




Pediatric Diabetes Services in Arab Countries during the First 6 Months of the COVID-19 Pandemic

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Abstract

Introduction The novel coronavirus disease 2019 (COVID-19) pandemic had an impact on different health services due to the lockdowns, curfews, or reducing provision of some clinical services to infection control.

Aims This study looked at the impact of the pandemic on the pediatric diabetes services in Arab countries during the first 6 months of pandemic.

Methods and Material An online survey using SurveyMonkey was e-mailed to the pediatric endocrine consultants practicing in Arab countries. The survey was active for the last 2 weeks of August 2020.

Results Responses received from 34 consultants. Most responses were from Saudi Arabia, Iraq, and Oman. 18% of consultants have more than 500 pediatric patients with type-1 diabetes mellitus (T1DM) under each of their care. A quarter of responding consultants had suspended their clinics completely during the pandemic period. The median number of children live with diabetes used to be seen in diabetes clinics has dropped significantly from 22 to only 4 patients per week during the pandemic. Half of respondents fed back those virtual clinics were useful. The number of elective and urgent admissions during the studied period were less than before the pandemic. A total of 17.6% of responders reported an increased incidence of Diabetic Ketoacidosis (DKA) during the pandemic. Also, 36.4% thought the research activity had markedly decreased during the COVID-19 pandemic.

Conclusion The pandemic has led to reducing the number of patients attending the diabetes clinic in Arab countries. However, virtual clinics and tele-consultations emerged evidently during the pandemic. It is expected to continue using the virtual clinics when the pandemic is over.

Keywords

- ▶ Arab
- ▶ children
- ▶ COVID-19
- ▶ diabetes
- ▶ services

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Introduction

Novel coronavirus disease 2019 (COVID-19), a disease caused by the coronavirus severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2), has emerged as a rapidly spreading communicable disease that affected more than 100 countries across the globe.¹ The implemented safety measures to contain the spread of the infection, such as curfews and lockdowns, had impacted the access to different health care services including the pediatric diabetes services.² In the first few months of the pandemic, some centers had to cancel their nonurgent clinical appointments, and in other centers, the patients stopped attending their clinics due to the fear of contracting the infection. Overall, there was a disturbance of the provided outpatient care.

The World Health Organization had previously forecasted a global deficit of approximately 18 million health care workers.³ Therefore, with such a pandemic crisis, the shortage is certainly going to have an impact. The health care services in Arab countries are widely diverse, and the population of each country is hugely different, as well as infrastructure and resources. Saying that, we wanted to study the impact of the COVID-19 pandemic on the service delivery for young patients live with type-1 diabetes mellitus (T1DM) in different Arab countries during the first 6 months of the pandemic.

This study highlights the response of many diabetes teams to the pandemic, and it addresses some issues for which it is going to participate in helping the relevant decision makers on how to increase the preparedness for facing future waves of this pandemic or other disasters. This study will shed the light on the adoption of telehealth and digital diabetes care in enabling health care providers to reach their patients in Arab region. This pandemic has forced many teams to reconsider the ways in which effective diabetes management can be delivered during challenging times.⁴

Telemedicine in which the health care services are delivered remotely via digital platforms, benefiting from the advancement in technology was recommended by number of health care providers during the pandemic,⁵ as it reduces the risk of infection spread hence protecting the health care professionals and on the same time, it helps managing and monitoring patients' conditions.⁶ In one global survey that recruited over 7,000 participants live with T1DM from 89 countries, a positive perception was found for remote appointments. Three quarters of participants consider continuing of telemedicine beyond the pandemic.⁷ Telemedicine became a standard of care in some centers around the world, including the delivery of pediatric diabetes care.⁸

Methods

Study Design

A cross-sectional study was performed over last 2 weeks of August 2020. An electronic survey using commercial software (SurveyMonkey SVMK Inc., San Mateo, California, United States) was used. A software that helps in analyzing data, once responses are received by participants. The survey

was e-mailed to 89 practicing consultant endocrinologists, members of the Arab Society of Pediatric Endocrinology and Diabetes (ASPED), who are on the authors' database and personal medical contacts on authors' social media. An invitation was sent with an explanation of the purpose of this study, and consent was obtained before the data entry. One reminder was sent a week after e-mailing the questionnaire for first time. The survey service automatically blocked submissions from the same used electronic device to prevent duplicated responses from the same person.

Survey Questions

The questions were written in English, the language used by all invited consultants. They were developed de novo in nature, trying to cover the objectives of this study. The survey included four main domains as follows: (1) scope of provided pediatric diabetes service, (2) impact of the pandemic on the provided service including the move toward telemedicine, (3) newly diagnosed patients with diabetes mellitus during the pandemic, and (4) impact of the pandemic on pediatric diabetes research activities. Additional questions were asked to determine some demographics.

Data Management and Statistical Analysis

Anonymous responses were received. They were stored electronically by the survey service which is accessible by password protected credentials. Results were analyzed by quantitative methodology. Simple descriptive analysis was used.

Results

Demographics

Responses received from 34 consultants in pediatric endocrinology from 10 different Arab countries including: (Bahrain, Egypt, Iraq, Kuwait, Libya, Oman, Qatar, Saudi Arabia, Sudan, and United Arab Emirates), most responses were from Saudi Arabia (38.24%), followed by Iraq (20.59%) and Oman (11.76%). Single response was received from some countries in which it is not necessarily reflective on the clinical practice of that country which considered to be one of the study limitations. Overall response rate to this survey was 34/89 (38%). All responding consultants cover inpatient and outpatient pediatric diabetes service.

The vast majority of respondents (82%) work in government sector, tertiary or university hospitals. A third of responded clinicians (11/34) reported that each of them is looking after 51 to 100 pediatric patients live with T1DM, whereas for 18% (six consultants), each of them is following-up more than 500 pediatric patients with T1DM (– Fig. 1).

Impact of COVID-19 Pandemic on Diabetic Service Provision

The number of diabetes clinics had markedly changed during the pandemic. Comparing with pre-COVID-19 era as shown in – Fig. 2, 10% of responders used to run five clinics per week that had dropped to only 3% during the pandemic, and 24% of the consultants were running three clinics per week in prepandemic that reduced to 6% during the pandemic. A quarter of this group of

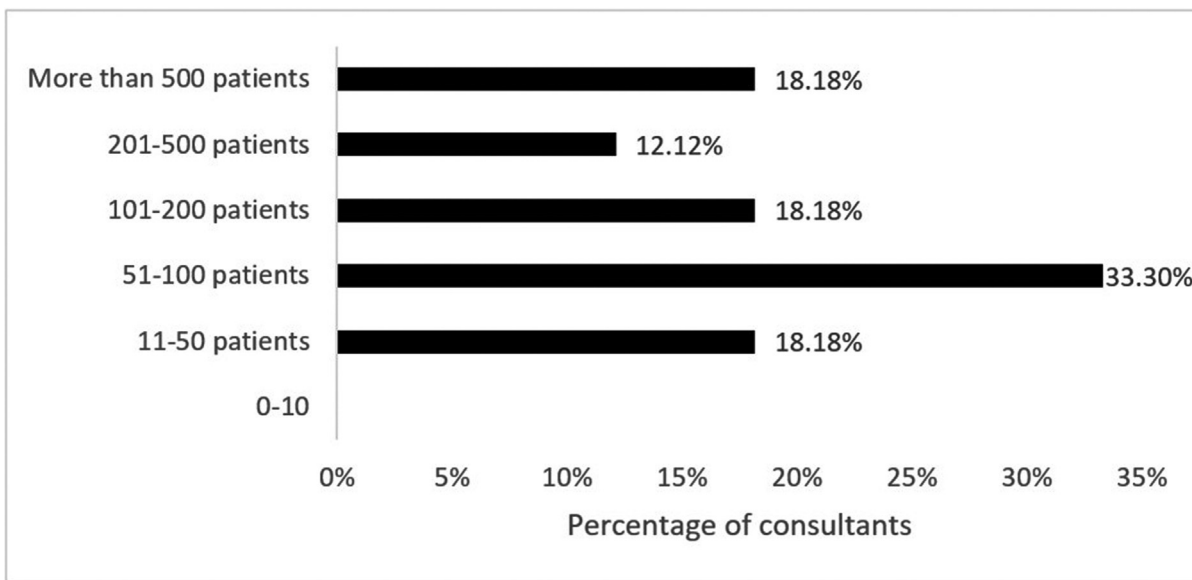


Fig. 1 Number of patient live with T1DM under care of each responding consultant. T1DM, type-1 diabetes mellitus.

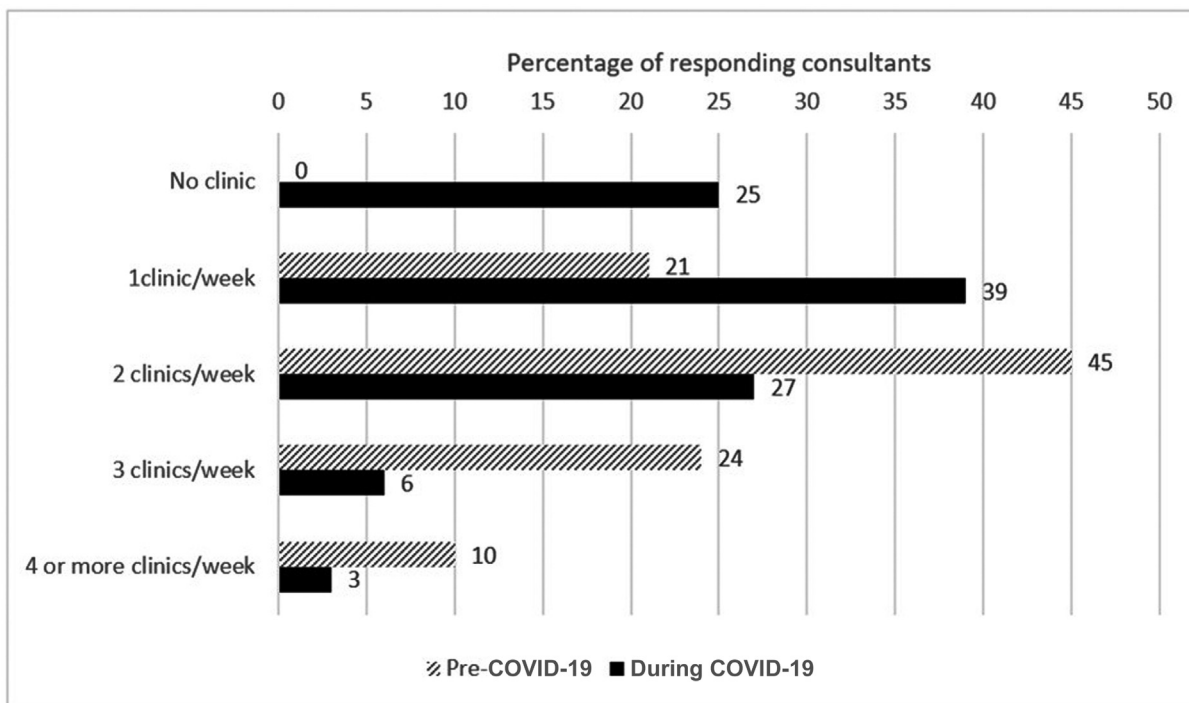


Fig. 2 Number of diabetes clinics pre-COVID-19 and during the first 6 months of the pandemic. COVID-19, novel coronavirus disease.

consultants (24%) had suspended their clinics completely during the pandemic period. The median number of children live with diabetes used to be seen by each pediatric diabetes consultant in clinic weekly has dropped significantly from 22 to only 4 patients per week during the pandemic. That was like 82% reduction of outpatient clinic activities.

Communication with Patients during the Pandemic

During the first 6 months of the pandemic, 70% of the centers had either started physician-led new remote consultation service via telecommunication or had increased sessions of

their preexisting ways of contacting patients, such as using messages, whereas 30% of centers responded by increasing the number of nurse-led remote consultations.

Also, 81.8% of the respondents used telephone consultations, 51.5% used WhatsApp/Viber/Skype to contact their patients, 36.4% initiated video calls, and 27.3% had e-mailed their patients in response to their queries to provide the required support.

Video-Based Virtual Clinics

Clinicians have used different applications for video-based virtual clinics, the majority chose Zoom, followed by Viber,

WhatsApp, Google Meet, Microsoft Teams, Cisco, Anat applications, and only one center used Skype to communicate.

Regarding the challenges of launching virtual clinics, 43% of the respondents faced no real challenges, while 57% agreed that they faced some difficulties while starting virtual clinics. However, the majority managed to overcome all those challenges, resolved them, and proceeded with using the virtual clinics, only two consultants responded that it was not possible to progress, and the reasons were mainly related to the acceptance of patients and their families to this new concept, as the patients felt uncomfortable to use video teleconferencing or otherwise the unavailability of the basic settings to run video-based virtual clinic such as electricity and internet connection.

Also, 45.5% of consultants were able to carry on their video-based virtual clinics from their homes, whereas 33.3% from their actual clinics and 21.2% from their offices.

Almost half (45.5%) of respondents fed back that virtual clinic was useful and 24.5% said that it was very useful. Therefore, the vast majority (70%) talked about the usefulness of this tool of communication with the patients. In contrast, 21.2% of responders either had no opinion or had not used the virtual clinic, so they could not evaluate its usefulness. Only three consultants (9% of respondents) thought it was not a useful experience.

Future Use of Virtual Clinics Postpandemic

There was overall optimism on continuing to use the virtual clinics in the future, when the pandemic is over. Majority of clinicians are willing to use them either definitely (45.5%) or possibly (42.4%) or only if deemed necessary (6.1%). Only minority of consultants (6.1%) decided not to use this method of consultation in the future (► Fig. 3).

COVID-19 Pandemic and Patients' Dynamics

Generally, the number of elective and urgent admissions during the studied period were less than what it was used to be before the pandemic, 63.6% of respondents had experienced a smaller number of elective admissions for diabetic children. Similarly, 42.4% of the consultants reported less-urgent patients' admissions during the COVID-19 pandemic. Interestingly, eight diabetes care centers reported an increase in number of newly diagnosed cases of T1DM and six centers noticed more Diabetic

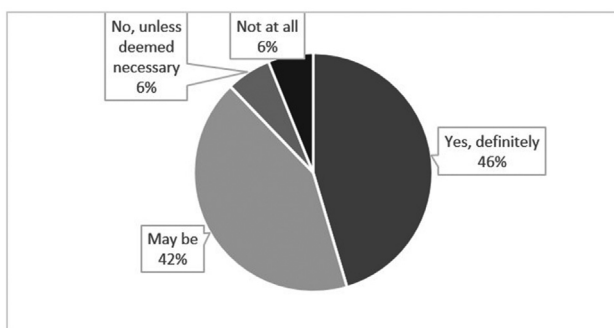


Fig. 3 Opinion of respondents about the possibility of continuing usage of virtual clinics in future (post-COVID-19 era). COVID-19, novel coronavirus disease.

Ketoacidosis (DKA) admitted cases for their known diabetic patients during the pandemic. Further, 17.6% of responders reported an increased incidence of DKA in children in their centers during the pandemic.

Regarding the incidence of newly diagnosed T1DM patients who tested positive for COVID-19, two centers, one from Saudi Arabia and one from Kuwait, had more than 10 patients each been newly diagnosed with T1DM and tested positive for COVID-19. Other centers had reported a total of six new infected patients, giving a total of approximately 36 newly diagnosed with T1DM patients who tested positive for COVID-19 in the Gulf area during the first 6 months of the pandemic. Saying that, 46.9% of other centers had none of their diabetic patients tested positive for COVID-19.

COVID-19 Pandemic and Its Impact on the Research Activity Related to Pediatric Diabetology

Overall, 36.4% of responders thought the research activity had markedly decreased during the COVID pandemic, and the reasons for this recession are thought by majority (39%) due to the shift of interest in research to COVID-19 rather than diabetes per se, 29% reported research-funding related issues, and 22% of consultants highlighted the fact that clinicians/researchers were directed more toward covering critical care services such as pediatric intensive care and emergency medicine. Minority (16%) thought that the decline in research activities was due to increasing the incidence of staff being off-sick.

Regarding the research funding, half of centers had no issues, and their funding was not affected. However, 43.75% said that funding was restricted in their countries, and furthermore, 6.3% reported that research funding was put on hold in their institutes.

Discussion

Substantive changes in health care services have been implemented to reduce the risk of infection transmission within health care facilities. Physical distancing for example has been applied and enforced, as well as other concepts such as mask wearing and hand hygiene. On the same time, there was a noticeable move toward telehealth provision.^{9,10}

This is the only study so far that oversee the impact of the first 6 months of the pandemic on pediatric diabetes services in Arab countries.

Also, 18% (6/34) of our responded clinicians indicated that each of them is having more than 500 children and adolescents live with T1DM under his or her own direct care, compared with 13% (38/301) of consultants in a study was performed by Elbarbary et al in 2020,¹¹ who surveyed 215 diabetes centers from 75 countries, majority of their responses were from the United Kingdom (35; 16.3%), the United States (20; 9.3%), and India (15, 7%).

In our study, 81.8% of the respondents used telephone consultations compared with 32% from the study by Elbarbary et al.¹¹ Video calls were initiated by 36.4% of our participants compared with 18% of previously mentioned

study. Similar response reported by Forde et al on their pan-European survey with diabetes specialist nurses,¹² their data showed a change in how diabetes nurses interacted with people with diabetes with a shift toward virtual contact, this was mainly by telephone, although the use of video consultations had also increased.

Moreover, 57% of physicians in our study agreed that they faced some difficulties while starting virtual clinics. However, the majority managed to overcome all those challenges and resolved them. Whereas an Australian study by Quigley et al¹³ showed that majority of centers (97%) reporting some degree of difficulty with telehealth setup which may reflect on some logistical difficulties in Australia such as funding difficulties, technological challenges, lack of telehealth training, and limited support to move health care workforces to virtual service. Saying that, it seems the infrastructure in our responding centers is of high standards which allowed an easy transition to virtual clinics when needed.

In our study, the number of elective and urgent admissions during the studied period was less than what it was used to be before the pandemic, 63.6% of respondents had experienced less number of elective admissions, and 42.4% of the consultants reported less-urgent patients' admissions during the COVID-19 pandemic, while the reported results from the study by Quigley et al¹³ indicated 42% of centers had less inpatient admissions; others, that is, 20, 17, and 16% of centers reported decrease in clinical presentations of diabetic ketoacidosis, hypoglycemic emergencies, and hyperosmolar hyperglycemic state, respectively. Obviously, the smaller number of elective admissions was mainly to reduce the risk of contracting the infection. This reflects clearly on how the pandemic had affected the nonurgent clinical services. Saying that, there was a great concern among the physicians as that impact could have potentially be a leading cause for worsening of diabetes management in certain patients.

An increase in the incidence of DKA was reported by 17.6% of the surveyed centers during the first few months of the pandemic, and that was slightly higher than what was reported by Elbarbary et al¹¹ for which 15% of their responders reported an increased incidence of DKA. However, that incidence was lower than another international cross-sectional electronic survey conducted later by Elbarbary et al¹⁴ in which 44% of their respondents reported increased diabetic ketoacidosis episodes in newly diagnosed cases and 30% in established cases. Similarly, Alaqeel et al¹⁵ studied the impact of COVID-19 pandemic lockdown on the incidence of new-onset T1DM and ketoacidosis among Saudi children. In this study, DKA frequency of the newly diagnosed T1DM patients was higher in 2020 compared with 2019 (26 vs. 13.4%).

Our survey revealed that approximately 40 patients from the Gulf area were newly diagnosed with T1DM and at the same time, they tested positive for COVID-19 compared with only 3 patients from the study by Elbarbay et al¹¹ that included bigger number of participant centers. That significant number of newly diagnosed and tested positive for COVID-19 could mean there is a cause-and-effect mecha-

nism between the virus and T1DM in Arabs. Further detailed studies are needed to explore this observation.

Research is fundamental to tackle the pandemic and its consequences.^{16,17} Hence, an exponential increase in the numbers of COVID-19 publications has marked the past couple of years.¹⁸ Different scientific entities have launched initiatives to encourage COVID-19-related research.^{19,20} Funding agencies have also launched calls for research proposals. However, it was challenging for some health care institutions (including medical schools and teaching hospitals) to implement COVID-19-related research due to the unexpected onset of this crisis and its substantial burden on the health care system. Another impact of this pandemic on these institutions could be a disruption of the preexisting research activity.²¹

In our study, 36.4% of responders thought that the research activity had markedly decreased during the COVID-19 pandemic, and the reasons for this recession were thought by majority (39%) due to a shift of interest in research to COVID-19 rather than diabetes per se. On the other side, a study was conducted by Adarmouch et al²¹ in which an online survey among faculty members explored the COVID-19-related research activity, as well as the impact of the pandemic on preexisting research, related challenges, and coping strategies; 58.2% of respondents reported conducting COVID-19-related research, while 40% reported that routine research activities were suspended as a result of the pandemic. Major challenges to research in this context were the clinical activity workload, limited access to patients, and research personnel shortage. In our survey, 29% reported a research funding-related issue is the major obstacle for research activities during the COVID-19 pandemic.

Limitations

This study has some important limitations such as it is a survey based which is naturally indicating that responses are reflecting on physicians' perception rather than real-world data. The small number of respondents is another limitation factor for which it may not necessarily form a strong foundation of data generation and recommendations. The study period was relatively short for which it may reflect on the current rate of participation.

Conclusion

The pandemic has led to decreasing the number of patients attending the diabetes clinic in Arab countries. However, virtual clinics and tele-consultations emerged evidently during the pandemic. Almost half of clinicians were able to run their virtual clinics from home. Overall, the virtual clinics were found useful, and it is expected to be continued in the Arab countries when the pandemic is over.

Authors' Contributions

H.A. conceptualized the research and designed it. H.A. and W.H.A. did the literature review, H.A. collected the data and analyzed the data with help of W.H.A. and K.A.H.

Manuscript was drafted by W.H.A. and edited by H.A. and L.S.A. Final review performed by all authors.

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Conflict of Interest
None declared.

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