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ORIGINAL ARTICLE

Mitigation of patients with hematological disorders during the COVID-19 pandemic through telemedicine: the physician's perspectives

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ABSTRACT

Background: Patients with hematological disorders are among the highly affected patient groups during the COVID-19 pandemic worldwide. Therefore, this study aimed to evaluate how physicians mitigated patients with hematological disorders during the COVID-19 pandemic in Saudi Arabia. In addition, the impact of the lockdown on hematologists and their recommendations according to their current experience was also assessed.

Methods: This was a questionnaire-based cross-sectional survey conducted among 62 hematologists in Saudi Arabia during the COVID-19 pandemic from 6th to 29th June 2020.

Results: The most common method of contact between physicians and their patients was the use of actual and virtual clinics and WhatsApp (22.6%). In addition, the most common cases that contacted the physicians were those suffering from hematological malignancies (such as lymphoma and leukemia) (37.1%), followed by sickle cell anemia (17.7%). Interestingly, majority of patients had contacted their physicians for general concerns (41.9%), followed by assurance purposes (35.5%). Furthermore, 53.2% of the physicians were satisfied with the experience of handling patients during curfew. Around 71% of the physicians thought that social media had a positive impact on communication with their patients, which was significantly correlated with male participants and those in the age group of 46-55 years (*p*-values 0.03 and 0.002, respectively).

Conclusion: Telemedicine is one of the most useful solutions utilized during the COVID-19 pandemic. However, it needs to be improved and should be used routinely as a part of the healthcare system in Saudi Arabia.

Keywords: Hematologists, hematological disorders, COVID-19, telemedicine, Saudi Arabia.

Introduction

Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) is a novel coronavirus of zoonotic origin, which was identified at the end of 2019 in Wuhan, China, and eventually spread all over the world [1,2]. Till now, there is no approved treatment available for COVID-19 and the management is empirical [3]. Many countries have taken strict measures, like social distancing, quarantine, and lockdown, to protect and prevent further spread of the virus [4]. For instance, curfew is a major step for the management of COVID-19 pandemic as it mitigates the spread of the disease among individuals [5].

According to the Ministry of Health (MOH) of Saudi Arabia, the first case of COVID-19 was detected on 2nd March 2020 in a citizen who had returned from abroad [6]. The lockdown in the Kingdom of Saudi Arabia was gradually implemented, starting as a partial curfew (i.e., individuals were allowed to go outside of their houses only from 6 am to 3 pm) that lasted for 3 weeks. Furthermore, full curfew (i.e., individuals were

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not allowed to go outside of their houses for 24 hours) was implemented, which lasted for 8 weeks. Then, partial curfew was applied again, following an ease of restrictions and opening of some public and commercial activities with precautions and preventive measures [7].

It was reported that the risk of severe COVID-19 illness was higher in immunocompromised patients, such as acute leukemia patients, who were receiving chemotherapy [8]. For instance, a recent study found that cancer patients had a higher risk of developing severe events, such as ICU admission, invasive ventilation, or death, compared with non-cancer patients [9]. Public health measures implemented to control the disease spread were aimed at decreasing preventable hospital admissions and elective procedures [10].

In Saudi Arabia, hospitals implemented several strategies to reduce potential infectious hazards, and patients were advised to limit hospital visits according to the instructions received from their medical team. Hence, physician-patient communication became affected due to current circumstances. Subsequently, some electronic applications, such as WhatsApp and Zoom, were used as an alternative to minimize the impact of this pandemic [11]. Furthermore, the physicians were encouraged to cooperate and benefit from the experiences of each other [12]. Therefore, this study aimed to evaluate how physicians mitigated hematological disorder patients during the COVID-19 pandemic in Saudi Arabia. In addition, the impact of the curfew on hematologists and their recommendations according to their current experience was also assessed.

Subjects and Methods

This cross-sectional survey was conducted among 62 hematology physicians in Saudi Arabia during the COVID-19 pandemic from 6th to 29th June 2020. Data were collected either by direct contact, via telephone, or ZOOM application. Data from 39 participants were collected via a web-based questionnaire using Google Forms which was distributed through WhatsApp, Twitter, and e-mail. Participants were from different hospitals, hematology subspecialties, and experiences. Clinical hematologists of both genders working in Saudi Arabia were included in the study; however, non-clinical hematologists or non-Saudi clinicians were excluded.

A predesigned questionnaire was used that included questions to assess the effect of the COVID-19 outbreak on physician-patient communication during the curfew. Phone calls were interactive, and physicians shared their recommendations and pieces of advice for any similar situation for the future. The questionnaire consisted of 21 questions, which was divided into four sections. Data were coded, tabulated, and analyzed using Statistical Product and Service Solutions version 20 (Armonk, NY: IBM Corp.). Qualitative data were expressed as numbers and percentages, and chi-squared (χ^2) test was applied to test the relationship between variables. A p-value of < 0.05 was considered to be statistically significant.

Results

This study surveyed 62 clinical hematology physicians of both genders and different ages. Furthermore, the surveyed physicians were from almost every medical institution in Saudi Arabia and embodied all clinical hematology subspecialties (Table 1).

When physician-patient communications was assessed, it was found that the most common method of contact between physicians and their patients was using actual and virtual clinics and WhatsApp (22.6%). Most of the participants (54.8%) reported more than one method for patient management and 41.9% mentioned that patients had contacted them for general concerns (Table 2).

It was also found that 53.2% of the participants were satisfied with the experience of handling patients during curfew and 71% found it effective to be repeated in case of any similar situation (Table 3).

The physicians were also assessed for their advice and opinions in case of any similar situation in the future. The pieces of advice were classified into three categories: first, piece of advice to patients; second, piece of advice to other physicians; and third, piece of advice to the decision-makers (Table 4).

Furthermore, participants' attitudes toward giving permissions to patients, using social media, and its impact on communication with patients were also assessed, as shown in Table 5.

When the relationship between participants' characteristics and their satisfaction with their experience of handling patients during the curfew was analyzed, a non-significant relationship was found between the participants' characteristics (i.e., gender, age, years of

Table 1. *Demographic information of the surveyed physicians (n = 62).*

Demographic characters	Frequency (%)
Gender	
Male	40 (64.5)
Female	22 (35.5)
Age	
≤35	14 (22.5)
36-45	25 (40.3)
46-55	15 (24.1)
≥ 56	8 (21.9)
Institution (Affiliation)	
MOH Hospitals	13 (20.9)
Specialist Hospitals	15 (24)
University Hospitals	10 (16)
National Guard Hospitals	7 (11.2)
Armed Forces Hospitals	7 (11.2)
Security Forces Hospitals	4 (6.5)
Others	6 (9.6)
Years of experience	
≤5	12 (19.4)
6-10	16 (25.8)
11-15	10 (16.1)
16-20	9 (14.5)
≥ 20	15 (24.2)
Position	
Consultant	54 (87.1)
Specialist	7 (11.3)
Resident	1 (1.6)

Table 2. *Assessment of physician-patient communication according to methods of contact with patients, type of work, common cases contacted, methods of management, and type of patients (n = 62).*

Variables related to physician-patient communication	Frequency (%)
How did you contact patients?	
Actual clinic	4 (6.5)
Virtual clinic	6 (9.7)
Both actual and virtual clinics	7 (11.3)
WhatsApp and phone calls	9 (14.5)
WhatsApp and virtual clinics	2 (3.2)
Actual and virtual clinics and WhatsApp	14 (22.6)
Phone calls	4 (6.5)
Actual and virtual clinics and phone calls	7 (11.3)
Virtual clinics, WhatsApp and phone calls	5 (8.1)
Actual clinics, WhatsApp and phone calls	2 (3.2)
Virtual calls	2 (3.2)
What was your type of work?	
Voluntary	12 (19.4)
Paid	33 (53.2)
Both	17 (27.4)
What are the most common cases that contacted you?	
Hematological malignancies (such as lymphoma and leukemia)	23 (37.1)
Sickle cell anemia cases	11 (17.7)
Other benign hematology cases	7 (11.3)
Thrombophilia, HLH, ITP, VTE	8 (12.9)
All hematology cases	13 (21)
For what reasons patients contacted you?	
Emergent	4 (6.5)
Urgent	10 (16.1)
Assurance	22 (35.5)
General concern	26 (41.9)

Table 3. *Assessment of physician's experience in terms of their satisfaction and appropriate method to contact patients during the curfew (n = 62).*

Variables related to physician's experience	Frequency (%)
How satisfied were you with the experience of handling the patients during the curfew?	
Satisfied	33 (53.2)
Not satisfied	29 (46.8)
Did you find it effective that you would repeat it in the future?	
Effective	44 (71)
Not effective	18 (29)
What is the most appropriate method to contact the patients during a curfew in your opinion?	
Virtual clinics	40 (64.5)
WhatsApp	4 (6.5)
Actual clinic if needed	9 (14.5)
Others	9 (14.5)
How did you manage your patients?	
Medication-related	34 (54.8)
Non-medication-related	28 (45.2)

experience, and position) and their satisfaction with their experience (Table 6).

Additionally, a non-significant relationship was also found between participants' characteristics and participants' opinions about the effectiveness of their experience (Table 7).

Moreover, a non-significant relationship was also found between participants' characteristics and their opinion about the most appropriate method to contact patients during the curfew (Table 8).

Finally, the relationship between participants' characteristics and their opinion about the impact of social media on communication with their patients was analyzed. Interestingly, male participants and those in the age group of 46-55 years significantly correlated with those who saw that social media has a positive impact on communication with their patients, with *p*-values of 0.03 and 0.002, respectively. However, there was no significant correlation with the other participants' characteristics (Table 9).

Discussion

This study demonstrated that hematologists, who participated in the current study's survey, were successful in mitigating the communication gap with hematological disorder patients during the COVID-19 pandemic in Saudi Arabia. The physicians involved in this study were chosen carefully to represent the impact of the COVID-19 pandemic on the practice of clinical hematology in Saudi Arabia. The satisfaction of physicians during the COVID-19 pandemic is one of the main indicators for the feasibility of rapid expansion of telemedicine [13]. More than half of the physicians were satisfied with the experience of handling patients during the curfew, which indicated a greater opportunity for expanding and improving the practitioner's satisfaction and experience. This level of satisfaction was good due to the implementation of novel alternative communication methods, such as virtual clinics. A similar high satisfaction rate was documented among physicians treating head and neck cancer patients, as well as physicians in child neurology care [14,15]. Participants in the current study agreed with other studies on the requirement for further improvement of virtual clinics.

One of the main measures to reduce the impact of the COVID-19 pandemic on patients and healthcare providers was to identify the risk groups and to reduce the load on the healthcare system. A recent cross-sectional study was conducted in Latin America, which looked into the impact of the COVID-19 pandemic on pediatric cancer care [16]. Vasquez et al. [17] showed that healthcare systems were not substantially affected in Latin America, which was consistent with the current study's observations. Despite these encouraging reports, it is likely that if the pandemic evolves, the burden on the healthcare system would increase and the impact might become serious or even severe if preventive measures are not taken.

There are at least three published letters (correspondence) in which it was discussed how this COVID-19 pandemic would affect patients with hematological disorders [17-19]. However, these letters were derived from the experts' point of view without surveying the physicians who were at the frontline and faced different scenarios. Almost all physicians agreed that managing patients' concerns were very challenging for two main reasons. Firstly, the load on the physicians was high; most of the patients were contacting the physicians for reassurance or for questions that could be answered by other healthcare providers, such as pharmacists (i.e., questions about how to use a medication). Secondly, physicians commented on their concerns regarding the patient's compliance as many of the problems were not controlled

Table 4. *Summary of the main physicians' suggestions in case of future curfews.*

Target	Suggestion
Advice to the patients	Go to the hospital whenever you feel that your symptoms are worsening. Always be cautious and follow protective measures (mainly wearing masks, washing hands, distancing from others). Never skip your hospital appointment and/or the dose of your medication (unless you are advised to do so by your physician). Follow the instructions provided by your physicians and/or the official medical channels, such as MOH. In case you have reassurance questions, please avoid unnecessary hospital visits and respect physician time (i.e., call or message during allocated times).
Advice to other physicians	Keep learning, stay positive, and be flexible. Phone calls are not ideal. Get trained on the updated virtual clinic applications. Stay in contact with your patients. Communicate with each other and benefit from others' medical field experiences.
Advice to the decision-makers	Send awareness messages to each specific segment of patients. Activate primary healthcare clinics (run by family medicine consultants) to reduce the referral to specialized physicians. Establish a logistic support unit or department that can help with patients concerns, such as how to request permission, follow-up the delivery of medications, as well as reassure the patients with their general concerns. Generate patient's electronic file for physicians to look for historical investigations, laboratory results, medications etc. Establish high-level virtual clinics and educate the patients about the virtual clinic. Solve the logistics for medication delivery and the availability units of blood for blood transfusion.

Table 5. *Participants' attitudes toward giving permissions to patients, using social media, and its impact on communication with patients (n = 62).*

Variables related to participants' attitude	Frequency (%)
Do you think that the permission should be obtained directly from the physicians? Yes No	 32 (51.6) 30 (48.4)
Do you suggest permanent permission to be given to patients during the curfew? Yes No If yes, who are those patients? (No.:21) High-risk patients Hematological malignancies All patients	 21 (33.9) 41 (66.1) 4 (19) 15 (71.4) 2 (9.5)
Do you use social media? Yes No	 53 (85.5) 9 (14.5)
What do think regarding the impact of social media on communication with your patients? Positive Negative	 44 (71) 18 (29)

Table 6. *Relationship between participants' characteristics and their satisfaction with their experience of handling patients during the curfew (n = 62).*

Variable	How satisfied were you with the experience of handling the patients during the curfew?		χ^2	*p*-value
	Satisfied frequency (%)	Not satisfied frequency (%)		
Gender Male Female	 23 (57.5) 10 (45.5)	 17 (42.5) 12 (54.5)	0.82	0.36
Age ≤35 36-45 46-55 ≥56	 2 (22.2) 15 (55.6) 11 (57.9) 5 (71.4)	 7 (77.8) 12 (44.4) 8 (42.10 2 (28.6)	4.63	0.2
Years of experience ≤5 6-10 11-15 16-20 ≥20	 3 (25) 8 (50) 6 (60) 7 (77.8) 9 (60)	 9 (75) 8 (50) 4 (400 2 (22.2) 6 (40)	6.54	0.16
Position Consultant Specialist Resident	 29 (53.7) 3 (42.9) 1 (100)	 25 (46.3) 4 (57.1) 0 (0.0)	1.18	0.55

by the patients, specifically the delay in medication delivery and the lack of blood donors. Fear of contracting COVID-19 infection played a major psychological role, for example, avoiding hospital visits even if the patients had concerning symptoms or skipping few doses of scheduled medication to avoid visiting the pharmacy for a medication refill. There are many studies which reported that the psychological impact of the COVID-19

Table 7. *Relationship between participants' characteristics and their opinion about the effectiveness of their experience (n = 62).*

Variable	Did you find it effective and that would you repeat it in the future?		X^2	p-value
	Effective frequency (%)	Not effective frequency (%)		
Gender Male Female	 26 (65) 18 (81.8)	 14 (35) 4 (18.2)	1.94	0.16
Age ≤35 36-45 46-55 ≥56	 5 (55.6) 20 (74.1) 14 (73.7) 5 (71.4)	 4 (44.4) 7 (25.9) 5 (26.3) 2 (28.6)	1.23	0.74
Years of experience ≤5 6-10 11-15 16-20 ≥20	 6 (50) 13 (31.3) 8 (80) 7 (77.8) 10 (66.7)	 6 (50) 3 (18.8) 2 (20) 2 (22.2) 5 (33.3)	4.11	0.39
Position Consultant Specialist Resident	 39 (72.7) 4 (57.1) 1 (100)	 15 (27.8) 3 (42.9) 0 (0.0)	1.1	0.57

Table 8. *Relationship between participants' characteristics and their opinion about the most appropriate method to contact patients during the curfew (n = 62).*

Variable	What is the most appropriate method to contact the patients during a curfew in your opinion[a]				X^2	*p*-value
	A frequency (%)	B frequency (%)	C frequency (%)	D frequency (%)		
Gender Male Female	 28 (70) 12 (54.5)	 6 (15) 3 (13)	 2 (5) 2 (9.1)	 4 (10) 5 (22.7)	2.49	0.47
Age ≤35 36-45 46-55 ≥56	 6 (66.7) 14 (51.9) 16 (84.2) 4 (57.1)	 0 (0.0) 3 (11.1) 1 (5.3) 0 (0.0)	 1 (11.1) 4 (14.8) 2 (10.5) 2 (28.6)	 2 (222) 6 (22.2) 0 (0.0) 1 (14.3)	9.32	0.4
Years of experience ≤5 6-10 11-15 16-20 ≥20	 9 (75) 8 (50) 6 (60) 6 (66.7) 11 (73.3)	 2 (16.7) 5 (31.3) 2 (20) 0 (0.0) 0 (0.0)	 0 (0.0) 1 (6.3) 0 (0.0) 2 (22.2) 1 (6.7)	 1 (8.3) 2 (12.5) 2 (20) 1 (11.1) 3 (20)	13.6	0.32
Position Consultant Specialist Resident	 34 (63) 5 (71.4) 1 (100)	 4 (7.4) 0 (0.0) 0 (0.0)	 8 (14.8) 1 (14.3) 0 (0.0)	 8 (14.8) 1 (14.30 0 (0.0)	1.15	0.97

[a]A = Virtual Clinics, B = WhatsApp, C = Actual clinic if needed, D = Others.

Table 9. *Relationship between participants' characteristics and their opinion about the impact of social media on communication with their patients (n = 62).*

Variable	Impact of social media on communication with your patients		X^2	*p*-value
	Positive frequency (%)	Negative frequency (%)		
Gender Male Female	 32 (80) 12 (54.5)	 8 (20) 10 (45.5)	4.46	**0.03***
Age ≤35 36-45 46-55 ≥56	 3 (33.3) 17 (63) 19 (100) 5 (71.4)	 6 (66.7) 10 (37) 0 (0.0) 2 (28.6)	14.8	**0.002***
Years of experience ≤5 6-10 11-15 16-20 ≥20	 8 (66.7) 9 (56.3) 8 (80) 6 (66.7) 13 (86.7)	 4 (33.3) 7 (43.8) 2 (20) 3 (33.3) 2 (13.3)	4.06	0.39
Position Consultant Specialist Resident	 39 (72.2) 4 (57.1) 1 (100)	 15 (27.8) 3 (42.9) 0 (0.0)	1.1	0.57

*Statistically significant.

pandemic is worsening with time, which might cause paralysis in the healthcare system [20-22].

MOH and other health organizations in Saudi Arabia played a great role in providing a wide range of awareness and information about the pandemic. However, these efforts were limited to the protection from COVID-19 transmission, which was not only related to the required information for patients with hematological disorders. For instance, patients with hematological disorders require personalized information regarding many aspects, such as their medication, which might reduce the immune system and make them more prone to SARS-CoV-2 infection. To partially solve this issue, some of the interviewed physicians used social media (mainly Twitter) with an aim to provide helpful information for patients with hematological disorders and to answer their questions. Therefore, it was found that the positive impact on communication with patients through social media was significantly correlated with male physicians and those in the age group of 46-55 years. However, it was strongly believed that a more appropriate platform must be implemented to fill this gap and work proactively.

Curfew during the COVID-19 pandemic affected logistic supply as well as the delivery of many goods and medications to its target areas. Medication-related issues were the main concern of the interviewed physicians. For instance, there are multiple consequences due to the delay of medication delivery that might lead to the deterioration of the patient's health and it might create a high probability of hospitalization. It was believed that a thorough plan must be drawn up and implemented to solve this problem. The plan should include a protocol for early identification of any potential delay and clearly defined alternatives. These alternatives might include shipping of the medication with another agency or collaborating with other pharmacies (government or private) to supply patients who are near to them whenever needed or offering a refund for the patients to buy the medication from their nearest pharmacy. Another issue that was found in the current survey was the severe deficiency in the units of blood for patients who required frequent transfusions. Thereby, this issue also needs to be addressed to the experts in the blood supply centers.

Telemedicine is one of the most useful solutions utilized during the COVID-19 pandemic. In the literature, there are many definitions for telemedicine; however, all were adopted by the World Health Organization [23]. In other studies, telemedicine is described as telehealth or virtual clinics [17,18]. In Saudi Arabia, many initiatives were aimed at implementing telemedicine services all over the kingdom since 2018. For instance, MOH released an application (called Seha) that provided visual medical consultations and allowed face-to-face communications with the physicians [24]. This important initiative was accompanied by the release of Telemedicine Regulations in the Kingdom of Saudi Arabia by the National Health Information Center in the Saudi Health Council [25]. Telehealth in Saudi Arabia was underutilized based on the observations of the current study and previous studies [26,27]. It was believed that COVID-19 pandemic will accelerate the utilization of telehealth. However, the potential value of telehealth during and after COVID-19 should not be underestimated, as it provided an opportunity to monitor the health of a significant proportion of patients, and the service could still be provided if physicians were self-isolated [28].

The healthcare system in Saudi Arabia was actively in transformation stage before the COVID-19 pandemic occurred. One of the main pillars of this transformation plan was to improve the efficiency and effectiveness of the system through the maximum implementation of information technology (IT) and digital transformation [29,30]. In the current study, it was observed that the healthcare system was not extremely affected as it was predicted and that is largely due to the previous investments in the IT and digital transformation. As mentioned earlier, Saudi Arabia released the telemedicine regulations 2 years ago and it turns out to be one of the most successful initiatives that were helpful during the COVID-19 pandemic. On the other hand, it is also shown in this study that more work needs to be carried out to improve the delivery of telemedicine in Saudi Arabia.

The major strength of this study was its geographical coverage and the coverage of almost all subspecialties of hematology, with responses from physicians representing all healthcare providers in Saudi Arabia. However, the main limitation was the imbalanced number of participants between healthcare providers, making it difficult to be compared across healthcare sectors.

Conclusion

More than half of the physicians were satisfied with the experience of handling patients during the curfew. It was also found that most of the hematology physicians agreed that managing patient's concerns was exhausting during the pandemic, for several reasons, and the most important of them was due to the high load on the physicians. Besides, delaying the delivery of medications had created a problem. Furthermore, telemedicine is one of the most useful solutions utilized during the COVID-19 pandemic; however, it needs to be improved and should be used routinely as a part of the healthcare system in Saudi Arabia.

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List of Abbreviations

COVID-19	Coronavirus disease 2019
ICU	Intensive care unit
IT	Information technology
MOH	Ministry of Health
SARS-CoV-2	Severe acute respiratory syndrome coronavirus-2

Conflict of interest
The authors declare that there is no conflict of interest regarding the publication of this article.

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Consent to participate
Informed consent was obtained from all participants.

Ethical approval

Ethical approval was obtained for the study from the Research Ethics Committee of the College of Applied Medical Sciences at Taibah University via letter number SREC/AMS 2020/64/ CLD dated: 09/06/2020.

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