

COVID-19 IN INTENSIVE CARE



Paediatric intensive care challenges caused by indirect effects of the COVID-19 pandemic

Hari Krishnan Kanthimathinathan^{1,2}, Uri Pollak^{3,4} and Lara Shekerdemian^{5,6*} 

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The coronavirus disease 2019 (COVID-19) pandemic has impacted people of all ages. Although children have been largely spared from the direct impact of the pandemic and only a minority of children affected with SARS-CoV-2 infection or the associated hyper-inflammatory syndrome require admission to a paediatric intensive care unit (PICU) [1], paediatric healthcare has been affected in a myriad of other ways. In this article, we review the indirect impact of the pandemic on PICU. It is important to note that the literature on this theme is constantly evolving and findings vary according to geography, demographic and potentially phase of the pandemic.

Impact on children

Paediatric emergency care attendance

At various stages during the pandemic, many countries imposed some form of 'lockdown'. In contrast with adults, significant reductions in paediatric emergency department (ED) attendance were reported [2]. The lower volumes may, in part, be related to the impact of the pandemic on overall child health, with lower numbers overall of trauma, accidents and other illnesses, in particular respiratory infections. The 2020–21 'winter viral season' has been historically 'light' with low numbers of PICU admissions thus far [3] and the Centers for Disease Control reported only one influenza-associated paediatric death during the 2020/21 compared with 195 at the same time point in the 2019/20 season. Socio-economic and mental health effects of the pandemic may have contributed to the increase in presentations of non-accidental injuries requiring PICU intervention and higher proportion of mental health related ED visits in children [4].

Delayed presentation of critical illness

The reduction in ED presentations may also reflect a reluctance to seek timely medical attention which can unfortunately lead to delayed presentation of acute and critical illnesses unrelated to COVID-19 [5]. Diabetic ketoacidosis (DKA), sepsis, non-accidental injuries, malignancy, and appendicitis are among the most commonly reported examples [6]. Several studies have focused on ED attendances in general and DKA admissions in particular during the pandemic, with conflicting observations that may in part be related to the population demographic or phase in the pandemic [7]. While we do not propose that the true incidence of type-1 diabetes in children has been impacted by COVID-19, delayed presentation of children with poor control may result in a higher incidence of severe presentations requiring PICU admission than pre-pandemic.

It is important to note that public health bodies and societies around the globe anticipated issues related to delayed presentations and addressed some of these concerns with clear messaging even during the early phase of the pandemic. However, the success of these measures depends on other determinants of health including access to, and receptiveness for such messaging.

Impact on families

Visitation

While patient visitation has, with only rare exceptions, not been allowed for adult in-patients for much of the pandemic to date, restricted access—typically one parent only—has largely been the norm for PICU [8]. Using prior research, and what is widely accepted within the PICU community, these policies are likely to cause additional stress among parents and carers as well as for the patients [9].

*Correspondence: lssheker@texaschildrens.org

⁵ Texas Children's Hospital, Houston, TX, USA

Full author information is available at the end of the article

Socio-economic and mental health impact

The pandemic has had unforeseen, and unprecedented global socio-economic effects. The need to adapt to job losses, sudden imposed changes in work patterns and schooling has been a challenge for the community. The pandemic is likely to worsen global inequality. It is estimated to push an additional 150 million children into multi-dimensional poverty and may contribute to between 0.25 and 1 million additional under-5 deaths in low- and middle-income countries [10, 11]. Disruption of health services including reduction in routine immunizations, medication shortages, poverty related malnutrition may all add to significant indirect downstream pressure on paediatric critical care services, especially in the low and middle-income countries. The mental health of children and families has been adversely impacted by the pandemic and may have contributed to a relative increase in suicides in teenagers, and non-accidental injuries [12].

Organizational impact

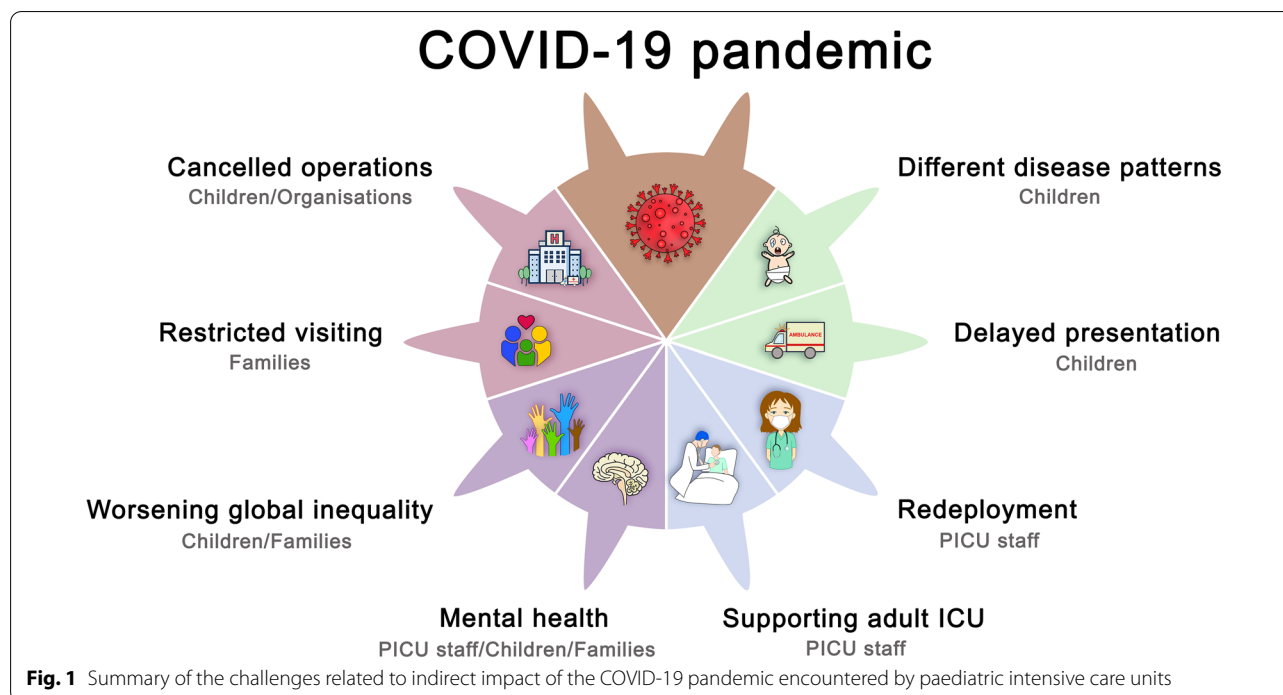
Supporting adult ICUs

As adult ICUs became overwhelmed during the COVID-19 pandemic, many PICUs stepped up to support them by admitting adults with or without COVID-19 disease, to the PICU, by re-designating PICUs to care exclusively for adults or by redeploying PICU team members to nearby adult ICUs. This called for

“rapid-fire” education of PICU staff to be able to practice in an unfamiliar role/environment, and to provide the best possible care to adults. Rapid development, deployment and dissemination of resources such as the “POPCoRN” network contributed to this rapid learning curve [13].

Elective activity

Elective surgical activity was impacted globally by the pandemic. This was primarily in response to the massive demands on beds to take care of critically ill adults but elective paediatric surgical activity was also restricted or halted at times. Paediatric cardiac surgery accounts for the majority of elective surgery in children requiring postoperative ICU admission. An international survey of paediatric cardiac surgeons highlighted a >50% reduction in paediatric cardiac surgical activity in ~50% of centres with most centres having to prioritise planned procedures, and all but emergency procedures being halted in up to 88% of centres [14]. This inevitably led to increases in waiting times for elective cardiac surgery, and unfortunately some ‘elective’ procedures ultimately becoming emergencies, leading to worsening outcomes. Close monitoring of patients on waiting list, re-classification of surgical priority, followed by careful plans for safe resumption of activity that includes flexible scheduling is required to accommodate all patients in a timely manner.



Impact on the PICU team

The pandemic has inevitably impacted the care team—demanding numerous changes in work practice relating to patient care, use of personal protective equipment, rounding paradigms, and family involvement in care. These factors, combined with fundamental changes in how we communicate with families and with each other, educate and collaborate in the workplace have challenged the very core values of working in the PICU. The loss of the normal team dynamic, with additional concerns regarding redeployment, expanded scope of practice, job instability of team members or their loved ones, a fear of contracting or transmitting COVID-19, and the impact on individuals or the PICU team of having COVID-19 or being placed in quarantine have had a significant impact on the mental health of the PICU team [15]. In addition, the ‘moral distress’ cost of PICUs supporting adults dying alone with COVID-19 during the pandemic cannot be under-estimated. Many hospitals have been proactive in providing interventions and support aimed targeting provider well-being to support the mental health and the integrity of the PICU team.

In summary, the impact of COVID-19 pandemic on PICU (Fig. 1), although less visible compared to adult units, is all-pervasive, substantial and likely to be long-lasting.

Author details

¹ Paediatric Intensive Care Unit, Birmingham Children’s Hospital, Birmingham, UK. ² University of Birmingham, Birmingham, UK. ³ Section of Paediatric Critical Care, Hadassah University Medical Center, Jerusalem, Israel. ⁴ The Hebrew University Hadassah Medical School, Jerusalem, Israel. ⁵ Texas Children’s Hospital, Houston, TX, USA. ⁶ Baylor College of Medicine, Houston, TX, USA.

Declarations

Conflict of interest

On behalf of all the authors, the corresponding author states that there are no conflicts of interest.

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