EDITORIAL

The Impact of COVID-19 Pandemic on Critical Care Systems in Low- and Middle-Income Countries

Ged WILLIAMS, RN, Crit. Care Cert, LLM, MHA, FACN, FACHSM, FAAN,[a] *Elizabeth KUSI-APPIAH, RN, MN,*[b] *and Elizabeth PAPATHANASSOGLOU, RN, MSc, PhD*[c]

The exponential growth of the COVID-19 pandemic worldwide has implications for contemporary public health priorities and critical care nursing globally (Carter et al., 2020; Ma & Vervoort, 2020). Analysis of country-based responses to COVID-19-related critical illness reveal more strain on ill-resourced critical care delivery systems in low- and middle-income countries (LMIC) (Houreld et al., 2020; Walker et al., 2020). Few data currently exist on the critical care capacity of LMIC for the pandemic (Ma & Vervoort, 2020). However, it is well established that LMIC trail behind high-income countries in several health measures and infrastructures (Siow et al., 2020). In a recent estimation of critical care capacity for COVID-19 management, the percentage of intensive care unit (ICU) beds was lowest in LMICs (1.47%–2.88%) and highest in high-income countries (3.30%) (Walker et al., 2020).

The gaps in the critical care capacity of LMIC are glaringly obvious. Mongolia, for instance, although reputed as a LMIC with a better intensive care system than most, at an evaluation of its pandemic preparedness, showed approximately 11 ICU beds per 100,000 inhabitants (Erkhembayar et al., 2020) which lags behind high-income countries with an estimated 59.5 ICU beds per 100,000 inhabitants (Ma & Vervoort, 2020). In India, where a pluralistic healthcare system serves an estimated 1.3 billion people, only 95,000 ICU beds and 48,000 ventilators were recorded at the height of the pandemic, translating to approximately 7 ICU beds and 3 ventilators per 100,000 inhabitants (Kapoor et al., 2020). At the extremes of ICU bed shortage, continent-wide, Africa averages less than one intensive care bed and one ventilator per 100,000 inhabitants (Houreld et al., 2020). Fostering practical social justice will mean building the capacity of LMIC for rapid innovative, cost-effective, and tailored mechanisms for critical care delivery (Kelley et al., 2020; Ma & Vervoort, 2020; Siow et al., 2020).

Factors such as overcrowding, close intergenerational contact, poor housing, and sanitation continue to spur the transmission of COVID-19 in LMIC, leaving LMIC with the immediate and longer-term consequences of the pandemic (Kelley et al., 2020). Although there are no data on the survival rate of COVID-19 ICU patients in LMIC, investigators surmise that COVID-19-related mortality may be higher than the predicted and reported case fatality rate in LMIC (Carter et al., 2020; Houreld et al., 2020; Hopman et al., 2020). The absence of digital infrastructure and institutional partnership tracking COVID-19-related critical illness largely negates active surveillance and concerted efforts for responsive healthcare actions in LMIC (Critical Care Asia et al., 2020; Mahmood et al., 2020).

Currently, high-income countries are torn between helping themselves and LMIC. As all

[a]*Adjunct Professor, Griffith University, Queensland, Australia*

[b]*University of Alberta, Faculty of Nursing, Edmonton, Alberta*

[c]*Professor, Faculty of Nursing, University of Alberta, 11405-87th Ave., Edmonton, Alberta, CA T6G 1C9. E-mail: papathan@ualberta.ca*

http://dx.doi.org/10.1891/WFCCN-D-21-00004

eyes turn to the global prospects for COVID-19 control and vaccine rollout, dominant narratives have centered on high-income countries (Wu & Robbins, 2020). It is a moral imperative to prevent the marginalization of the 75% of the global population residing in LMICs, by strengthening the international discourse and action on global equitable access to COVID-19 vaccines (Salluh et al., 2020). We, therefore, profile the challenges COVID-19 poses to the critical care system in LMICs to contribute to the international dialogue on strengthening health systems for future epidemics (Cenat, 2020).

IMPACT ON CRITICAL CARE INFRASTRUCTURE AND HEALTH WORKERS

The global shortage of critical care workforce is severely felt in LMIC, where a major shortage of trained and experienced critical care staff exists, while western developed courses are used out of context for building staff's clinical competencies (Carter et al., 2020; Verhagen et al., 2020; Williams, 2020). Currently, many high income countries have smoothened their nursing registration process and softened their immigration policies to facilitate the influx of nurses from LMIC to combat the pandemic (Dempster & Smith, 2020). Due to the lack of incentives and competitive salaries for health workers in LMIC, an immigration wave of ICU health workers toward high-income countries my further contribute to the collapse of critical care systems in LMIC (Tayaben & Younas, 2020).

For critical care nurses combating the pandemic in LMIC, the shortage of workforce means working overtime with limited personal protective equipment (PPE) and limited knowledge regarding infection control practices (Chersich et al., 2020; Meghani & Nasreen, 2020). Most hospitals in LMIC are struggling with the need to protect patients and staff from nosocomial transmission amid a lack of isolation units and protocols (Chersich et al., 2020; Phua et al., 2020; Meghani & Nasreen, 2020). In some LMIC, critical care services are plagued with electricity rationing and outages forcing facilities to rely on diesel-powered generators, which. in effect increases healthcare spending (Cenat, 2020).

Nurses in most LMIC have a low social image, they are not involved in health policy advocacy, while their work may not be acknowledged, and they may be victimized by members of the public who are frustrated by the shortcomings of the healthcare system (Meghani & Nasreen, 2020; Wilson et al., 2020). Amid the pandemic, bureaucratic dysfunctions in health systems, lack of administrative support, immense workloads, missed days off, lack of PPE and equipment shortages, as well as challenges with transportation, accommodation, and childcare facilities weigh heavily on critical care nurses' mental well-being in LMIC (Meghani & Nasreen, 2020). As a result, most nurses in LMIC are reporting symptoms of fear, anxiety, depression, posttraumatic symptoms, spiritual, and moral distress (Meghani & Nasreen, 2020).

As overwhelming as the above summary may feel, it gets worse when considering the global foreign direct investment (GFDI) dropped 42% from $1.5 trillion in 2019 to $859 billion in 2020 associated with fears of the economic impact of COVID on many first world countries (UNCTAD, 2021), and forecasts indicate that the pandemic will push 71 million people back into extreme poverty in 2020, in what would be the first rise in global poverty since 1998 (United Nations Economic and Social Affairs [UNESA], 2020).

FINDING A WAY FORWARD

We refer to the wisdom and leadership of António Guterres, Secretary-General, United Nations who proclaims: "Everything we do during and after this crisis [COVID-19] must be with a strong focus on building more equal, inclusive and sustainable economies and societies that are more resilient in the face of pandemics, climate change, and the many other global challenges we face." Although challenged by the enormity of the task, we are seeing some attempts by first world nations to distribute COVID vaccines to LMICs in their regions (Wouters et al., 2021) and collectives of

global healthcare organizations such as the Sustainable Health Equity Movement partnering to lobby for greater equity of health resources to LMICs (Williams & Friganovic, 2021) as well as national critical care nursing organizations partnering with LMIC countries in their region to support improved access to education, training, and capacity (Williams et al., 2020). The World Federation of Critical Care Nurses (WFCCN) and our national societies have an opportunity and a responsibility to continue to drive an agenda of equity and sustainability of healthcare resources globally to affect a better world for critical care nurses and their communities in a post-COVID world. Our final word of advice comes from Gandalf the Grey of Lord of the Rings who said: *"All we have to decide is what to do with the time that is given to us."*

REFERENCES

Cenat, J. M. (2020). The vulnerability of low- and middle-income countries facing the COVID-19 pandemic: The case of Haiti. *Travel Medicine and Infectious Disease*, *37*, 101684. https://doi.org/10.1016/j.tmaid.2020.101684

Carter, C., Lan Anh, T. N., & Notter, J. (2020). COVID-19 disease: Perspectives in low- and middle-income countries. *Clinics in Integrat ed Care*, Vol 1 (2020): 100005 doi:10.1016/ j.intcare.2020.100005.

Chersich, M. F., Gray, G., Fairlie, L., Eichbaum, Q., Mayhew, S., Allwood, B., English, R., Scorgie, F., Luchters, S., Simpson, G., Haghighi, Mosalman., M, & Duc Pham, M. (2020). COVID-19 in Africa: Care and protection for frontline healthcare workers. *Globalization and Health*, *16*(46), 1–6.

Critical Care, Asia., Hashmi, M., Beane, A., Murthy, S., Dondorp, A. M., & Haniffa, R. (2020). Leveraging a cloud-based critical care registry for COVID-19 pandemic surveillance and research in low- and middle-income countries. *JMIR Public Health and Surveillance*, *6*(4), 1–6. https://doi.org/10.2196/21939

Dempster, H., & Smith, R. (2020). *Migrant health workers are on the COVID-19 frontline. We need more of them*. Center for Global Development. https://www.cgdev.org/blog/migrant-health-workers-are-covid-19-frontline-we-need-more-them.

Erkhembayar, R., Dickson, E., Badarch, D., Narula, I., Warburton, D., Thomas, G. N., Ochir, C., & Manaseki-Holland, S. (2020). Early policy actions and emergency response to the COVID-19 pandemic in Mongolia: Experiences and challenges. *The Lancet Glob Health*, *8*, e1234–1241. https://doi.org/ 10.1016/ S2214-109X(20)30295-3

Hoopman, J., Allegranzi, B., & Mehtar, S. (2020). Managing COVID-19 in low- and middle-income countries. *Journal of American Medical Association*, *323*(16), 1545–1550. https:// doi.org/10.1001/jama.2020.4169

Houreld, K., McNeil, R., & Granados, S. (2020). *Understanding COVID-19: Virus exposes gaping holes in Africa's health systems.*. https:// graphics.reuters.com/HEALTH-CORONAVIRUS/AFRICA/yzdpxoqbdvx/.

Kapoor, G., Sriram, A., Joshi, Y., Nandi, A., & Laxminarayan, R. (2020). *COVID-19 in India: State-wise estimates of current hospital beds intensive care unit (ICU) beds and ventilators* [Pre-print]. https:// doi.org/10.1101/2020.06.16.20132787

Kelley, M., Ferrand, R. A., Muraya, K., Chigudu, S., Molyneux, S., Pai, M., & Barasa, E. (2020). An appeal for practical social justice in the COVID-19 global response in low-income and middle-income countries. *The Lancet Global Health*, *8*(7), 888–889. https://doi.org/10.1016/S2214-109X(20)302 49-7

Phua, J., Weng, L., Ling, L., Egi, M., Lim, C. M., Shrestha, R., Arabi, y, Ng, J., Gomersall, C. D., Nishimura, M., Koh, Y., & Du, B. (2020). Intensive care management of coronavirus disease 2019 (COVID-19): Challenges and recommendations. *The Lancet Respiratory Medicine*, *8*(5), 506–517.

Ma, X., & Vervoort, D. (2020). Critical care capacity during the COVID-19 pandemic: Global availability of intensive care beds. *Journal*

of Critical Care, *58*, 96–97. https://doi.org/10.1016/j.jcrc

Mahmood, S., Hasan, K., Carras Colder, M., & Labrique, A. (2020). Global preparedness against COVID-19: We must leverage the power of digital health. *JMIR Public Health Surveillance*, *6*(2), e18980. https://doi.org/10.2196/18980

Meghani, S., & Nasreen, L. (2020). Critical care nurses as frontline warriors during covid-19 in Pakistan. *Connect: The World of Critical Care Nursing*, *13*(4), 196–201. https://doi.org/10.1891/WFCCN-D-20-00009

Salluh, J. I. F., Burghi, G., & Haniffa, R. (2020). Intensive care for COVID-19 in low and middle-income countries: Research opportunities and challenges. *Intensive Care Medicine*, *47*, 226–229. https://doi.org/10.1007/s00134-020-06285-y

Siow, R. W., Liew, M. F., Shrestha, B. R., Muchtar, F., & See, K. C. (2020). Managing COVID-19 in resource-limited settings: Critical care considerations. *Critical Care*, *24*(167), 1–5. https://doi.org/10.1186/s13054-020-02890-x

Tayaben, J. L., & Younas, A. (2020). Call to action for advocacy of immigrant nurses during COVID 19 pandemic. *Journal of Advanced Nursing*, *76*(9), 2220–2221. https://doi.org/10.1111/jan.14432

UNCTAD. (2021, January 24). *Global foreign direct investment fell by 42% in 2020, outlook remains weak*. https://unctad.org/news/global-foreign-direct-investment-fell-42-2020-outlook-remains-weak

United Nations Economic and Social Affairs. (2020). *The sustainable development goals report 2020: Finding transformative pathways in turbulent times*. https://unstats.un.org/sdgs/report/2020/finding-transformative-pathways-in-turbulent-times/

Verhagen, M. L., Groot, de., R, Lawrence., A, C., Talijaard, J., Cotton, M. F., & Rabie, H. (2020). COVID-19 response in low- and middle-income countries: Don't overlook the role of mobile phone communication. *International Journal of Infectious Diseases*, *99*, 334–337. https://doi.org/10.1016/j.ijid.2020.07.0691201-9712/

Walker, P. G. T., Whittaker, C., Watson, J. O., Baguelin, M., Winskill, P., Hamlet, A., Djafaara, B. A., Cucunubá, Z., Mesa, Olivera., D, Green., W, Thompson., H, Nayagam., S, Ainslie., C, K. E., Bhatia, S., Bhatt, S., Boonyasiri, A., Boyd, O., Brazeau, N. F. ··· ··· Cuomo-Dannenburg, G. (2020). The impact of COVID-19 and strategies for mitigation and suppression in low- and middle-income countries. *Science*, *369*(6502), 413–422. https://doi.org/10.1126/science.abc0035

Williams, G. (2020). The true worth of a nurse ···time to act! *Journal of Advance Nursing*, *76*, 2469–2470. https://doi.org/10.1111/jan.14418

Williams, G., Jaspers, R., Wohuinangu, V., Micik, S., & De Luca, A. (2020). Critical care nursing in Papua New Guinea. *Connect: The World of Critical Care Nursing*, *14*(1), 35–44. https://doi.org/10.1891/WFCCN-D-20-00011

Williams, G., & Friganovic, A. (2021). Sustainable health equity - Can it be secure in a post COVID world?. *Connect: The World of Critical Care Nursing*, *14*(3).

Wouters, O., Shadle, K. C., Salcher-Komrad, M., Pollard, A. J., Larson, H. J., Teerawattananon, Y., & Jit, M. (2021). Challenges in ensuring global access to COVID-19 vaccines: Production, affordability, allocation, and deployment. *The Lancet*, 397: 1023-34. https://doi.org/10.1016/S0140-6736(21)00306-8

Wilson, D., Anafi, F., Kusi-Appiah, E., Darko, E. M., Deck, K., & Errasti-Ibarrondo, B. (2020). Determining if nurses are involved in political action or politics: A scoping literature review. *Applied nursing Research*, *54*(151279), 1–10. https://doi.org/10.1016/j.apnr.2020.151279

Wu, K. J., & Robbins, R. (2020). As rollout falters, scientists debate new vaccination tactics. *The New York Times.*. https://www.nytimes.com/2021/01/03/health/coronavirus-vaccine-doses.html

Disclosure. The authors have no relevant financial interest or affiliations with any commercial interests related to the subjects discussed within this article.

Funding. The author(s) received no specific grant or financial support for the research, authorship, and/or publication of this article.