



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Letter to the editor

Hand hygiene and the novel coronavirus pandemic: the role of healthcare workers



Sir,

The novel coronavirus (SARS-CoV-2) responsible for the current pandemic of coronavirus disease (COVID-19) that originated in Wuhan, China, in December 2019, has now spread to 113 countries and territories outside of China [1,2]. SARS-CoV-2 is a betacoronavirus that infects humans and the disease presents mostly with fever, cough and dyspnea [3]. Healthcare workers (HCWs) are at the front-line of the COVID-19 outbreak, and their constant exposure to infected patients and contaminated surfaces can put them at risk of acquiring and transmitting the infection [4]. SARS-CoV-2 appears to be transmitted person-to-person through respiratory droplets and close contact, as previously seen in severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV), the two other zoonotic coronaviruses. In healthcare settings, this highlights the necessity of practicing respiratory hygiene and hand hygiene, and using appropriate personal protective equipment [5,6]. Additional airborne precautions such as N95 masking should be used by HCWs during aerosol-generating procedures when caring for COVID-19 patients [6]. The World Health Organization (WHO) has strongly recommended HCWs to ask patients to cover their nose and mouth with a tissue or elbow when coughing or sneezing, to provide masks for patients who are suspected of having COVID-19, and to perform appropriate hand hygiene [6].

Hand hygiene with alcohol-based hand rub (ABHR) is widely used around the world as one of the most effective, simple and low-cost procedures against COVID-19 cross-transmission [6]. By denaturing proteins, alcohol inactivates enveloped viruses, including coronaviruses, and thus ABHR formulations with at least 60% ethanol have been proven effective for hand hygiene [7]. ABHRs such as those recommended by the WHO, containing ethanol (80% v/v) or isopropanol (75% v/v) as active components, have a marked virucidal effect against SARS-CoV and MERS-CoV [8,9]. Accordingly, during outbreaks and periods with increased demand, in case of the absence or shortage of commercially produced ABHRs, the WHO formulation can be produced locally [10]. HCWs should adhere to the WHO's 'My 5 Moments for Hand Hygiene': before touching a patient, before clean or aseptic procedures, after body fluid exposure or risk,

after touching a patient and after touching patient surroundings [9]. The WHO guidelines promote a six-step technique by applying a palmful of ABHR, covering all surfaces of the hands and rubbing until dry [9]. However, low hand hygiene compliance levels are still a disquieting challenge worldwide despite the numerous interventions and campaigns performed in promoting this action [11]. According to existing reports, hand hygiene, an essential component of infection prevention and control, is often neglected by HCWs both in developed and developing countries, with compliance rates sometimes dipping below 20% [12]. Overcrowding of healthcare facilities, the lack of distinct patients zones, and lack of access to reliable and adequate ABHR, are among the many challenges preventing effective hand hygiene procedure in resource-limited healthcare settings [13].

As the WHO has recently reported, 9 million more nurses and midwives are needed around the world in order to achieve universal health coverage by 2030 [14]. Nurses are the group of HCWs who are often the primary point of care in their communities especially during infectious disease outbreaks. Their frequent exposure to pathogens, long working hours, stressful work environment and fatigue predispose them to acquire or transmit infections such as COVID-19 [15,16]. Their adherence to infection prevention and control guidelines is vital in combatting the current COVID-19 pandemic [15]. Most healthcare-acquired infections could be avoided by well-trained nurses with appropriate hand hygiene compliance and use of protective equipment [17]. In order to ensure safety and quality of care, having adequate numbers of nursing staff and access to equipment is crucial [18]. The growing rate of nosocomial transmission of COVID-19 magnifies the global demand to implement infection prevention and control more effectively in all healthcare settings [2,6].

Midwives are another major group of HCWs who contribute significantly to the provision of quality health services in the community [14]. Although the impact of COVID-19 is not yet clear on pregnant women, they might be at greater risk of acquiring the infection because pregnant women are more susceptible to respiratory viruses [19]. As COVID-19 infection has been reported from close contact of neonates with confirmed cases, it is important to consider pregnant women and their newborn infants as at-risk populations while preventing and managing COVID-19 infection [19]. Accordingly, nurses and midwives should be trained to appropriately comply with infection prevention and control guidelines including hand hygiene when providing care for this group [20].

Given the seriousness of disease outbreaks in general and COVID-19 specifically, it is crucial to promote the WHO guidelines and implement the 'SAVE LIVES: Clean Your Hands'

campaign around the world. The WHO has designated 2020 the Year of the Nurse and the Midwife. The hard work and responsibility of this often-underappreciated group of HCWs should be addressed and appreciated, especially during outbreaks and global health challenges. Please join us in honoring their significant role in providing and improving health services. 'Nurses and Midwives: CLEAN CARE is in YOUR HANDS!'

Disclaimer

The views expressed in this article are those of the authors alone and do not necessarily represent the views, decisions, or policies of the institutions with which the authors are affiliated. The World Health Organization (WHO) takes no responsibility for the information provided or the views expressed in this article.

Conflict of interest statement

None of the authors has any conflicts of interest to disclose.

Funding sources

This work is supported by the Infection Control Programme (SPCI), University of Geneva Hospitals and Faculty of Medicine, Geneva, Switzerland; hand hygiene research activities at the SPCI are also supported by the Swiss National Science Foundation (grant no. 32003B_163262).

References

- [1] Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020;395(10223):497–506.
- [2] WHO. Coronavirus disease 2019 (COVID-19) situation report – 51. Available at: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200311-sitrep-51-covid-19.pdf?sfvrsn=1ba62e57_4 [last accessed March 2020].
- [3] Sun P, Lu X, Xu C, Sun W, Pan B. Understanding of COVID-19 based on current evidence. *J Med Virol* 2020.
- [4] Phan LT, Maita D, Mortiz DC, Bleasdale SC, Jones RM. Environmental contact and self-contact patterns of healthcare workers: Implications for infection prevention and control. *Clin Infect Dis* 2019;69(Supplement 3):S178–84.
- [5] WHO. Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19). Interim guidance. WHO; 27 January 2020. Available at: https://apps.who.int/iris/bitstream/handle/10665/331215/WHO-2019-nCov-IPCPE_use-2020.1-eng.pdf [last accessed March 2020].
- [6] WHO. Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected. Interim guidance. WHO; 25 January 2020. Available at: <https://apps.who.int/iris/rest/bitstreams/1266296/retrieve> [last accessed March 2020].
- [7] Kamming D, Gardam M, Chung F. Anaesthesia and SARS. *Br J Anaesth* 2003;90(6):715–8.
- [8] Siddharta A, Pfaender S, Vielle NJ, Dijkman R, Friesland M, Becker B, et al. Virucidal activity of World Health Organization-recommended formulations against enveloped viruses, including Zika, Ebola, and emerging coronaviruses. *J Infect Dis* 2017;215(6):902–6.
- [9] World Health Organization. Guidelines on hand hygiene in health care. First global patient safety challenge clean care is safer care. Available at: https://apps.who.int/iris/bitstream/handle/10665/44102/9789241597906_eng.pdf?sequence=1 [last accessed February 2020].
- [10] World Health Organization. Guide to Local Production: WHO-recommended Handrub Formulations. Available at: https://www.who.int/gpsc/5may/Guide_to_Local_Production.pdf [last accessed March 2020].
- [11] Luangasanatip N, Hongsuwan M, Limmathurotsakul D, Lubell Y, Lee AS, Harbarth S, et al. Comparative efficacy of interventions to promote hand hygiene in hospital: systematic review and network meta-analysis. *BMJ* 2015;351:h3728.
- [12] Allegranzi B, Bagheri Nejad S, Combescurie C, Graafmans W, Attar H, Donaldson L, et al. Burden of endemic health-care-associated infection in developing countries: Systematic review and meta-analysis. *Lancet* 2011;377(9761):228–41.
- [13] Loftus MJ, Guitart C, Tartari E, Stewardson AJ, Amer F, Bellissimo-Rodrigues F, et al. Hand hygiene in low- and middle-income countries. *Int J Infect Dis* 2019;86:25–30.
- [14] Nursing and midwifery. Fact sheets. World Health Organization; 9 January 2020. Available at: <https://www.who.int/news-room/fact-sheets/detail/nursing-and-midwifery> [last accessed March 2020].
- [15] World Health Organization. Coronavirus disease (COVID-19) outbreak: rights, roles and responsibilities of health workers, including key considerations for occupational safety and health. Available at: https://www.who.int/docs/default-source/coronaviruse/who-rights-roles-respon-hw-covid-19.pdf?sfvrsn=bcabd401_0 [last accessed March 2020].
- [16] Heymann DL, Shindo N. COVID-19: what is next for public health? *Lancet* 2020;395(10224):542–5.
- [17] Storr J, Topley K, Privett S. The ward nurse's role in infection control. *Nurs Stand* 2005;19(41):56–64. quiz 6.
- [18] Kang HS, Son YD, Chae SM, Corte C. Working experiences of nurses during the Middle East respiratory syndrome outbreak. *Int J Nurs Pract* 2018;24(5):e12664.
- [19] Qiao J. What are the risks of COVID-19 infection in pregnant women? *The Lancet* 2020;395(10226):760–2.
- [20] CDC. Interim Considerations for infection prevention and control of coronavirus disease 2019 (COVID-19) in inpatient obstetric healthcare settings. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/inpatient-obstetric-healthcare-guidance.html> [last accessed 6 March 2020].

N. Lotfinejad^a
A. Peters^b
D. Pittet^{b,*}

^aDepartment of Research, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

^bInfection Control Program, University of Geneva Hospitals and Faculty of Medicine, Geneva, Switzerland

* Corresponding author. Address: Infection Control Programme and WHO Collaborating Centre on Patient Safety, University of Geneva Hospitals and Faculty of Medicine, 4 Rue Gabrielle-Perret-Gentil, 1211, Geneva 14, Switzerland. Tel.: +41 22 372 9828/+41 22 372 9833.

E-mail address: Didier.pittet@hcuge.ch (D. Pittet)

Available online 19 March 2020