

VIEWPOINT

GLOBAL HEALTH REPORT

The Hidden Victims of the COVID-19 Pandemic

Congenital Heart Disease Patients



Sonia A. El-Saiedi, PhD,^{a,*} Christiane Haeffele, MD,^{b,c,*} Baher M. Hanna, PhD,^a George K. Lui, MD^{b,c}

The unprecedented challenges of the novel coronavirus (severe acute respiratory syndrome-coronavirus-2 [SARS-CoV-2], or coronavirus disease-2019 [COVID-19]) pandemic has pressed health systems to rapidly adapt to the critical care needs of COVID-19 patients. As of the writing of this paper, more than 4 million individuals have been reported worldwide with COVID-19 (1). In order to preserve resources including personal protective equipment and critical care beds, hospitals have been forced to defer elective procedures. Many patients have also avoided hospitals to lessen the risk of contracting COVID-19. Emergency department visits have seen reductions of 40% to 50% (2). An analysis of U.S. catheterization lab ST-segment elevation myocardial infarction activations demonstrated a 38% reduction during the early phase of the pandemic as compared with pre-COVID-19 (3). The congenital heart disease (CHD) community is not immune to these challenges, as infants, children, and adults with CHD often require intervention in a timely manner in order to improve survival and long-term outcomes.

Prior to the global outbreak of COVID-19, Egypt had successfully created a network of care for an estimated 20,000 infants born with CHD every year (4).

A central, specialized CHD hospital was established in Cairo, and referral networks of specialized pediatric centers around the country allowed improved access to care for patients around the country. A review of the Cairo University Children Hospital in 2013 demonstrated that 2,000 children per day were seen in various specialty clinics; about 1,000 pediatric catheterizations and over 6,000 echocardiograms were performed annually, 30% of which were cyanotic CHD patients (5). At the Aswan Heart Centre, over 1,100 open-heart surgeries, 3,000 cardiac catheterizations, and 25,000 consultations were performed annually (6), with children comprising 60% of their surgical patients. The global pandemic now threatens to undo this progress in Egypt.

Now, with the global pandemic, intensive care units beds sit empty, people have stopped travel into the country because of the national lockdown and fear of contracting the virus, surgeries have been canceled, and clinics are closed. Some of the complex surgical volume was dependent on the assistance of foreign medical missions, which have also ceased because of travel restrictions. Cardiac catheterization is now limited to a maximum of 10 cases/week. Critical neonates with CHD are directed to emergency services in order to keep isolation or negative-pressure rooms vacant for COVID-19 patients. Only 1 cardiovascular operating room is functional for emergency cases. Organ transplantation has ceased, leaving critically ill patients without options. A report addressing pitfalls in behavior during the COVID-19 pandemic noted the uneven distribution of cases within and between countries will lead to inequalities in care (7). In this silent void of care, as international focus shifts to COVID-19, CHD patients are at risk of dying at home or developing complications from their cardiac condition. They are among the hidden victims of the COVID-19 pandemic.

From the ^aDivision of Pediatric Cardiology, Pediatrics Department, Cairo University, Cairo, Egypt; ^bDivision of Pediatric Cardiology, Stanford University School of Medicine, Stanford, California; and the ^cDivision of Cardiovascular Medicine, Stanford University School of Medicine, Stanford, California. *Drs. El-Saiedi and Haeffele contributed equally to this work. The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the *JACC: Case Reports* [author instructions page](#).

Several themes have emerged from the literature regarding the impact of COVID-19 on congenital cardiac programs (8-10). Limited resources such as hospital beds, ventilators, and blood products have resulted in difficult decisions regarding timing of CHD surgery. When health care resources become scarce because of increased demand and must be rationed, a triage system becomes necessary (11). A triage system must be founded on transparency and based on committee decision, to avoid individual bias and singular responsibility for care allocation. Shared decision making among medical and surgical teams is essential to implement timing of CHD intervention when there are less resources. General guidance for timing of CHD intervention has been outlined by Stephens *et al.* (10). Many CHD patients have excellent prognoses if they receive operative intervention in a timely fashion. Identifying which patients are most likely to benefit from intervention, either from a minimal intervention with maximal benefit or those who are most likely to suffer significantly from delayed care, must be prioritized.

The effect of pandemics and viral outbreaks on vulnerable pediatric patients has been previously demonstrated. In 2003, during a SARS outbreak in Canada, 2 hospitals in Toronto attempted to follow neonatal patients via mail or telephone surveys for a 2-month period during lockdown. Compared with standard clinical practice for a similar 2-month period in 2005, approximately 25% of the neonates during the SARS period were lost to follow-up, compared with a 7% rate during normal clinical operations (12). A review of countries affected by the Ebola outbreak in 2014 to 2015, when access to health care decreased by an estimated 50%, showed significantly increased mortality from malaria, human immunodeficiency virus or acquired immunodeficiency syndrome, and tuberculosis (13). In one particular model, it was estimated that children <5 years of age had a 50% higher mortality rate from untreated malaria during the Ebola outbreak (13).

Finally, COVID-19 testing in the United States and worldwide as well as adequate personal protective equipment have been woefully lacking. Congenital cardiac programs are inherently small and especially

vulnerable if providers are repurposed to COVID units. There is a limited pool of physicians with expertise in the care of CHD patients. Egypt is particularly vulnerable, with about 250 pediatric cardiologists and 60 pediatric cardiac surgeons serving the 102 million citizens. It is paramount for each program to reduce overall exposure by scheduling providers in on-off rotations, maintaining adequate personal protective equipment, surveillance via widespread testing of asymptomatic health care providers, and strategies for remote telehealth (10).

A triage system of care and a recommitment to the care of CHD patients must be implemented, or the death toll from COVID-19 will continue to mount through the loss of life from these hidden victims in the pandemic. The COVID-19 pandemic could last up to 2 years. Patients with CHD cannot wait until the pandemic has resolved to receive care. Although it is not yet known how many CHD patients may be lost to follow-up or delay needed testing or intervention because of COVID-19, we can begin to mitigate this risk by reaching out to patients and families now and acting together regionally and globally. A 2018 review demonstrated that low-income countries and low- to middle-income countries already had a significant lack of access to cardiac surgery, resulting in premature death from rheumatic heart disease and CHD (14). Although we must be mindful of our patients' safety and protect them and their families from COVID-19 infection, the health care system must continue to care for those whose lives will be lost without intervention. Countries such as Egypt, and even high-income countries such as the United States, where care for chronic diseases has also been halted, must find ways to care for CHD patients even in crisis. The international progress made in caring for CHD patients over the past 3 decades must not be lost.

ADDRESS FOR CORRESPONDENCE: Dr. Sonia A. El-Saiedi, Pediatric Cardiology, Cairo University, 2 Aly Pasha Ibrahim Street, PO Box 11111, Mounira, Cairo, Egypt. E-mail: myheartclinic@windowlive.com.

REFERENCES

1. Johns Hopkins University of Medicine. Coronavirus Resource Center. Available at: <https://coronavirus.jhu.edu>. Accessed April 2020.
2. Stone W, Yu E. Eerie emptiness of ERs worries doctors: where are the heart attacks and strokes? OrthoSpineNews. Available at: <https://orthospine.com/2020/05/06/eerie-emptiness-of-ers-worries-doctors-where-are-the-heart-attacks-and-strokes/>. Accessed May 7, 2020.
3. Garcia S, Albaghdadi MS, Meraj PM, *et al.* Reduction in ST-segment elevation cardiac catheterization laboratory activations in the United States during COVID-19 pandemic. *J Am Coll Cardiol* 2020;75:2871-2.
4. Hoffman J. The global burden of congenital heart disease. *Cardiovasc J Afr* 2013;24:141-5.
5. Emam S, Agha H, Sobeih A, Al-Natsha A. Incidence of congenital heart disease among patients referred for echocardiography unit at Cairo University Children Hospital, concluding a referral

criteria for echocardiographic study. Paper presented at: International Conference and Exhibition on Pediatric Cardiology; August 25-27, 2015; Valencia, Spain.

6. Scholtz A. Professor Sir Magdi Yacoub and the Aswan Heart Centre. *J Am Coll Cardiol* 2018;72:1417-21.
7. Redelmeier DA, Shafir E. Pitfalls of judgment during the COVID-19 pandemic. *Lancet Public Health* 2020;5:e306-8.
8. Levy E, Blumenthal J, Chiotos K, Dearani JA. COVID-19 FAQ's in pediatric cardiac surgery. *World J Pediatr Congenit Heart Surg* 2020 Apr 21 [E-pub ahead of print].
9. Morray BH, Gordon BM, Crystal MA, et al. Resource allocation and decision making for pediatric and congenital cardiac catheterization during the novel coronavirus SARS-CoV-2 (COVID-19) pandemic: a U.S. multi-institutional perspective. *J Invasive Cardiol* 2020;32:E103-9.
10. Stephens EH, Dearani JA, Guleserian KJ, et al. COVID-19: crisis management in congenital heart surgery. *Ann Thorac Surg* 2020 Apr 14 [E-pub ahead of print].
11. Gal DB, Char DS. Considerations for triaging elective cases in children with cardiac disease in a time of crisis. *Circulation* 2020 Apr 13 [E-pub ahead of print].
12. Nasef N, O'Brien K, Wylie L, Unger S. Lessons from SARS: a retrospective study of outpatient care during an infectious disease outbreak. *BMC Pediatr* 2010;10:51.
13. Parpia AS, Ndeffo-Mbah ML, Wenzel NS, Galvani AP. Effects of response to 2014-2015 Ebola outbreak on deaths from malaria, HIV/AIDS, and tuberculosis, West Africa. *Emerg Infect Dis* 2016;22:433-41.
14. Zilla P, Yacoub M, Zuhlke L, et al. Global unmet needs in cardiac surgery. *Glob Heart* 2018;13:293-303.

KEY WORDS congenital heart disease, COVID-19