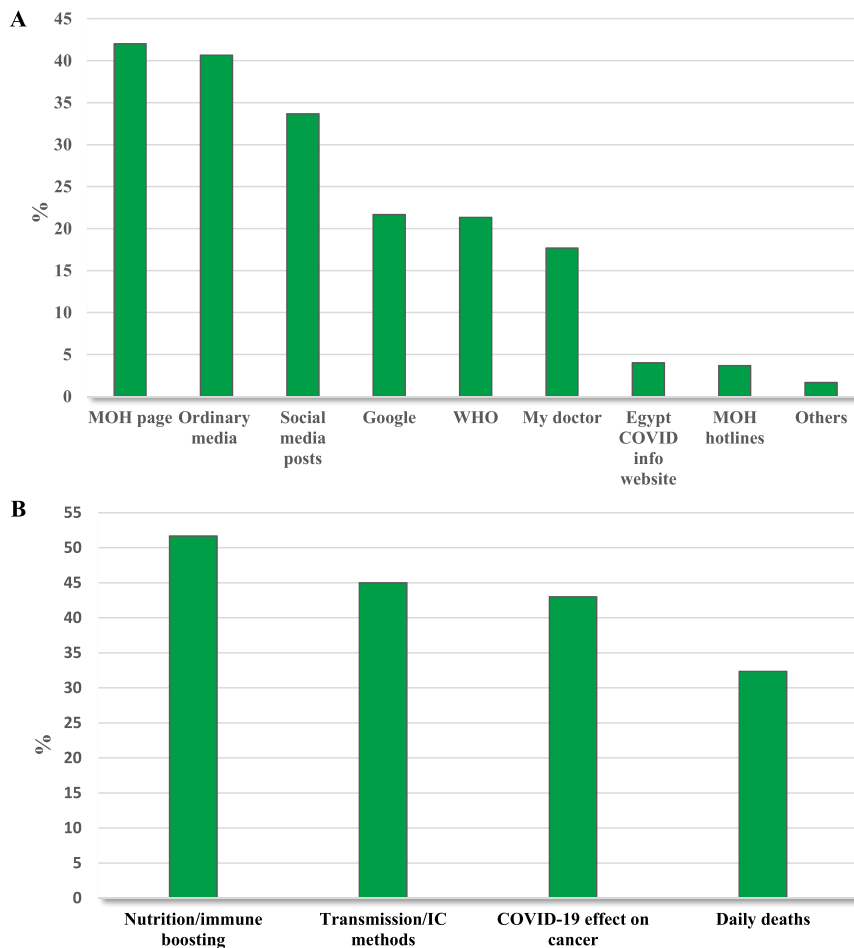


Fig. 4. Sources of information about COVID-19 pandemic (A) and subjects searched (B) (n = 300). **Abbreviations:** MOH: Ministry of Health. WHO: World Health Organization. IC: Infection Control.

than the treatment plan (~5%) itself. Generally, adjustment occurred more likely when longer than a year has elapsed since the diagnosis. Patients on follow-up used remote consultations more than patients who were still on treatment. Usually, patients were more concerned about fulfilling their treatment and follow up visits than the possibility of catching COVID-19 infection. They did not commonly feel safe with remote consultations nor worried about getting infected from the care place more than the community but, they increased their attention to infection control practice. Patients were almost completely aware that they are a high-risk group with more susceptibility to complications. They were somewhat concerned about the quality of care and—to a lesser extent—about their cure rate in the era of pandemic. Many had adequate access to COVID-19 information; and the Ministry of Health and Population webpage, the ordinary mass media, and social media posts were the commonly used sources.

4.2. Care adjustments

Only a third (29.3%) of our patients have experienced some sort of adjustment in their cancer care; a finding that almost in line with the reported 36.2% reduction in the therapeutic oncology service utilization in 2020 in Egypt [14]. This result is similar to a Netherlands study stating that 30% of cancer patients reported the occurrence of consequences for their treatment and hospital visits as a result of COVID-19 [18]. In other developed countries however, higher results were reported. For instance, 50% of cancer patients and survivors in the United States [19] and 42% in Australia [16] reported impact to their cancer care due to the pandemic.

Care adjustments in our study were less likely to occur when the location of healthcare facility was in governorate other than that of patients' residence. This finding could be explained by first, for far-living patients, it is unfeasible for service providers to deliver oral treatment to patients at home if the routine prescription refill and treatment dispensing visits were cancelled. Second, difficulty in remotely communicating with our patients—given the limited access of many of them to a reliable communication method—besides, most of them did not prefer remote consultations and were keen to come and receive their treatment. Hence, service providers tried to keep the appointments for patients living in other governorates as planned. Contrary to our finding, a Croatian study reported that patients who lived more than 50 kilometers from the hospital were more likely to discontinue their treatment [15]. It is worth saying that none of our patients have discontinued their treatments except for one patient who did not wish to complete the planned radiotherapy course.

4.3. Patients' concerns, beliefs, and knowledge

Although our patients have strong belief in their high probability of contracting COVID-19 infection and almost completely aware of being a high-risk group with greater vulnerability to complications, they were very keen to receive all the treatment as planned and attending their visits during the pandemic—especially those in the treatment stage. This finding could be principally explained by the patients' beliefs that the risk of contracting COVID-19 from cancer care facilities is not higher than that in the community; in addition to their ability to follow hygienic measures and infection control practice. This also indicates that patients' concern about the potential detrimental effect of delaying cancer treatment outweigh that of contracting COVID-19 infection. Egyptian patients seem to not prefer remote consultation as shown by the low proportion of patients who felt safer with it than with hospital visits. With patients not favoring remote consultations, absence of direct communication with physicians may affect such patients' sense of security and well-being. This finding could raise a concern about telemedicine and its approbation among Egyptian patients.

During the pandemic, cancer patients were highly concerned about their nutrition, immune boosting, and methods of COVID-19

transmission and infection control more than following the daily reports of cases and deaths. This finding indicates a positive attitude towards life. Patients also tend to use the national sources of information, either the Ministry of Health webpage or the ordinary mass media, more than the international sources. Accordingly, it is important to maintain continuous access to accurate, adequate, and updated information through such sources to close the knowledge gap.

4.4. Strength and limitations

To our knowledge this work is the first in Egypt to address healthcare provision during COVID-19 pandemic from the patients' point of view. The study included patients from different Egyptian regions and affiliated to different types of healthcare facilities. The aspect of patient's perspective is important to be explored—considering the regional and cultural differences—to add value to the growing knowledge of the impact of such pandemic. However, this study has some limitations. First, our method of data collection did not enable selection of a random and representative patients' sample. The lack of well-established national cancer registry with full patients' contact data to reach them personally has prevented us from taking such a sample. Due to the conditions of partial lockdown, stay-at-home instructions, and social distancing during the period of the study conduct, we could not do the survey by interviewing the patients. The resulting increased use of social media due to lockdown made us to decide reaching our sample through the available social media patients' groups. Hence, we obtained a convenience sample of internet users only that were mostly highly educated. Second, a limited number of participants were included considering our population of cancer patients. In the beginning, we were expecting a greater number of participants based on the high number of social media users in Egypt (42 million) [20] but unfortunately this did not happen. The culture of participating in online research is not common in the Egyptian society. However, the results obtained can represent Egyptian cancer patients in relation to the care adjustments, but only represent the opinion and the level of knowledge of an educated group of them.

5. Conclusion

Cancer care adjustments in consequence of COVID-19 pandemic was not commonly reported (~30%) by our patients; and primarily occurred in care provision rather than treatment plan and when longer than a year has elapsed from the date of diagnosis. In general, patients believe that this pandemic has negative impact on the quality of their care and on the treatment outcome. However, COVID-19 infection and its consequences are much less appreciated than the concern about their cancer. The effects of a pandemic on healthcare systems are unavoidable, but it is critical to provide continuity of care to cancer patients in addition to ensuring psychological and emotional support during this pandemic and in further similar situations.

Policy statement

Considering the encouraging technological advancement, enhancement of the application of telemedicine might be beneficial for cancer patients particularly in the follow up stage. Such a change may need revision of practice guidelines and establishment of a policy for more patient engagement—as essential stakeholders—and the promotion of their telemedicine experience. To ensure continuity of care, more investment in the establishment of specialized cancer care facilities that apply the end-to-end care pathway (primary prevention, diagnosis and staging, treatment, and surveillance) may be justified as a policy to heighten the pandemic resilience for cancer care in Egypt.

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CRedit authorship contribution statement

Conception and design: Aalaa M. Abdou, Ahmed H. Abdelaziz; Literature search: Sahar Khalil, Aalaa M. Abdou; Questionnaire design and revision: Aalaa M. Abdou, Sali A. Al-Yamani, Sahar Khalil; Data Collection: Aalaa M. Abdou, Mohamed Atef, Mohamed Yassin, Ahmed H. Abdelaziz; Data management, analysis and interpretation: Sahar Khalil; Writing – original draft: Aalaa M. Abdou, Sahar Khalil; Review and editing: Ahmed H. Abdelaziz, Mohamed Yassin, Sahar Khalil; Final approval of manuscript: All authors.

Declarations of interest

None.

Data Availability

The data supporting this study findings are available from the corresponding author upon reasonable request.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.jcpc.2022.100359](https://doi.org/10.1016/j.jcpc.2022.100359).

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