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Experience of Paediatric emergency unit during COVID-19 Pandemic: A Physician's Perspective

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COVID-19 pandemic has changed entire healthcare system across the globe. It also had a profound impact on paediatric emergency departments since its declaration as pandemic by World Health Organization (WHO) on 11th March 2020. This brief report is a narrative review of paediatric emergency department (ED) from the perspective and experience of managing an emerging outbreak. In the present article we highlight the experience of paediatric ED during the prevailing wave of COVID-19 pandemic in King Abdulaziz University Hospital (KAUH), KSA and how the same scenario may be managed in a better way in future. The author has been working in Paediatric Emergency Department and has presented her own experiences and observations during COVID-19 pandemic. The pandemic generated demands on health care system and necessitate systematic planning with the increasing trend of infections. Though Saudi Arabia (SA) has well developed healthcare system the preparedness and response for more devastating consequences was warranted. However, there had been various challenges and obligations for different medical specialities.

Keywords: COVID-19, paediatric emergency, Saudi Arabia

INTRODUCTION

The COVID-19 has spread like a wildfire since its first detection in Wuhan city of China in the last part of December 2019 (Ciotti et al. 2019). The pandemic has created havoc among the young to old eliciting prompt responses from global health community. Like other countries of the world, the COVID-19 pandemic has met a rapid public health response in Saudi Arabia where the high volume of population was at risk of infections spread. The clinical manifestation of SARS-Cov-2 ranged from asymptomatic to severe pneumonia followed by multi-organ failure (Alimohammadi et al. 2020). The COVID-19 pandemic has had a massive effect on paediatric emergency departments which necessitate prompt preparedness and responses throughout the world.

Saudi Arabia is the second largest country in the Arab world with a current population of 34.8 million of which estimated 8.0 million populations were below the age of 14 (Almofada et al. 2020) (Young et al. 2021). The healthcare services in Saudi Arabia are provided to the general public free of charge through the Ministry of Health (MOH), military hospitals, and other government-sponsored hospitals (Al Otaibi et al. 2017). The private sector also has a nationwide network of for-profit hospitals (Chowdhury et al. 2021). The Saudi vision 2030 also considers major systemic healthcare sector changes to meet increasing demand for healthcare services in the kingdom (Chowdhury et al. 2021). The Kingdom of Saudi

Arabia is one of the countries that could have a significant implication during such global pandemic, because millions of Muslims from all over the world visits Saudi Arabia for Umrah and Hajj, which is considered one of the largest religious congregations in the world, rendering the nation a possible pandemic spreading hotspot (Muneeza et al. 2021) (Atique et al. 2020). Furthermore, companies, foreign investments, increasing tourism and major ongoing Vision 2030 projects render Saudi Arabia an active destination for travel (Khan et al. 2020).

In Saudi Arabia the first case was confirmed officially by Ministry of Health on 2 March 2020 (Khan et al. 2021). By 2nd April the number of infected person reached 1,885 with 21 deaths and 165 new cases (Awaji 2020). The community spread of infection has surged, challenging the health care providers for containment measures. As of July 28, Saudi Arabia has 270,831 confirmed cases with 225,624 recoveries and 2,789 deaths (Abazid 2021). The coordinated steps were taken by the hospital organization as per Ministry of Health advisories under the WHO guidelines for effective planning in mitigating adverse health crisis. This pandemic has changed the management practices of the hospitals and their departments. Some of the departments were closed temporarily while few continued to work with highly changed environment and managed in a different way. The paediatric emergency departments have also suffered during covid-19. At the start, the doctors/physicians and

other supporting staff were not properly trained to combat such a pandemic due to their least exposure to manage such worst and high-risk situation to get infected with the virus themselves. The aim of this paper was to describe the experiences of Paediatric Emergency Unit in KAUH and management practices, sharing of resources etc. in response to the COVID-19 pandemic.

Organization and implementation in Pediatric ED

KAUH is a 1,080-bedded tertiary care hospital in the western province, equipped with most advanced technology (Rahman et al. 2021). The paediatric emergency unit is under the umbrella of the emergency department, these combined facilities are crucially important for surge planning. Paediatric emergency unit serves approximately 9000+ patients annually. The unit is supported by coordination of physicians, nurses, pharmacists, laboratory personnel's and respiratory therapist for quality paediatric support. Our practice adapting to COVID-19 may have useful implications for paediatric emergency unit in the non-free-standing children's hospital and in other hospitals preparing for this pandemic.

KAUH was serious on the spread of the infection and its risk level. Initially at starting/entry point, under temporary built shade, pre-triage screening (visual triage) was initiated before entering the ED premise. Patients' travel history if any and probable contact history was recorded. All the patients before their entry to ED were distributed with surgical face mask and were subjected to hand rub with alcohol-based hand sanitizer.

Patients were segregated into physically separated risk groups/area. Patients were screened in the pre-triage area based on the visual triage score, adhering the infection control guidelines of the hospital. All patients without travel history, fever or acute respiratory symptoms and visual triage score lower than 4 were managed in low-risk area. Low-risk patient after initial screening were directed to the main ED triage area.

Suspected patients/caregivers, based on symptoms with fever or acute respiratory symptoms and travel history, and visual triage score greater than or equal to 4 were directed to isolation room with negative pressure (high-risk area). A paediatric emergency physician was assigned to look after the patients. Subsequently, despite the novel viral pandemic with multiple unknown risk stratification, updated guidelines of Ministry of Health and infectious diseases hospital team, were followed. As per the inputs each case was considered as high-risk.

Covid Taskforce training

The surge of epidemic necessitates standard staffing and constitution of covid taskforce for expected health outcome. Training on the Covid-19 was invariably important for the effectiveness of the taskforce in handling the crisis. Taskforce consisting of all healthcare providers were trained on how to use personal protective equipment

(PPE) through a 2-hour PPE simulation-based training session held in the Clinical Skills & Simulation centre (CSSC). All the healthcare providers were involved in the training starting with frontline healthcare provider, frontline emergency team, personnel from intensive care and anaesthesia department followed by the administrative staff and housekeeping. Sequential training was imparted based on their roles and responsibilities.

We considered the guidance based on the Ministry of Health and infectious diseases hospital team on the national use of PPE recommendations. Healthcare workers involved in clinical contact with patients were recommended to use surgical mask, gloves, gown and eye protection shield during physical examination. For known/suspected patients/ patients with respiratory symptoms and patients in isolation facility, N95 respirator, along with gown, gloves and face shield for protection against airborne/ droplet-borne infections were made mandatory. Special emphasis was given on the sequence for donning and doffing of PPE following standard bio-safety precautions.

Swab collection, packaging, and transportation

Specimen collection, packaging, and transport to testing laboratories were carried out as per the directives of Ministry of Health, Saudi Arabia. Trained laboratory personnel and healthcare workers were assigned for collection of specimens for novel coronavirus (2019-nCoV) testing, adhering strictly the case definition underlined by MOH by making it sure to prevent self-infection. The clinical samples were collected in the presence of clinician adopting bio-safety measures and wearing PPE.

At the onset of the outbreak, symptomatic/suspected patients/patients with respiratory illness and patients with recent travel history were subjected to nasopharyngeal swabs in a negative pressure room. Non-suspected cases were screened, treated and discharge from the main ED triage area. Following swab collections all the patients were subjected to mandatory home quarantine for 14 days till the swab results are obtained. Parents/guardians were advised to bring back their children immediately to ED if they feel unwell or have fever and respiratory distress symptoms during the quarantine period.

Nasopharyngeal swab collections were performed by PED staff in a negative pressure room or a single neutral-pressure room with portable HEPA filter, with all the bio-safety precautions and wearing PPE. Swab samples were placed immediately into sample vials containing viral transport medium. The labelled sample vials were properly sealed and covered with a plastic biohazard bag in a separate zip-lock bag or specimen container for immediate transport to the hospital laboratory which will be dispatched to King Fahad Research Center (KFRC) right away.

Disposition

All COVID-19 positive and high-risk cases were admitted

to isolation ward at ED. Asymptomatic patients were discharged with home quarantine precautions after swab collection. High-risk patients were determined based on criteria of MOH, such as infants aged <1 year, having clinical or radiographic disease (including moderate to severe asthma), SpO₂ < 92% on room air, respiratory failure, and pre-existing chronic condition. High-risk patients were admitted along with accompanying mother/caregiver. Their movement was minimized as part of outbreak containment efforts.

Consideration of Critical Case Management

Minimal use of nebulizer, non-invasive ventilator, bag mask ventilators, and use of glidoscope instead of direct laryngoscopy during intubation was considered. Based on the interim guidance received from CPR during COVID-19 outbreak to reduce the risk for the transmission regarding the resuscitation care, the following standard and transmission-based precautions are followed: Aerosol generating procedures like CPR, ETT, non-invasive ventilations procedures are performed in AIRBORNE infection isolation room or using respiratory protection HEPA filtration. The numbers of providers are limited during the procedure. General aerosols like BVM, nebulizers and non-invasive PPV are avoided due to greater risk of aerosol generation. The hospital was notified by EMS team prior to arrival of suspected case of COVID-19. Mock code drill was initiated and implemented to update the health care workers on CPR during COVID-19, ensuring that all healthcare workers are aware of the new update. As the healthcare workers are at high-risk exposure, manpower per shift (8 h) was reduced to 70%.

General Discussion:

This study is a unique attempt to provide hints to those paediatricians who are not already significantly involved in fighting the epidemic by exploring for the first time the perception of paediatric emergency physicians in one of the most afflicted nations. COVID-19 has spread to every region of the planet. It would have been extremely helpful at the very beginning of the pandemic to have similar insights from Chinese colleagues, who were initially involved in COVID-19 outbreak management. This would have allowed paediatricians all over the world to be at least partially prepared in advance for what to expect (Walker et al. 2020).

One of the most important things is that the clinical practise altered, as well as individual attitudes, with the goal of giving more priority to important treatments and manoeuvres, at the expense of routine but nonvital procedures. Not only does this include disease epidemiology, IPC protocols, and the application of PPE, but it also includes fundamental principles of disaster medicine, such as surge capacity and scarce resource allocation, triage, and ethical dilemmas of rationing medical care. Health-care practitioners should be able to keep up with the rapidly evolving knowledge and

guidelines, as well as comply with a way of acting that would probably be new and unfamiliar for the majority of them (Dzieciatowski et al. 2020) (Al-Ani et al. 2020).

Not only from an individual point of view, but also in the interest of the community, the absolute priority of the safety of the health-care practitioner is another idea that is of the utmost importance. In fact, if doctors did not take measures to protect themselves from the infection, it would be detrimental to the overall health-care system. This is for two reasons: first, they might not be able to continue working if they became ill, and second, they might spread the infection even if they did not have any symptoms but continued to come into contact with patients and other doctors. The importance of wearing personal protective equipment correctly is emphasised in ad hoc COVID-19 paediatric resuscitation algorithms, which were made public by the American Heart Association. These algorithms list the wearing of PPE as the first step in the process (Elkind et al. 2020). According to this point of view, doctors need to examine each child as if they were a prospective COVID-19-positive patient, but they also ought to be able to avoid fixating only on COVID-19 illness and instead constantly keep in mind more frequent differential diagnoses. Beneath the same presenting symptoms of COVID-19, there is a broad variety of pathological disorders that also need to be detected and treated as part of the overall treatment plan (Philips et al. 2020) (Belfer et al. 2022).

Future Directions

The paediatric emergency unit needs design improvements for its isolation rooms, including entrances for PPE donning/doffing and a separate isolation resuscitation area for non-pandemic infectious cases such as measles or pertussis. It is seamless for handling potentially infectious cases outside the ED during an outbreak. More tent house should function to meet the need for the increasing number of COVID-19 cases.

Limitations:

Yet, there are a few caveats that need to be mentioned. To begin, the crisis that paediatricians in Kingdom of Saudi Arabia were going through at the time precluded us from having a tight methodological framework and sample size, which stopped us from providing evidence-based data. As a result, it was just for the purpose of documenting. Second, the experiences and observations are from author(s) only.

CONCLUSION

In conclusion, it is likely that countries that are dealing with the COVID-19 pandemic will see a substantial reduction in the amount of access to the PED, similar to our experience and to that reported in other Arab countries. This will occur as a consequence of the reluctance on the part of parents and carers to risk exposure to SARS-CoV-2 in a hospital setting, as well as

the lower rates of acute infections during this time period. Our experience and the experience reported in other Saudi Hospitals. This might potentially result in a negative delay in the provision of care for children who are severely unwell. Among a limited set of reports on PED management during pandemic, documented 4 fatalities and 6 patients that were admitted to critical care units as a result of delayed access to treatment (Pines et al. 2021). On the other hand, the considerable decrease in visits to PEDs ought to offer fuel for thought on the real appropriateness of a significant portion of the everyday usage of PEDs to address requirements that are not immediate or emergent. It is highly recommended that this issue be brought up for discussion within the context of health care policy (Walker et al 2020).

This study is not meant to suggest a code of behaviour; rather, its only purpose is to inform other paediatric health-care clinicians who are not currently extensively engaged in the treatment of the COVID-19 pandemic of the challenges that they will most likely confront in the near future. We believe that the primary strength of this work is the sharing of real-life experiences of front-line practitioners with their peers in countries that are not already deeply facing the pandemic. These experiences offer insights to be somewhat prepared in advance for a completely new and unknown situation, which is the main strength of this work in our opinion.

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

AUTHOR CONTRIBUTIONS

The paper has been completely written, edited, and reviewed by the corresponding author (MH)

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