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ORIGINAL RESEARCH

Preparedness of Primary Health Care Leaders During COVID-19 Outbreak, Riyadh, Saudi Arabia: A Qualitative Study

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Purpose: Our study aims to explore the preparedness of the frontline leaders of the primary health care (PHC) centres in dealing with the COVID-19 pandemic and to understand their experiences in implementing preventive interventions necessary to routinise health care service delivery.

Methods: A qualitative exploratory study was conducted using in-depth interviews with the participants in English. The interviews were transcribed verbatim, and inductive coding followed by thematic analysis was performed using NVivo version 12.

Participants: Six participants in charge of managing their respective primary health care settings were included in the study. Purposive sampling was used to identify participants until saturation was reached. After agreement, the interviews were scheduled as per availability.

Results: The results were grouped into three major themes and nine subthemes. Most leaders reported that they were trained in pandemic preparedness, but there was a lack of focused readiness to handle a massive-scale, infectious disease outbreak or pandemic. The initial lack of guidelines specific to COVID-19 was a barrier in making decisions related to staff and patient care. Services were interrupted initially and there was lack of staff since many acquired COVID-19 and were isolated. The shortage of the staff was delt by repurposing staff from other departments to the essential care services. Fears related to pandemic was one of the main concerns reported among staff and patients. Several initiatives were taken to ensure staff safety and uninterrupted service delivery to patients. The use of technology was an effective mechanism in preparing for the pandemic.

Conclusion: This qualitative study helped in understanding the experiences of primary health care leaders during the COVID-19 pandemic. The facilities lacked overall preparedness at the beginning of the pandemic; however, many initiatives were taken in course of time to ensure smooth operations and continued service delivery to the patients.

Keywords: COVID-19, preparedness, primary health care centre, PHC, Saudi Arabia, prevention

Introduction

A pandemic is defined by the World Health Organization[1] as a global outbreak of an infectious disease.[1] The risk of a pandemic increases with time, due to many factors.[2] A pandemic not only affects the health care system negatively but also has economic, political, and social consequences.[3,4] Considering the current situation of COVID-19, there has been an increased interest in assessing how prepared a health care system is to deal with emerging pandemics. The WHO recognized emergency preparedness as

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> the knowledge, capacities, and organizational systems developed by governments, response and recovery organizations, communities, and individuals to effectively anticipate, respond to, and recover from the impacts of likely imminent, emerging, or current emergencies.[5]

According to the WHO's qualitative analysis of seven countries in the European Region, pandemic preparedness activities were found appropriate and effective during the 2009 H1N1 pandemic.[6] However, a comparison of the emergency response to H1N1 and COVID-19 in China showed that the emergency response for H1N1 was faster than that for COVID-19, which influenced the cases' peak time and spread speed.[7]

Several studies stress the need for the preparedness of hospitals, emergency departments, health practitioners and even the general population in dealing with pandemics.[8–11] Iraqi and Jordanian population showed average awareness about COVID-19 with more than 60% of both of them relying on health care providers for COVID-19 information.[12] Furthermore, a study of multiethnic Asian population found that two-third of their population felt prepared for the pandemic and majority were confident with capacity of the government to handle the difficult situation.[13] Preparing the general population and increasing their awareness is vital in ensuring compliance with preventive measures.[14] Frontline workers of primary health care (PHC) facilities play an important role in dealing with patients during COVID-19.[15] In the critical early phase of the COVID-19 pandemic, the emphasis on PHC increased, and its response is varied among different health care leaders and institutions worldwide.[16] A study that assessed primary health care leaders' perception and preparedness toward the pandemic showed a lack of personal preparedness and misconceptions regarding future pandemics.[8] Although PHC physicians in Pakistan showed positive attitude and good knowledge about COVID-19, they still emphasized on the importance of focused training programs to improve their strategies and preventive measures.[17] A study also in India showed constrained response of PHC leaders towards the COVID-19 pandemic due to weak infrastructure.[18]

Dealing with the COVID-19 pandemic in Saudi Arabian PHC centres resulted in a high level of stress, role ambiguity, and conflict among PHC workers, especially those working in flu clinics.[19] Additionally, when assessing paediatric ER leaders in Saudi Arabian pandemic planning and response during the 2009 H1N1 Influenza, there was some variability in their preparedness plans owing to the incomplete penetration of preparedness guidance into the level of paediatric emergency physician leaders. They also reported some difficulty in dealing with unexpected challenges, such as eliciting needed responses from others in the institution and institutional administrative hurdles.[20]

The Saudi Arabian Health Care System

As in the case of most countries, the Saudi Arabian public and private sectors provide comprehensive health care to people, based on their needs. The public sector financing and supervision are mainly controlled by the Ministry of Health. All hospitals work in an integrated system between tertiary, secondary, and PHC centres. The regional directorates authorized by MOH allocate the funding and budgets to each centre.[21] The expenditures for the provision of services come from the government and patients receive the treatment free of cost. The public health care sector represents approximately 79% of bed capacity utilized for service provision. The budget allocation in 2019 for public sector grew by 8% and stood at SAR172 billion in 2019 (USD=46 billion), which was SAR159 billion (USD=41 billion) for the preceding year.[22]

Currently, there are multiple PHC centres in the main and periphery regions. The location of PHC centres is highly influenced by the dense population; there may be more than one PHC centre to cover the demand. In 2018, new reforms were suggested for the privatization of the health care sector in Kingdom of Saudi Arabia (KSA), by which PHC centres would be handed over to the private sector. However, MOH is the regulator of the health care services, and not the service provider. The plan eventually includes the steady privatization of approximately 290 hospitals and 2300 primary health centres by year 2030.[23] Therefore, exploring the PHC leaders' understanding in decision-making is of vital importance for disaster preparedness and management of pandemics in future. During the current pandemic, major preventive measures in response to pandemic were financed by the government; however in future, the situation is expected to change. In this study, we aim to understand leaders' perspectives regarding their preparedness to manage Saudi Arabian PHC centres and to explore the barriers to routine service delivery, both in the context of COVID-19. This study adds on to the knowledge base of measures taken at the

PHC level in Saudi Arabia to ensure an uninterrupted service delivery during the COVID-19 pandemic.

Methods

Study Design and Setting

An observational qualitative design with an interpretive research paradigm was used.[24] The current study operationally defined frontline managers as

> supervisors or PHC leaders directly involved in the decision-making process related to staff placement, logistics distribution, and managing service delivery during the pandemic.

Different aspects of pandemic preparedness, including staff, patient, resources, communication, and infection prevention and control were explored in this study.

The prime focus of the current study was PHC setups as their main role is disease prevention and health promotion. All PHC centres provide comprehensive outpatient and continued medical care, including health promotion, disease prevention, patient education, and diagnosis and treatment of acute and chronic illnesses. In this context, PHC facilities have prime importance during the pandemic; hence, they were included in the study. The total population of Riyadh city is approximately 7.3 million and the city is divided into 15 municipal districts.[25] Each district in Riyadh has a chain of PHC centres linked to one tertiary care setup. The PHC centres linked to one tertiary care hospital were focused for inclusion in this study.

Table 1 Summary of the Participants

Variable Category	Number
Gender	
Male	04 + 01*
Female	01
Age in years	
30–35	01
36–40	02
41–45	01
46–50	01+01*
Qualification	
Bachelor	04 + 01*
Masters	01
Post-graduate training	
Yes	03
No	02 + 01*
Current role in PHC**	
Staff Manager	01
Leader PHC	04+ 01*
Years of experience in current position	
1–3	04
4–6	01+ 01*
>6	01
Total years of experience	
1–5	02
6–10	00
>10	04

Notes: *The interviews added to confirm saturation after initial analysis. **PHC, Primary Healthcare Center.

Sampling and Identification of Participants

Any PHC leader working during the pandemic in a PHC facility linked to a tertiary centre was eligible for inclusion in the study. Important information collected from participants were on gender, age, and years of experience. A purposive sampling technique was used to include participants who provided rich information and specifically fulfilled the operational definition for the study participants.[26,27] Initially, invitations were sent to nine PHC managers, of which eight agreed to participate in the study. One participant was excluded because of a conflict of interest with the current study. Of the remaining seven, a total of six managers were included in the study. An official email invitation was sent by the principal investigator to the participants, including the details of ethical approval and the overall aim and objective of the study (Table 1).

Data Collection Process

In-depth one-to-one interviews were used to collect the data.[28] A semi-structured interview guide was developed based on the objectives of the study and a review of literature on the topic.[8,20,29,30] The interview guide was prepared in English. Two pilot interviews were conducted with participants working in a similar position to our study participants. A few probes related to the study objectives were added, based on the participants' suggestions, and irrelevant questions were removed from the interview guide. The final interviews were conducted after participants confirmed the time and venue. The venue was selected based on the suitability of the participants; most of them were interviewed in their offices, while one interview was conducted out of office. There were no interruptions during the interviews, and none of the interviews were repeated. Questions were edited based on the

feedback from participants included in the pilot testing by an independent researcher (Supplementary Material). All the interviews were conducted in English. Information about the study, the primary investigator, their rights to withdraw, and confidentiality were explained. The participants signed a written informed consent which included publication of anonymized responses. All the interviews were audio recorded and each interview lasted from 35 to 60 minutes.

The interviews were conducted by a senior researcher (AB), who is also a Saudi Board-certified family medicine consultant and has many years of experience in managing PHC facilities. He could understand the participants' responses very well. Most participants were male, so they openly talked to about their experience. A field note was kept at all times during the interview and the important points were recorded, including a summary of each interview.[31] After every interview, the summary was immediately shared with the participants; their opinions were taken on the notes and the changes suggested were incorporated. The interviews were transcribed verbatim by (AM) and (AA). To ensure consistency in and the quality of the transcription, the recordings were independently analysed by (MN), and information was checked for accuracy and completeness. (MN) is a senior researcher and has experience with qualitative analysis. During the transcription phase, the participants' identity was concealed and any information leading to identification of the participant, or a location was coded.

Analysis

We used steps for thematic analysis as prescribed by Braun and Clarke,[32] or an analysis of the interviews. The initial transcription was performed by AM and AA and the interviews were transcribed verbatim into English. Next, interview coding was performed by an expert qualitative researcher using NVIVO (QSR international) version 12, where the text in the interviews was read multiple times to be familiar with the data, followed by line-by-line coding. Inductive coding was conducted, whereby the text was coded according to the most appropriate idea and information it contained.[33] The authenticity of the coding process was ensured by verification and feedback from the research team. Additionally, researcher triangulation was done, and after the initial coding, the emerging themes were discussed with two independent members who were not part of the initial research team to confirm the analysis. Final nodes and codes were then merged according to the formed themes. Data were reported as per the guidelines recommended by the consolidated criteria for reporting qualitative research.[34] We identified three distinct but interrelated themes after the co-authors verified the authenticity of the themes, which formed a construct to answer our research question (Table 2).

Ethical approval was granted by the institutional ethical review board with reference number (IRBC/1682/20). All the participants were provided the informed consent form at the time of the interview and their consent was obtained for the audio recording of the interviews.

Results

The results of the study were presented as three broad themes: 1) Unpreparedness for the unprecedented pandemic, 2) Addressing the impact upon service delivery, and 3) Addressing fear and concern among the staff and in the community. The themes were extracted from the data during the analysis phase (Figure 1).

Theme 1: Unpreparedness for the Unprecedented Pandemic

This theme includes participants' discussions surrounding local healthcare system's preparedness for the COVID-19 pandemic. Participants' accounts of how they and their teams were prepared to deal with the pandemic showed a lack of readiness, before COVID-19 was established as a pandemic. They believed that the situation was perhaps because of a lack of a prior experience in dealing with such a massive challenge. This situation led to extraordinary pressure on the health managers to implement a strategy to streamline the services. They believed that, because of the unprecedented nature of the problem, a full-scale impact of COVID-19 upon the local health care services was not realized initially. They suggested that preparations must be made beforehand and that the lessons learnt from COVID-19 may help develop a formal mechanism of preparing the local healthcare services for a future pandemic.

"Like what happened in MERS-CoV. (Only) general information (was in place but there was) no plan". Interview 4 – A practice manager

> (We need) to be ready for any disaster and not to make it as reactive again. And if you have a plan, everybody will do predefined job. The committees can be activated. (to perform their jobs). Interview 3 – An employee clinic director

Table 2 Summary Themes and Codes

Themes	Categories and Codes	No. of Interviews	References
Theme 1: Unpreparedness for the unprecedented pandemic	**Nodes and Subnodes**		
Node	*Pandemic preparedness*	6	40
Subnode	• Dealing with the pandemic was one of its kind of experience	2	5
Subnode	• Previous experience of dealing with emergencies	3	5
Node	*Role during the pandemic*	4	5
Subnode	• Leading from the front	4	11
Node	*Support on guidelines*	6	30
Subnode	• Clarity of policies and guidelines	4	9
Theme 2: Addressing the impact upon service delivery			
Node	*Addressing staff shortages*	6	23
Subnode	Innovating to cover staff shortages	4	14
Subnode	Initial worries about COVID-19 pandemic	5	16
Node	*Initial challenges*	6	15
Subnode	• Situation at the start of the pandemic	2	3
Subtheme 1	*Impact upon service delivery*	6	18
Subnode	• Impact on regular patients	4	8
Subnode	• Resource availability in the clinics	6	26
Node	*Initial Steps when Pandemic started*	6	29
Subnode	*Burden on the staff*	5	8
Subnode	• Vulnerable staff	5	16
Subnode	• Protecting the staff	6	29
Node	*Infection prevention strategies*	4	8
Subnode	• Screening patients at hospitals for COVID-19	5	10
Subnode	• Steps for patient safety	4	10
Theme 3: Addressing fear and concern among the staff and in the community			
Node	*Psychological impact on staff*	5	14
Node	*Communicating with staff and authorities*	6	20
Subnode	• Creating awareness in public	2	11
Subnode	• Dealing with difficult patients	2	4
Subnode	• Dealing with fear in patients	3	4
Subnode	• Lack of awareness in patients	3	7
Subnode	• Plans for vaccination	5	9

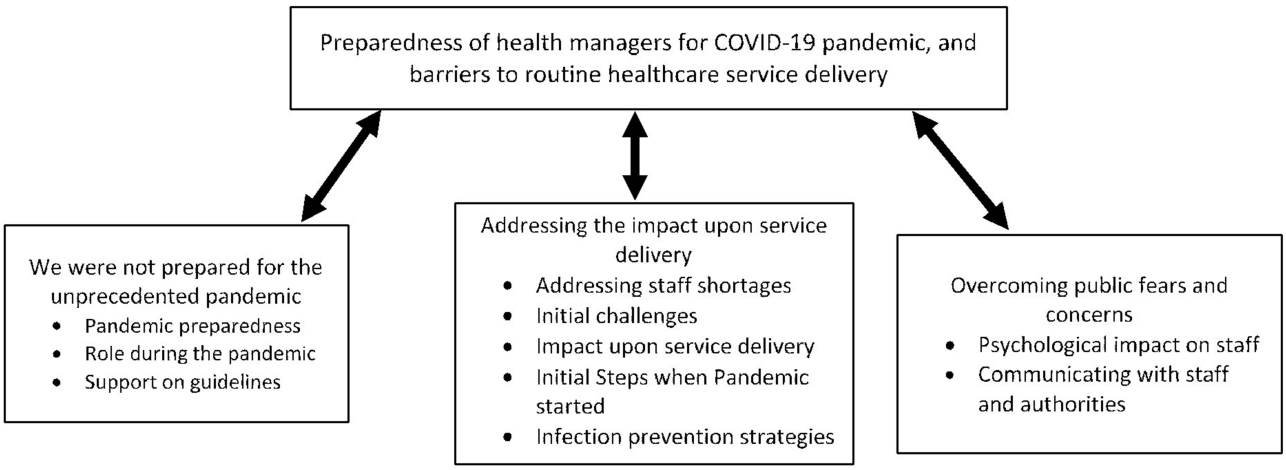

Figure 1 Summary main themes and subthemes emerging from analysis.

Several participants revealed that some level of training on disaster preparedness was previously given to them. However, none of it focused upon the prevention of large infectious disease outbreaks. They unequivocally identified the need to train relevant staff on pandemic management. A practice manager stated that any pandemic preparedness plan needs to consider communication strategy, knowledge and skills development, availability of personal protective equipment, and leadership. A clinic director exemplified the planning of the annual Hajj pilgrimage and believed that such a plan can be developed to prevent pandemics.

"We need more courses, I mean, training for this pandemic, how can we deal with this disaster, not just COVID-19." Interview 2 – director I. clinic

> I think we can have a better plan like Hajj, every year we have Hajj which we (have) accomplished for many years. If we make the same for the pandemics, I think we can manage it. Interview 3 – An employee clinic director

An initial lack of readiness to deal with the pandemic was further complicated by a lack of clear guidelines initially about case management, daily operations, and prevention of COVID-19 infection among staff members.

> We did not have a clear guideline about our patients, appointments, or how to control our patients and staff. So, it was like everyone will work in his centre. (according to what he sees). Interview 5 – Director D. clinic

Theme 2: Addressing the Impact Upon Service Delivery

This theme covers a wide range of issues that participants had dealt with initially. The key issue that this theme highlights is staff shortage. The reason for the availability of fewer staff members for work was that they started getting diagnosed with COVID-19 and had to be subsequently isolated from the rest of the staff. As the staff were not reporting the symptoms initially, perhaps because of a lack of understanding about the gravity of the illness, they continued to attend clinics with symptoms of COVID-19. Their adherence to protective measures was also dismal, leading to more staff taking sick leave.

"At the beginning, no one knew what the pandemic was. Some of the employees were sick; they had fever and flu. I have faced it a lot." Interview 5 – Director D. clinic

A practice manager talked about how the services of a large tertiary care hospital were drastically affected because of the staff getting infected.

"It was a big challenge; a big percentage of people were infected. You remember, (the name of the hospital) broke down." Interview 4 – A practice manager

Despite the implementation of several screening check points, infection prevention and patient safety interventions —such as triage and protecting staff from the infection— was difficult, which also affected the service delivery.

"Thinking about the safety of our staff, it affected our services for the patients." Interview 1–Ops. manager of a specialized clinic

Services such as radiology and other essential laboratory testing were affected for general patients because the equipment in these departments required frequent disinfection by dedicated staff, and partly as the patients were reluctant to come for laboratory investigations. Consultations for gynaecology and obstetrics also reduced as female patients had not been following up on their appointments. Radiology or dental care had been closed.

"The radiology had fewer patients because it's inside and needs to be disinfected after the patient." "Dental[16] was also shut down during the pandemic." Interview 6 – A medical director

Participants suggested that despite an initial gap in the supply of gloves, masks or filters, and other personal protective equipment, the need for various supplies was adequately met with the support from the health directorate.

"Regarding the HEBA machine filters, I did not have enough machines at that time." Interview 2 – Director I. clinic

These participants were of the view that the patients, particularly those with chronic illnesses, were discouraged to attend consultations in person and were given an option of phone consultation, but they did not seem to benefit much from these virtual consultations. Preventive care, including screening for chronic illnesses, was another major service area that suffered a loss.

"Caring for patients with diabetes and hypertension, we did not even do the prevention part for screening, during COVID-19." Interview 5 – Director D. clinic

A main aim was to protect the staff to deal with further shortage of staff. The managers implemented innovative strategies that included repurposing staff from other departments to the essential care services, reducing staff meetings and gatherings, separating the flu clinic from the rest of the service lines, sending vulnerable staff on leave, and making non-essential staff to work from home.

> I had to cut manpower, especially when they decided that chronic patients will not join the work, so around 60% of my employees were not there, they were above 50 years, diabetic, or hypertensive. Interview 5 – Director D. clinic

However, as these measures, aimed to support and protect staff and run the services smoothly were implemented, the staff suffered from pressure and burnout because they had to adopt to new circumstances that required them to ensure a high level of care for the patients and protect themselves from the infection.

"One of the physicians was crying at that time." Interview 3 – Employee clinic director

"But by time, they know this is not easy for them, they have families, they have kids." Interview 2 – Director I. clinic

Theme 3: Addressing Fear and Concern Among the Staff and in the Community

Participants gave multiple examples of staff members suffering from anxiety, fear, stress, and probable depression, because of their experience of working in a challenging work environment and under social isolation. There was at least one incident where a staff member was referred for psychiatric evaluation. The managers also cited several examples where a psychologist advised the staff members, or they personally helped their colleagues overcome stress.

"They panicked because they did not want to get infected or the virus to get to their homes." Interview 6 – A medical director

> Others think that this is the end because this is a new disease, nobody knows (about it). Especially in the first three weeks, we suffered a lot, mainly anxiety among physicians. Interview 3 – An employee clinic director

The participants talked about their efforts to address the fear of COVID-19 in their communities by creating awareness campaigns through their outreach teams. The participants believed that the communities had several concerns about the illness, and because of poor awareness about the disease, even the staff members were not following the guidelines to prevent transmission of the virus through contact.

> I asked some of my colleagues to give some lectures regarding COVID-19, the treatment, if there are any new guidelines, because some patients are asking, is there any treatment? Is there any vaccine? We will not come to the clinic. Interview 2 – Director of I. clinic

> People are not aware about it, even our staff. We had an outbreak in our staff. Like in the lounge, I asked them for social distancing. When I came, no one had a mask. One tested positive, then yet another became positive. Interview 5 – Director D. clinic

This laxity in following the infection prevention guidelines was further complicated by patients attending clinics with some non-specific symptoms, thereby increasing the risk for other patients, attendants, and staff. This risky behaviour was controlled by intensive lockdowns and curfews in the later phase of the pandemic when the daily case load continued to rise.

"Sometimes they called me, we have a patient who came and he's neglecting the precautions.' Interview 2 – Director I. Clinic

When asked about the intentions regarding the vaccine uptake, the health managers were convinced that they would receive the vaccine, but also talked about the concerns among the staff and in the community, which needed awareness.

> There is fear in the staff and patients because the study (period for vaccine development) is less, within six months, when they bring a new vaccine, and this is the main reason of fearing the vaccine. Interview 6 – A medical director

> I really recommend the vaccine. We should deal with COVID-19 as a chronic thing, either you will get the disease—a very sharp and terrible illness—or you should have the vaccine. Interview 5 – Director D. clinic

Discussion

In this qualitative study, we explored the PHC leaders' experiences, initiatives, and preparedness during the COVID-19 pandemic. Although news about the outbreak of the COVID-19 pandemic had surfaced in 2019, the WHO declared it as a global pandemic on 11 March 2020.[35] The first case was detected in Saudi Arabia on 2 March 2020.[36] Saudi Arabia was one of the countries that implemented early protective measures even before the first case was detected. These measures were regulated by the Ministry of Health and the government (Figure 2).

Lack of Clear Guidelines Towards the Unprecedented Pandemic

Despite all the protective measures implemented by the government, there were no clear guidelines to regulate and maintain functional PHC centres. There were variations in the responses of different leaders and managers of PHC centres. This fact was emphasized in a study that described Italy's experience with COVID-19, where there were large variations in plans, even within the same region. The application of unspecified protocols and the inconsistencies in implementing protective measures within regions played a major role in the spread of COVID-19.[37] In our study, participants described a lack of readiness that was attributed to the absence of clear guidelines. Without clear guidance or plans, the leaders felt extraordinarily pressured to implement a strategy to keep the services operational. Coping with the clinic's demand and function during the COVID-19 pandemic without clear guidelines or evidence-based practice has been challenging.[38]

Lack of Training for the Unprecedented Pandemic

Our PHC leaders also mentioned a lack of proper training or education about infectious pandemic despite the recent pandemic of MERS-COV in 2012, and the Saudi Arabian experience of dealing with about 2 million pilgrims during the annual Hajj pilgrimage.[39] There are possible explanations for our findings regarding the lack of guidance or regulations. The initial underestimation of the pandemic's effect, the vague nature of the virus, and the continuous changes in the WHO guidelines regarding the approach to COVID-19 could be one possible reason. Our work highlights and builds on the suboptimal preparedness and response mentioned in previous work.[8–11] Previous work has demonstrated lack of personal pandemic preparedness from outpatient PHC leaders.

Lack of Human Resources and Impact on Service Delivery

The leaders in our study struggled in managing the PHC services during the pandemic. Staff shortages due to illness, long quarantine periods, and being allocated in different services outside of their assigned clinics were some of the main challenges. There were no clear policies about handling them, the period of their absence, or regarding compensation. A paper by Wong et al on how PHC centres responded to COVID-19 in China reported that PHC centres played a major role in screening for COVID-19 to deflate the pressure from tertiary health care services.[40] Their PHC centres developed a strong communication system with higher level management and shortage of staff was met accordingly.[40] The shortage of staff also affected the services and leaders were forced to make day-to-day decisions, some of which were to close services to better handle the expected staff shortage. This action is not surprising when compared to a UK study that listed shortage of staff as the second cause after decreased demand of imaging studies for the closure of 9 out of 18 diagnostic imaging facilities during the COVID-19 pandemic.[41] The PHC clinics are on the frontier of our medical care services. Developing a strong communication with the higher management and formulating a plan to allocate and repurpose the staff and to manage them with clear guidelines

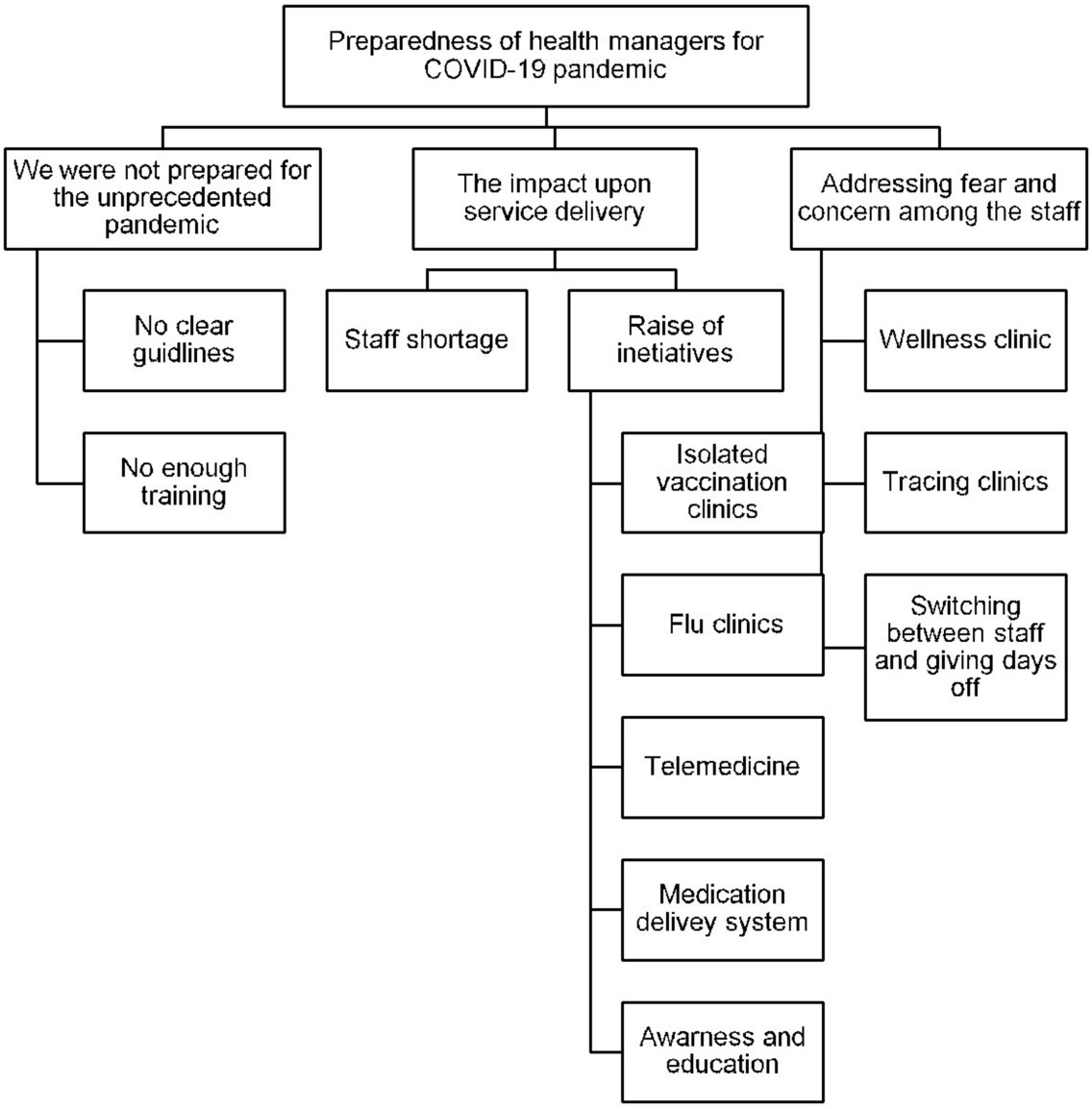

Figure 2 Summary preparedness of health managers for COVID-19 pandemic.

and regulations during the emergency, are vital to keep the services functional.[15,42]

Initiatives to Ensure Uninterrupted Service Delivery

Although PHC leaders demonstrated a lack of readiness in dealing with the new pandemic, they took diverse initiatives to deliver safe, comprehensive, and continuous health care services that need to be highlighted for future improvements. There was a reduction of routine vaccination visits for children as parents were concerned about exposing their children to COVID-19 during visits to the well-baby clinics.[43] This aspect was also an issue in a study that explored parents' experience with their children's routine vaccination during COVID-19.[44] They also mentioned difficulty in booking appointments and the unclear instructions as to whether the well-baby clinics were running or not.[45] Routine vaccines are crucial in preventing communicable diseases other than COVID-19.[45] Realizing the importance of vaccines, the PHC leaders separated well-baby clinics from other clinics so that children did not have contact with other patients. In addition, flu clinics were opened to minimize staff exposure and to assess suspected cases to relieve the stress of the tertiary hospital. Flu clinics were easily accessible and well organized, and patients did not require appointments or referrals for consultation. On the other

hand, only patients with appointments could enter regular PHC centres, which reduced the crowd. They passed through a checkpoint, which included taking the temperature and screening questions.

The utilization of technology was high during the COVID-19 pandemic in Saudi Arabia as well as in various countries.[46,47] The PHC clinics switched to virtual clinics to limit the exposure, especially for high-risk groups; the patient would book an appointment online through the governmental app and their physicians would contact them virtually or on the telephone. If cases needed complex care, home visit or instructions to visit the emergency department would be offered to the patients. The switch to tele health was needed as Saudi Arabia ordered a lockdown, and only emergency cases would have permission. Citizens of Saudi Arabia were instructed to call a dedicated number for their emergency health inquires, and in case of an emergency room visit, the citizens would be granted a one-day pass. The tele health transformations was a necessity as worldwide health care systems were overwhelmed and orders of stay at home were implemented.[47–50] Several governmental mobile apps were developed to track and educate patients during the COVID-19 pandemic and to help restore regular life.[51] The development and utilization of mobile apps and telehealth during pandemics has increased specially among the top 50 affected countries by COVID-19 and its role became pivotal not only for the current situation but also for any future pandemics.[51,52]

Medication delivery to patients was another issue. Patients with chronic diseases were concerned about coming to the clinic to refill their medications. Moreover, it was difficult for some patients living outside Riyadh to travel during the curfew. A medication delivery system was generated by some PHC leaders. After contacting patients through virtual clinics, those outside Riyadh were given their medication through shipping companies, while their counterparts in Riyadh would get them in the parking area, without entering the clinic or having direct contact with other patients. Increased patient awareness and education was one of the main initiatives taken by PHC centre leaders. Patients were reluctant to come to the clinic even on their physician's advice. Additionally, a lot of myths and misconceptions circulated in the social media, which increased stress and anxiety in the community.[53] Frequent virtual lectures with updated knowledge about COVID-19 were provided by physicians to counter this situation.

Addressing Fear and Concern Among the Staff and in the Community

Staff support was an area that leaders had to deal with.[54] Stress and anxiety were huge in particular at the beginning of the pandemic. News from other countries, where health care providers continued to risk their lives or spread the infection to their families and loved ones, put a burden on health care providers, especially the ones covering flu clinics. Referral to Wellness clinic, which is a specialized psychiatry clinic for employees, switching between staff, and giving days off were certain measures adopted to support these staff. To reduce the pressure on the secondary and tertiary hospitals, stable cases with COVID-19 isolated at their homes or at isolation facilities were followed up daily by the family care physicians on the telephone to assess their symptoms, answer their questions, and reassure them. These decisions made by PHC leaders played a major role in overcoming the struggles of this pandemic and maximizing patients and staff care.

Limitations of the Study

This research would have benefited from focus group discussions, which is a valuable qualitative data collection method; however, because of the precautionary measures imposed during the pandemic, this was not possible. Our results may not be generalizable to other settings, because primary care setup and response during the pandemic may differ elsewhere. Nevertheless, the setting in which this study was conducted we included all the PHC centres covered under one tertiary care centre, thereby representing a model setting for other governmental PHC settings. Therefore, with a small variation in the overall plans, similar circumstances were applicable to most of the PHC facilities in Saudi Arabia. The current study solely focused on the challenges to the service delivery at the PHC level. Future studies are required to understand the preparedness and barriers to care at other levels of healthcare centres, which may help improve service delivery in Saudi Arabia and other similar settings. The generalisability of results and initiatives to private sector is limited as we only focused on the public sector PHCs. In future the contracting out of the public sector PHC is under process. The results of this study for policy and planning for pandemic preparedness should be considered. Currently, Ministry of Health is the funding and regulatory authority; however in future, many of the initiatives would require financial, physical and human resource for

implementation. Additionally, the current study generates many ideas for future research including assessing the provider and patient satisfaction with the virtual consultations, effectiveness of the online public awareness campaigns and challenges to doorstep medication refill are few to mention.

Conclusions and Recommendations

There was a lack of overall preparedness on the part of the facilities at the beginning of the pandemic. The unprecedented scenario challenged the routine functions of the entire healthcare system; however, many initiatives were taken in course of time to ensure smooth operations and the continuation of service delivery to patients. The use of technology in terms of virtual clinics and health education lectures were effective. Training PHC leaders to deal with pandemics is vital to ensure a well-prepared system and smooth service delivery in future. The major contribution of this study is that it explores how drastically a PHC service delivery can be affected even in a high-income country when it is not ready for a catastrophic pandemic that affects all aspects of the life. The findings from this study clearly identify the need to scrutinise and evaluate the healthcare services in PHC settings in Saudi Arabia and other similar settings to understand the readiness of the system for any calamity like COVID-19 pandemic. Our study calls for these systems to ponder upon how to leverage change and establish a standby plan, resources and plan, which can be employed in extraordinary pressure on the services. The examples of comforting the community members and healthcare workers in our study highlight the need for capacity building to professionally deal with the fears and concerns in the community to build trust and ensure compliance with the drastic changes to PHC service delivery, which may be seen as disruptive by the communities.

Abbreviations

PHC, primary health care; WHO, World Health Organization; EP, emergency physician; MOH, Ministry of Health[21]; KSA, Kingdom of Saudi Arabia.

Data Sharing Statement

The full dataset and materials pertaining to this study can be obtained from the corresponding author on reasonable request. Interview questions used in this study are available in the Supplementary Material.

Ethical Approval

Ethical approval was granted by the Ethical Review Board of King Abdullah International Medical Research Center Riyadh, KSA (IRBC/1682/20), approved on 25 August 2020).

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Disclosure

The authors declare no conflicts of interest for this work.

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