Original Article

Preparedness of Primary Care Centers for COVID-19 epidemic in Aseer region, KSA

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Abstract

Objective: The objective of this study is to assesses the preparedness of primary care centers (PHCs) in Aseer region, KSA, for the coronavirus disease 2019 (COVID-19) pandemic. **Methods:** This survey was conducted during April 2020 in PHCs. The questionnaire was developed by the investigators and sent via e-mail to health care providers of primary health care centers (PHCCs). The questionnaire consisted of five parts to assesses readiness of PHCs, knowledge, attitude, and practice of health care providers (HCPs) concerning the COVID-19 pandemic. Data entry and analysis were managed by SPSS version 20. **Results:** Three hundred and seventy-one HCPs participated in this study. Most of them were males (58%), doctors or nurses (81%). Almost all PHCCs have adequate infection control resources, with some shortage in sterilization rooms. Most of participants received on-job training (85%) and had good knowledge about COVID-19. Attitudes of participants showed variation toward COVID-19; 74% were afraid to be infected, 54% were afraid to care for infected patients, 58% were ready for vaccination, and 80% thought that COVID-19 has a huge negative impact on the health care system. Compliance with preventive measures ranged from 66% for keeping social distance to 90% for using personal protective equipment. Most of the participants had positive contributions regarding health education of individuals and communities using different methods including the new social media (80%). **Conclusion:** This study revealed that PHCCs in Aseer region were well equipped and HCPs were well prepared to deal with the COVID-19 pandemic. There are some shortage in a few items of infection control at PHCCs and gaps in knowledge and practice among HCPs which need continuous assessment and monitoring to overcome such barriers.

Keywords: Aseer region, attitude, COVID-19, knowledge, PHCC, practice, preparedness

Introduction

Coronaviruses are human and animal agents. By 2019, a novel coronavirus was recognized in China as coronavirus disease 2019 (COVID-19).[1] According to a recent statistical report from the World Health Organization (WHO), the total confirmed cases of COVID-19 exceeded 110 million and the total death reached more than 2.4 million.[2] In Saudi Arabia, There are more than 374,000 reported cases and 6457 deaths.[2] Despite this serious epidemic, the health care systems all over the world face many challenges to deal with this issue. In Europe and USA, many challenges were faced and led to high incidence and mortality of COVID-19 in Italy, Spain, and USA.[2] In Saudi Arabia, the government took different initiatives and actions to control

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this epidemic. The interventions included isolation, quarantine, stopping schools, and cessation of Omra, international, and domestic flights in order to control COVID-19.[3,4] As this epidemic is unexpected, it will make stress and load on health care systems including primary health care centers (PHCCs) and all team members in these health care facilities.

Primary care centers (PCCs) are the gate of an effective health care system; they have vital roles in prevention of epidemic diseases including COVID-19.[5] PHCCs can introduce health education, conduct training for public regarding personal hygiene and hand washing and other primary preventive measures.[6] PHCCs are accessible for the community which enables all individuals to visit them when they feel sick. PHCCs can detect the suspected COVID-19 through screening and make referral to hospitals for suspected cases.[7,8] In order to carry out all the above activities, PHCCs should be provided with relevant infrastructures and train the health care providers (HCPs) to perform their jobs appropriately.[9,10]

The objectives of this study were to assess the preparedness of PHCC for COVID-19 regarding availability of essential infrastructures of infection control, to assess the knowledge of staffs, to assess the attitude toward COVID-19, and to evaluate the steps of decision making among PHCC teams when dealing with suspected cases of COVID-19 at PHCCs.

Methodology

Setting and study design

This cross-sectional study was conducted during April and May 2020 in PHCCs, Aseer region, southwest KSA. In Aseer region, there are about 200 PHCCs; eight of them were chosen to care for suspected COVID-19 cases (diagnosis, management, and referral to secondary care if needed). The targets of this study were the HCPs working at PHCCs.

Tool of study

To achieve the objectives of this study, the investigators developed an Arabic questionnaire after reviewing the relevant publications and documents such as protocols, guidelines, and national standards.[11-13] The questionnaire consisted of five parts: The first part was about the scientific and demographic profile of participants. The second part was about the availability of the relevant essential structures of infection control. The third part was about knowledge and training regarding COVID-19. The fourth part was about attitude toward COVID-19, whereas the fifth part was about steps of dealing with suspected cases of COVID-19 at PHCCs.

The second, third, fourth, and fifth parts of the questionnaire were scored independently. PHCC was considered to be well prepared for COVID-19 if the total score was ≥80% and acceptable (60–79%) and not prepared if the total score was less than 60%. Questions assessing the knowledge were given one mark for correct answers and zero for incorrect response. If the total score was ≥80%, the PHCC was good; if the total score was 60–79%, the PHCC was acceptable; and if the total score was less than 60%, the PHCC was classified as poor. Regarding attitude, it was classified to be positive if the total score was ≥75% and negative if the total score was less than 75%. Practice was classified into three classes: Good if the total score was ≥80%, fair if the total score was 60–79%, and poor if it was less than 60%. To test the validity and feasibility of the questionnaire, it was distributed to 20 different health professionals in Abha city who were excluded from the study.

Sample size calculation, ethical approval, and data management

Using the Raosoft equation, the sample size was estimated based on the following factors (margin of error = 5%; confidence interval = 95%; the total HCPs was 2000, and 50% of them were considered to have good knowledge, attitude, and practice toward COVID-19). The total sample size was 323 individuals. After obtaining the approval from the Regional Research Ethical Committee under the number of REC-No-4-5-2020, the questionnaire was distributed via e-mail to all PHCCs through internal communication channels and followed up daily for 2 weeks until a representative sample was obtained. Data coding, entry, cleaning, analysis, and presentation were managed by using SPSS version 20.

Results

Demographic profile

Table 1 shows the characteristics of the 371 participants in this study. The mean age was 37 years; the majority was male (58%), non-Saudi participants represent 65%, and physicians and nurses represent 81%.

Resource availabilities and readiness of PHCCs for COVID-19

Table 2 depicts the availability of resources for infection control in the PHCCs and training. Most of the resources were available in all PHCCs except the infection control committee and sterilization rooms, which were available in 76% and 85% of PHCCs, respectively. Almost 85% had on-job training with different methods; more than 2/3 had confidence and competencies to practice relevant infection control after training.

Table 3 illustrates the readiness of PHCCs to deal with COVID-19. About 90% had the solutions, 86% had the personal protective measures, 88% clean PHCC regularly, 99% allocated place for patient screening, 95% allocate places for isolation-suspected cases, and about 30% of PHCCs screen clients for 24 hours; 41% used a structured form with relevant questions to screen for COVID-19, whereas 86% of PHCCs received logistic support from directorate or health sectors.

Table 1: Characteristics of HCP, PHCC, Aseer region, KSA, 2020

Age (mean) 37.2±8.6	No (%)
Sex	
Male	214 (58)
Female	157 (42)
Nationality	
Saudi	130 (35)
Non-Saudi	241 (65)
Job	
Physician	164 (44)
Nurse	138 (37)
Pharmacist	13 (3.5)
Lab Specialist	9 (2.4)
Radio Specialist	3 (0.8)
Dental	10 (2.7)
Health inspector	10 (2.7)
Others	24 (6.5)
Qualification	
Diploma	138 (37)
Bachelor	187 (50)
Master	19 (5)
phD Fellowship	27 (7)
Marital status	
Married	307 (83)
Single	55 (15)
Widow	3 (0.8)
Divorced	6 (1.6)

HCPs=Health care providers. PHCCs=Primary Health Care Centers

Table 2: Availability of resources for infection control and training of HCPs at PHCCs

Infection Control	*n* (%)
Infection control guideline	363 (98)
Trained personnel on infection control	353 (95)
Infection control committee	282 (76)
Infection control program	346 (93)
Policies and procedures for infection control	363 (98)
Equipment for infection control	352 (95)
Adequate washing hand stations	351 (95)
Personal protect equipment (PPE)	347 (94)
Containers for medical wastes	367 (99)
Place for medical waste collection	353 (95)
Sterilization room	314 (85)
Isolation room for suspected cases of COVID-19	347 (94)
Health education posters on COVID-19	368 (99)
Training	
On-job Training	315 (85)
Types of training	
Lectures	143 (44%)
Workshop	82 (26%)
Simulated cases	76 (24%)
Videotapes	118 (37%)
Provision guidelines	221 (69%)
Confidence after training	
High	221 (59)
Moderate	60 (17)
Low	90 (24%)
Training of staff at PHCC regarding dealing with COVID-19	
All members	249 (67)
Infection control team	93 (25)
No training	29 (8)
Impact of training to acquire competencies to deal with COVID-19	
High	211 (56%)
Moderate	70 (17%)
Low	90 (24%)
Impact of training on teamwork tasks to deal with COVID-19	
High	275 (73)
Moderate	79 (21)
Low	17 (4)

Knowledge, attitude, and practice of HCPs

Table 4 shows the knowledge among HCPs. More than 90% mentioned that the source of information regarding COVID-19 was from Saudi MOH; most of the participants were able to identify the high-risk groups who may be infected, more than half identified the incubation period correctly, more than 2/3 identified the common symptoms, and more than 90% were able to identify the most common route of virus transmission and the prognosis of COVID-19.

Responses regarding the effective drugs were incorrect regarding anti-malaria (60%), steroids (38%), anti-viral (46%), and antibiotics (35%).

Table 5 summarizes the attitude of HCP toward COVID-19. More than 2/3 thought that COVID-19 leads to a decrease in the use of services at PHCs; 74% were afraid to be infected because they are HCPs (81%), which make them afraid to deal with infected patients (54%); more than half were ready to receive the vaccine for COVID-19 if it is available; 79% thought that COVID-19 has a negative impact on Saudi health; and only 44% thought that patients who were infected with COVID-19 will have immunity, whereas 98% were convinced about the procedures taken by the Saudi government to control the COVID-19 pandemic.

Table 6 demonstrates the practice of HCPs. About 90% stated that they complied with use of personal protective measures; washing hands (79%); keeping distance (66%); avoiding shaking hands of colleagues (79%), patients (83%), and relatives (72%); avoiding touching the nose, mouth, and eyes (57%); avoiding attending social gathering (73%); and properly getting rid of personal protective equipment (PPE) (81%).

Contribution of HCPs regarding prevention of COVID-19

More than 80% participated in health education of families, patients, or communities using different methods with Whatsapp as the main used method (81%), followed by snap chat (29%) and then YouTube (26%) as depicted in Figure 1. Most of the participants stated that the Saudi community showed good compliance with official instructions issued by the government and 74% of them dealt with suspected cases of COVID-19 during the past few months.

Table 3: Readiness of PHCC for COVID-19 (*n*=371)

Resources availability	*n* (%)
Availability of solutions, containers	
Always	248 (67)
Often	88 (23)
Sometimes	24 (7)
Rarely	11 (3)
Availability of personal protective equipment	
Always	238 (64)
Often	82 (22)
Sometimes	29 (8)
Rarely	22 (6%)
Cleaning of PHCCs	
Daily	295 (79)
Each other day	33 (9)
Weekly	33 (9)
Not noticed	10 (3)
Allocated place for visual screening for COVID-19	
Yes	369 (99.5)
At entrance	358 (96)
Special room inside PHCC	11 (3%)
Allocated place for isolation of suspected cases of COVID-19	351 (95)
HCP in charge for screening for COVID-19	
Nurses	357 (96)
Doctors	5 (1)
Others	9 (3%)
Targets for COVID-19 screening	
All clients	356 (96)
All clients with ARI symptoms	11 (3)
All clients who came from the region with the pandemic	4 (1)
Timing of screening	
24 hours	111 (30)
8:00 am to 4:00 pm	260 (70)
Method of screening	
Verbal interview	203 (55)
Use of special forms for COVID-19	168 (45%)
Receiving logistic support from the sector and directorate	
Very High–high	242 (65)
Moderate	77 (21)
Low–very low	52 (14)
Distance between waiting chairs at PHCC (≥ 1 meter)	364 (98)
First step to deal with suspected cases of COVID-19	
Isolation and informing the relevant authority	190 (51)
Communication with red crescent and referral to hospitals	7 (2)
Referring to the doctor at PHCC	6 (2)
Ask the patient to wear gloves and masks soon	168 (45%)

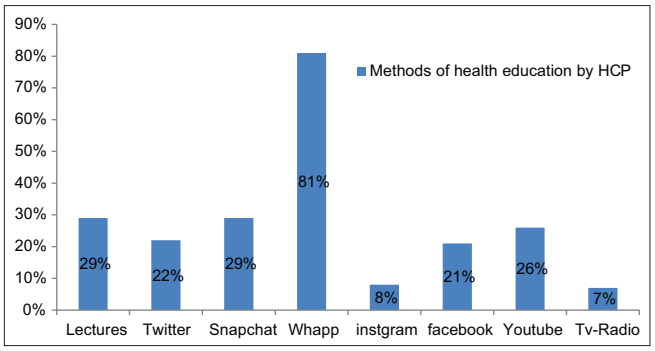

Figure 1: Methods used for community education regarding COVID-19

Discussion

Resources and readiness of PHCCs

This study reports the findings regarding the preparedness of PHCCs, knowledge, attitude, and practice of 371 HCPs working in 99 PHCCs in Aseer region, KSA. The participants represented most of the HCPs such as doctors, nurses, and other allied medical professionals which may give a real picture about the readiness of PHCCs for COVID-19. It is obvious that the PHCCs had adequate resources for infection control which reflected the supportive role of the local authority to deal optimally with this pandemic. The presence of infection control committees and sterilization rooms were still inadequate; however, these findings were better than that reported by Al-Ahmari *et al.*[14] in 2018. This inadequacy should be managed by the concerned authority at PHCCs and health sectors in the region.

One of the most important interventions to scale up the knowledge and skills of HCPs is to conduct "on-job training". In this study, 85% of the participants received training using different methods such as lectures, workshops, and provision of clinical guidelines for COVID-19. These findings emphasized the appropriate and quick action of the local health authority to equip HCPs with relevant competencies to deal with COVID-19. However, some of the participants still need to have extra training to upgrade their competencies, particularly the aspect of screening for COVID-19, which was a weak area as 55% used verbal interview instead of structured formats and only 45% took appropriate actions as recommended by MOH (45%) to manage suspected cases of COVID-19. In a study conducted in China, it revealed that training and supporting general practitioners have a positive impact on their confidence in diagnosis and management of COVID-19.[15]

Knowledge of HCPs

Assessment of knowledge showed some deficiencies in many aspects of COVID-19 among participants as only 54% were able to respond correctly to the mean incubation period and effectiveness of some drugs that were prescribed for patients with COVID-19 despite the insufficient evidence of their use. Such deficiencies could be due to that the guidelines recommended using some drugs in the beginning of the pandemic despite questionable effectiveness of their use.[11,12] In a recent study from Aseer region, Khaled *et al.*[16] found that the citizens of the Aseer region had high knowledge regarding COVID-19.

Attitude of HCPs

Assessment of attitude among participants showed phobia regarding getting of infection because they are at risk (HCPs) or afraid to transmit the infection to their families members, which may hinder them from dealing with suspected or confirmed cases in their health facilities. In this regard, it is very mandatory to insist for compliance with using PPE to minimize the transmission of infection from HCPs to others. More than half (58%) reported that they were ready to receive the vaccine

Table 4: Knowledge of HCP about COVID-19 (*n*=371)

Questions	*n* (%)
Source of information about COVID-19	
Memos of MOH	343 (92)
National clinical guidelines	114 (57)
Regional guidelines	116 (31)
Colleagues	134 (36)
Social media	140 (37)
Others	46 (12)
High-risk groups to be infected with COVID-19	
Elderly	330 (89)
Patients with chronic diseases	352 (95)
Pregnant	218 (59)
Children	123 (33)
Patients on immunosuppressive drugs	281 (75)
Knowing the average days for the incubation period of COVID-19	201 (54)
Common symptoms of COVID-19	
Fever	357 (96)
Cough	287 (77)
Sore throat	236 (63)
Muscular pain	178 (48)
COVID-19 transmitted from other sources	
Droplets	353 (95)
Airborne	251 (68)
Direct contact with patients	299 (81)
Use the personal instruments of the patient	353 (95)
Touching infected surfaces	348 (94)
Most of the COVID-19 cases	
are simple	270 (73)
need admission	54 (15)
will cure	360 (97)
Rate of mortality differs from one country to another	245 (66)
Compared to other corona, the mortality because of COVID-19 will be	
Very high (≥ 10%)	18 (5)
High (5-9.99%)	27 (7)
High to some extent (3-4.9%)	88 (23)
Low (1-2.9%)	162 (44)
Very low (less than 1%)	76 (20%)
What is the probability of complete cure of patients with COVID-19?	
≥90%	217 (58)
80-89%	97 (26)
70-79%	51 (14)
Less than 70%	6 (2)
Which of the following drugs showed effectiveness in treating COVID-19?	
Steroids	140 (38)
Anti-malaria	224 (60)
Anti-viral	171 (46)
Antibiotics	131 (35)

Table 5: Attitude of PHC providers toward COVID-19 (*n*=371)

Questions	*n* (%)
Effect of COVID-19 on the rate of PHC service utilization	
No change	53 (14)
Increase	70 (19)
Decrease	248 (67)
Fear to be infected with COVID-19	
High	101 (27)
Moderate	176 (47)
Low	94 (25)
Cause of fear to be infected with COVID-19	
I am an HCP	302 (81)
I have chronic disease	72 (19)
To transmit infection to my family	275 (74)
High number of cases globally	104 (28)
In the case of having moderate to high phobia of having COVID-19, will this prevent you from:	
Participating in dealing with suspected cases	89 (24)
Participating in dealing with confirmed cases	201 (54)
Participating with your colleagues who contacted with suspected or confirmed COVID-19 cases	182 (34)
Patients in general	111 (30)
In the case of discovery of a vaccine against COVID-19, how ready are you to receive this vaccine?	
Ready	215 (58)
I will think before receiving	108 (29)
Not ready yet to have such a vaccine	48 (13)
Do you think that COVID-19 will have a huge impact on health of Saudis?	
Very huge	57 (15)
Huge	82 (22)
Moderate	152 (41)
Low	65 (17)
Very low	15 (4)
Do you think that the infected patients with COVID-19 will get immunity?	
Yes	164 (44)
No	72 (19)
Do not know	135 (36)
To which extent do you think that Saudis are afraid from COVID-19?	
High	144 (39)
Moderate	202 (54)
low	25 (6)
To which degree you are convinced with procedures taken from the high authority to control COVID-19?	
High	304 (82)
Moderate	60 (16)
Low	7 (2)

against COVID-19 if it was available. In one community study from the region, about 70% of the participants agreed to take the vaccine if it was available.[16] This figure is considered low among health professionals and could be explained by the lack of convincing data regarding safety and effectiveness of such a vaccine as 55% mentioned that immunity against COVID-19 was uncertain. However, with current updated vaccine information and the wide use globally, it is expected that such attitude will change toward positive to intake the COVID-19 vaccine.

The other important finding of this study is the agreement of most of the participants that COVID-19 has had a negative impact on Saudi health (78%), which made the high authority to issue the appropriate regulations to control COVID-19 despite negative consequences on different aspects of life (social, economic).[3,6]

Practice of HCPs

Compliance with different daily practice showed some variations among HCPs; continuous use of personal protective

Table 6: Practice of PHC providers regarding COVID-19 (*n*=371)

Questions	*n* (%)
Compliance with use of personal preventive measures (masks, gloves)	
Always	331 (89)
Often	26 (7)
Sometimes	14 (4%)
Compliance of teams working at PHCC with using personal preventive measures	
Always	303 (82)
Often	54 (15)
Sometimes	14 (4%)
Compliance of teams working at PHCC with washing hands	
Always	301 (81)
Often	54 (15)
Sometimes	16 (4%)
To which extent do you comply with the following measures to prevent COVID-19?	
1-Washing hands as per instructions	
High	294 (80%)
Moderate	35 (9)
Low	42 (11)
2-Keeping distance between you and others (120-150 cm)	
High	246 (66)
Moderate	81 (22)
Low	44 (12)
3-Avoid shaking hands of colleagues	
High	293 (79)
Moderate	35 (9)
Low	43 (12)
4-Avoid shaking hands of patients	
High	308 (83)
Moderate	20 (5)
Low	43 (12)
5-Avoid shaking hand of relatives	
High	268 (72)
Moderate	51 (14)
Low	52 (14%)
6-Avoid touching the nose, mouth, and eyes	
High	210 (57)
Moderate	95 (26)
Low	66 (18)
7-Avoid attending any social gathering	
High	270 (73)
Moderate	49 (13)
Low	52 (14)
8-Staying home unless necessary to go outside	
High	252 (68)
Moderate	64 (17)
Low	55 (15)
9-Properly getting rid of PPE after its use	
High	301 (81)
Moderate	28 (8)
Low	42 (11)

measures was high to some extent for individuals but less for teamwork (89% and 82%, respectively), washing hands (79%), social distancing (66%), avoiding hand shaking (72–83%), avoiding nose–mouth–eyes touching (57%), avoiding social gathering (73%), staying at home (68%), and properly getting rid of PPE (81%). Generally poor compliance was less than 15% for most of the practices. In a community study in KSA, Bazaid *et al.*[17] found that compliance with most of the instructions regarding prevention and control of COVID-19 was high regarding hand hygiene, wearing gloves, and masks (90%), whereas more than 2/3 avoid shaking hands (63.7%). In a previous study from Abha, Al-Ahmari *et al.*[14] found that compliance with using gloves and face masks during patient examination was sub-optimal (39% and 44%, respectively), which is lower than that reported in this study (89%). The difference could be explained by the fact that during the pandemic, the compliance with infection control instructions is expected to be high particularly to prevent this infectious virus. In this regard, it is emphasized that all HCPs should follow clinical instructions to prevent and to control infection as such interventions are the only few measures that proved to be effective for controlling the transmission of infections and protect the community from the COVID-19 pandemic.[11,18]

Contribution of HCPs to prevent COVID-19

HCPs play vital roles in health education of communities. In this study, most of the participants were involved in this activity using the different modern methods such as whatsapp, snap chat, and youtube [Figure 1]. This effort indicates that during pandemics, each one of the HCPs has an important role that should be played despite his position and official duties.[15] In one study conducted by Hassounah *et al.*[19] to explore digital use in this pandemic, their findings showed excellent results regarding using different new media in dissemination of health education and providing consultation and advices for the public. However, Alfattease *et al.*[20] concluded that the COVID-19 vaccine was mis-represented by social media among 74.6% of the participants with a negative impact on their psychological well-being.

In general, the readiness of PHCCs and PCP HPCs in Aseer region regarding the COVID-19 pandemic is acceptable. Such a level could reflect the excellent regional management of this pandemic as recently reported by a study conducted in the region.[21]

Conclusions and Recommendations

This study revealed that PHCCs in Aseer region were well equipped and prepared to deal with the COVID-19 pandemic; most HCPs were trained, but there were some gaps in their knowledge. The participants showed positive attitude and good practice regarding management of COVID-19. Continuous assessment of PHCCs and HCPs to overcome such barriers and to fill the gaps regarding management of COVID-19 or any emerging pandemic in the future is emphasized.

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Conflicts of interest

There are no conflicts of interest.

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