

Evidence-Based Public Health COVID-19 Measures: From Practice to Policy to Curriculum

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ABSTRACT

The complex public health challenges posed by COVID-19 pandemic provide a great opportunity to reflect and identify improvements to pandemic response practices, policies, and curricula. The public health developmental and resourcing divide can clearly be seen from the identification of the pandemic through to the crisis management stage and post-crisis ongoing management. Strengthening of extant public health curriculum components especially the often-overlooked components is needed to ‘future-proof’ the public health teaching programs. Alternative approaches in delivering public health curricula, including expansion of commonly used approaches and collaboration with non-conventional disciplines in inter-professional learning, would support the pandemic preparedness in the increasingly interconnected world.

Keywords: COVID-19, curriculum, public health

1. INTRODUCTION

Just as in the previous pandemics in history, COVID-19 control measures are a combination of basic medical sciences, clinical sciences, and public health [1]. The role of public health in COVID-19 control measures is highly complex and far-reaching due to the unique context of the 21st century. Issues such as globalisation, geopolitics, economics to government political systems greatly compound what initially seemed like just another novel infectious disease [2]. Factors such as conspiracy theories and the impact on and of the “digital nomad” generation further complicate the public health approaches to controlling and managing the pandemic [3],[4]. Health literacy about the pandemic is insufficient to protect against transmission, as indicated by social infections among clinicians [5]. This paper reflects on these public health challenges in relation to evidence-based public health measures, and proposes key features in public health curricula which may better prepare the public health workforce for future pandemics.

2. IDENTIFICATION OF THE PANDEMIC

Identification of COVID-19 pandemic initially followed the familiar steps of outbreak investigation from unusual case series reporting to case definition and a chain of steps including some mis-steps [6]. The ongoing mutations of the SARS-CoV-2 combined with global

travels have been creating subsequent waves with improved knowledge on how to manage them at each wave [7]. However, the pandemic also reveals, perpetuates, and accentuates the divide of evidence-based practice capacity across the globe. More developed countries are able to quickly identify the genomic nature of the virus in each wave and thus obtain a better understanding of the spread. Meanwhile, less developed countries have had to build their containment strategies based on incomplete knowledge which makes their task doubly difficult with the limited resources they have. Limited knowledge about the causative agent of a pandemic necessitates skilful adaptation of what is already known, often in a different context, to the local context. This step is standard in evidence-based practice [8], yet often overlooked especially in less developed countries where direct adoption of protocols from developed countries prevails [9],[10].

3. CRISIS MANAGEMENT

Outbreak management in the crisis stage requires two equally strong measures to treat the victims and prevent the spread: preventative measures led by public health professionals and treatment development led by clinicians and scientists. Evidence-based preventative measures for COVID-19 demonstrate the contemporary challenges of public health in the 21st century. Case

investigations and contact tracing are key steps in pandemic containment [11], and COVID-19 starkly accentuates the divide between countries (and indeed, parts of the same country) with stronger and weaker preparedness. Government policies and public health orders must tread the very fine balance among various interests [12], often in volatile, uncertain, complex and ambiguous (VUCA) situations where scientific evidence is still being built [13]. Questions about indications for different types of masks, the safe physical distance, and different levels of public restrictions require extensive readings and critical appraisal of ever-changing evidence landscape. Even practices which are considered evidence-based such as environmental deep cleaning must continually be re-evaluated and perhaps changed or dropped [14]. This challenge to evidence-based policy-making is unprecedented, and again creates a divide between countries with much better equipped public health workforce and those which are less prepared and less resourced.

Behavioural change is at the heart of COVID-19 public health messaging, yet the challenges are enormous. The primacy of internet and social media influences on the “digital nomad” generation is in contrast to the prominence of community leaders from past generations [4]. The role of misinformation reaches an unprecedented extent under COVID-19 both in its global reach and impact on people’s health beliefs and behaviours [15]. Evidence-based information provision from government and professional authorities is also hampered by other factors. First, the previously mentioned ever-changing nature of scientific evidence requires continuous vigilance and quick information updates. The speed with which new evidence is published and public health messages are revised is often incommensurate with the rate of information distribution and access by the public [16]. By the time certain pieces of information becomes widespread, the state of evidence may have changed, and the process of unlearning and re-learning could be dizzying for health professionals, let alone the general public. Second, rampant conspiracy theories indicate the low level of trust from the peoples to the authorities [3]. Combined with the various stressors from the pandemic, from heavy clinical workload to repercussions from community restrictions, it is understandable that behavioural changes needed for containment and preventative measures are elusive. An anthropological approach to developing strategies for behavioural change may help [17]; yet medical anthropology is often given low priority in general health professional curricula.

Physical distancing and community restrictions are some other hallmarks of COVID-19 pandemic containment measures. While these measures have a sound scientific basis and evidence of effectiveness, they are fraught with non-medical implications [12]. The economic repercussions, in particular, have led to many

protests demanding less restrictions which, in combination with overall frustrations, often led to violence. The COVID-19 pandemic has demonstrated the importance of the economics of pandemic containment measures, which is an aspect which is rarely (if at all) discussed in many basic lectures on outbreak management and pandemic preparedness for health professional students.

In the treatment arm, the importance of research skills training for evidence-based practice by clinicians is well-known [18]. However, less is discussed about the fact that research skills and evidence-based medicine training in medical schools are often fractionated. In many medical schools these topics are delivered by public health academics while research (bio)ethics are often delivered in conjunction with legal aspects of medicine [19]. The silos of Population Health, Clinical Medicine, Bioethics and Medico-Legal may hamper effective translation of public health research skills to clinical applications, which could be deleterious in managing complex challenges [10]. Public health, clinicians, bioethicists and medicolegal academics who teach research skills in medicine need to collaborate to ensure the students are prepared for clinical research and evidence-based practice. This collaboration is particularly important as various ethical concerns have been raised in relation to research ethics and methodology for COVID-19 treatments [20].

Issues surrounding SARS-CoV-2 vaccines may illustrate the convergence of the abovementioned challenges. The vaccines, which have been developed in record times [21], have both saved lives and created extreme controversies from social justice [22] to anti-vaccination movements [23]. Countries had to make crucial decisions on vaccination strategies from choice of vaccines to effective roll-out while safety and efficacy were still very limited, and the full extent of knowledge is still years ahead in the making. When Astra-Zeneca vaccine was linked to incidents of blood clots [24], decisions on its use in each country need to be based on comparative risks between the risk of blood clotting and the risk of severe COVID-19. Yet, many less developed countries do not have a baseline data on blood clots incidence in various patient populations especially when post-mortem examination is not routinely done. This lack of baseline data leave these countries with the challenge of extrapolating data from other countries which may have stark differences in various aspects from ethnicity to epidemiology and health services availability, which render ‘apple-to-apple’ comparison practically impossible. Meanwhile, alternative vaccines have been developed although some have generated heavy criticisms on the basis of questionable premise and/or protocol [25].

4. ONGOING MANAGEMENT

The COVID-19 pandemic has sent a clear message about the importance of interprofessional learning and collaboration in health. COVID-19 has expanded the need for this collaboration well beyond the commonly involved health professions to include laboratory-based scientists, economists, cultural anthropologists, politicians and decision-makers – to name but a few [26]. Every profession in a wide range of expertise holds a piece of the solution and each piece of knowledge needs to be utilised in light of other pieces. Public health professionals, by virtue of their broad base and inherently multi-disciplinary nature, are well-placed to advocate for this inter-professional collaboration. Interprofessional competencies may need to be expanded based on the lessons learned under the COVID-19 pandemic [27].

Public health curricula and systems also need to be strengthened to ‘future-proof’ public health professionals against other pandemics. The siloed approach to various sub-disciplines in public health such as Epidemiology, Health Promotion, Environmental Health and so on needs to be balanced with the training of generalist public health professionals. The basic building blocks of health economics, digital information management, ethics, global health, human behaviours including medical anthropology, and clinical aspects of public health topics need to be introduced to all students of public health. This generalist approach to public health workforce development is particularly important in settings with limited human resources in public health. Training on evidence-based practice needs to be extended beyond frontline service delivery to include evidence-based policy-making and advocacy.

5. CONCLUSION

The COVID-19 pandemic has revealed the complexity of pandemic management and the role of public health which is inseparable from those of other disciplines. There is ample room for improvement for public health curricula to better prepare for future challenges.

AUTHORS’ CONTRIBUTIONS

All process in writing the article was done by BM.

REFERENCES

- [1]. Morensa DM, Daszack P, Markeld H, Taubenberger JK. Pandemic COVID-19 Joins History’s Pandemic Legion. *Clin Sci Epidemiol* 2020; 11(3):e00812-20. <https://doi.org/10.1128/mBio.00812-20>
- [2]. Allen J, Burns N, Garrett L, Haass RN, Ikenberry GJ, Mahbubani K, Menon S, Niblett R, Nye JS, O’Neil SK, Schake K, Walt SM. How the world will look after the coronavirus pandemic. *Foreign Policy*. 2020. Available online: <https://foreignpolicy.com/2020/03/20/world-order-after-coronavirus-pandemic/> (accessed on 21 August 2021)
- [3]. Miller JM. Do COVID-19 conspiracy theory beliefs form a monological belief system? *Can J Political Sci*. 2020; 53(2):319-326. <https://doi.org/10.1017/S0008423920000517>
- [4]. de Almeida MA, Correia A, Schneider D, de Souza JM. COVID-19 as opportunity to test digital nomad lifestyle. 2021. *IEEE 24th International Conference on Computer Supported Cooperative Work in Design (CSCWD)*, pp. 1209-1214. <https://doi.org/10.1109/CSCWD49262.2021.9437685>
- [5]. Burak KW, Law S, Rice C, Hu J, Fung CI, Woo AKH, Fonseca K, Lang ALS, Kanji JN, Meatherall BL. COVID-19 outbreak among physicians at a Canadian curling bonspiel: A descriptive observational study. *CMAJ Open*. 2021; 9(1):E87-E95. <https://doi.org/10.9778/cmajo.20200115>
- [6]. Jones DS. History in a crisis - lessons for Covid-19. *N Engl J Med*. 2020; 382(18):1681-3. <https://doi.org/10.1056/NEJMp2004361>
- [7]. Du P, Ding N, Li J, Zhang F, Wang Q, Chen Z, Song C, Han K, Xie W, Liu J, Wang L, Wei L, Ma S, Hua M, Yu F, Wang L, Wang W, An K, Chen J, Liu H, Gao G, Wang S, Huang Y, Wu AR, Wang J, Liu D, Zeng H, Chen C. Genomic surveillance of COVID-19 cases in Beijing. *Nat Commun*. 2020; 11:5503. <https://doi.org/10.1038/s41467-020-19345-0>
- [8]. Masic I, Miokovic M, Muhamedagic B. Evidence based medicine - new approaches and challenges. *Acta Inform Med*. 2008; 16(4):219-225. <https://doi.org/10.5455/aim.2008.16.219-225>
- [9]. Sabri AA, Qayyum MA. The problem of evidence-based medicine in developing countries. *Canadian Med Assoc J*. 2006; 175(1):62.
- [10]. Marjadi B. Infection control barriers in rural Indonesia: A study of four clinical practice areas. (Thesis.) 2009. Kensington: The University of New South Wales. <http://unsworks.unsw.edu.au/fapi/datastream/unsworks:5266/SOURCE02?view=true>
- [11]. Ruebush E, Fraser MR, Poulin A, Allen M, Lane JT, Blumenstock JS. COVID-19 case

- investigation and contact tracing: Early lessons learned and future opportunities. *J Public Health Manag Pract.* 2021; 27(Suppl.1):S87-S97. <https://doi.org/10.1097/PHH.0000000000001290>
- [12]. Gostin LO, Wiley LF. Governmental Public Health Powers During the COVID-19 Pandemic: Stay-at-home Orders, Business Closures, and Travel Restrictions. *JAMA.* 2020; 323(21):2137–2138. <https://doi.org/10.1001/jama.2020.5460>
- [13]. Pandit M. Critical factors for successful management of VUCA times. *BMJ Leader.* 2021; 5:121-123.
- [14]. Lewis D. COVID-19 rarely spreads through surfaces. So why are we still deep cleaning? *Nature.* 2021;590:26-28. <https://doi.org/10.1038/d41586-021-00251-4>
- [15]. Islam MS, Kamal AHM, Kabir A, Southern DL, Khan SH, Hasan SMM, Sarkar T, Sharmin S, Das S, Roy T, Harun MGD, Chughtai AA, Homaira N, Seaale H. COVID-19 vaccine rumors and conspiracy theories: The need for cognitive inoculation against misinformation to improve vaccine adherence. *PLOS ONE* 2021;16(5): e0251605. <https://doi.org/10.1371/journal.pone.0251605>
- [16]. Palayew A, Norgaard O, Safreed-Harmon K, Anderse TH, Rasmussen LN, Lazarus JV. Pandemic publishing poses a new COVID-19 challenge. *Nat Hum Behav.* 2020; 4:666–669. <https://doi.org/10.1038/s41562-020-0911-0>
- [17]. Higgins R, Martin E, Vesperi MD. An anthropology of the COVID-19 pandemic. *Anthropology Now.* 2020; 12(1):2-6. <https://doi.org/10.1080/19428200.2020.1760627>
- [18]. Laidlaw A, Aiton J, Struthers J, Guild S. Developing research skills in medical students: AMEE Guide No. 69. *Med Teach.* 2012; 34(9):e754-71. <https://doi.org/10.3109/0142159X.2012.704438>
- [19]. Marjadi B, Wulandari AS. Teaching public health in undergraduate medical schools: Experience in Indonesia and Australia. Presentation at the 15th World Congress on Public Health, Melbourne, Australia, 3rd-7th April 2017.
- [20]. Hsu NS, Hendriks S, Ramos KM, Grady C. Ethical considerations of COVID-19-related adjustments to clinical research. *Nat Med.* 2021; 27:191-193. <https://doi.org/10.1038/s41591-020-01216-2>
- [21]. Ball P. The lightning-fast quest for COVID vaccines and what it means for other diseases. *Nature.* 2021; 589:16-18. <https://doi.org/10.1038/d41586-020-03626-1>
- [22]. Rhodes R. Justice in COVID-19 vaccine prioritisation: Rethinking the approach. *J Med Ethics.* 2021; 47:623-631. <http://dx.doi.org/10.1136/medethics-2020-107117>
- [23]. Mylan S, Hardman C. COVID-19, cults, and the anti-vax movement. *Lancet.* 2021; 397(10280):1181. [https://doi.org/10.1016/S0140-6736\(21\)00443-8](https://doi.org/10.1016/S0140-6736(21)00443-8)
- [24]. Østergaard SD, Schmidt M, Horváth-Puhó E, Thomsen RW, Sørensen HT. Thromboembolism and the Oxford-AstraZeneca COVID-19 vaccine: side-effect or coincidence? *Lancet.* 2021; 397(10283):1441-1443. [https://doi.org/10.1016/S0140-6736\(21\)00762-5](https://doi.org/10.1016/S0140-6736(21)00762-5)
- [25]. Widyastuti HP. “Vaksin Nusantara”: A look from a concerned scientist. [Online article.] 2021. Available online: <https://www.infid.org/news/read/vaksin-nusantara-look-concerned-scientist> (accessed on 20 September 2021).
- [26]. World Health Organization. Framework for action on interprofessional education & collaborative practice. 2010. Geneva: World Health Organization.
- [27]. O’Keefe M, Henderson A, Chick R. Defining a set of common interprofessional learning competencies for health profession students. *Medical Teacher.* 2017; 39(5):463-468. <https://doi.org/10.1080/0142159X.2017.1300246>