



The role of integrated programs in the prevention of COVID-19 in a humanitarian setting

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The COVID-19 pandemic has caused a severe depletion to health systems worldwide. In the South Kordofan state, a war-torn humanitarian region in Sudan, the United Nations High Commissioner for Refugees and the WHO Emergencies Programme have led the development of integrated programs for health, peace and rehabilitation by training rapid response teams to strengthen both surveillance system and response capacities, engaging the communities at risk with health education and promotion activities, as well as following proper infection, prevention and control measures during case investigation. Also, Early Help Assessment coordinators met with health services managers and recruited 14 teams who were trained to ensure a rapid response to COVID-19. Also, the implementation of water, sanitation and hygiene services was upscaled. Although the local community of South Kordofan is fragile and at high risk of infectious diseases, the limited numbers of detected cases of COVID-19 and COVID-19 deaths could be attributed to the early preparation and integration of programs that helped to prevent the local spread of COVID-19. This lesson needs to be thoroughly investigated to estimate whether it is cost-effective and to determine the feasibility of it being successfully implemented in other humanitarian settings.

Keywords: COVID-19, Humanitarian setting, Integrated programs, Prevention

The lessons

The emergence of coronavirus disease 2019 (COVID-19), which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has caused a pandemic.¹ The estimated incubation period for infection was recorded as an average of 5.2 d, with fever, cough, myalgia, fatigue, pneumonia and complicated dyspnea being the most common signs and symptoms.² Appropriate supportive care and strict prevention/control strategies are recommended, plus using one of the suggested treatments, such as dexamethasone or tocilizumab.³ SARS-CoV-2 transmits via respiratory droplets from infected people.² This mode of transmission raises concerns, particularly in densely populated areas like humanitarian camps. Current COVID-19 control strategies are based on social distancing, hygiene, wearing face masks, testing, isolating, contact tracing and vaccination.^{4,5}

By 16 May 2021, COVID-19 cases reached more than 163 251 301 with 3 385 484 deaths worldwide (<https://www.worldometers.info/coronavirus/>). Sudan is one of the African countries where COVID-19 has spread significantly, lacking community adherence to prevention measures like social dis-

tancing.^{6,7} By 16 May 2021, the number of COVID-19 cases in Sudan reached 34 272, with most of the cases reported in Khartoum state.⁸ South Kordofan is one of Sudan's states that has experienced armed conflicts and it has developed into a humanitarian crisis setting. Refugees and internally displaced persons (IDPs) constitute the majority of the local community. By the declaration of the COVID-19 pandemic, the WHO office in South Kordofan state called for an urgent meeting to plan the training of the Rapid Response Teams (RRTs), strengthen the surveillance system and increase the response capacities to reduce COVID-19 morbidity and mortality. The integrated programs invested in expanding community awareness about the health risk and personal protection measures, improving the timely detection and isolation of cases and making the health information available immediately through improving contact tracing, cases documentation and reporting.⁹

The interventional programs are implemented through a multidimensional approach. The first program mainly focused on training teams through presentation sessions, video sessions, interactive discussions and group discussions. RRTs were trained for 5 d; each team consists of 90 participants.

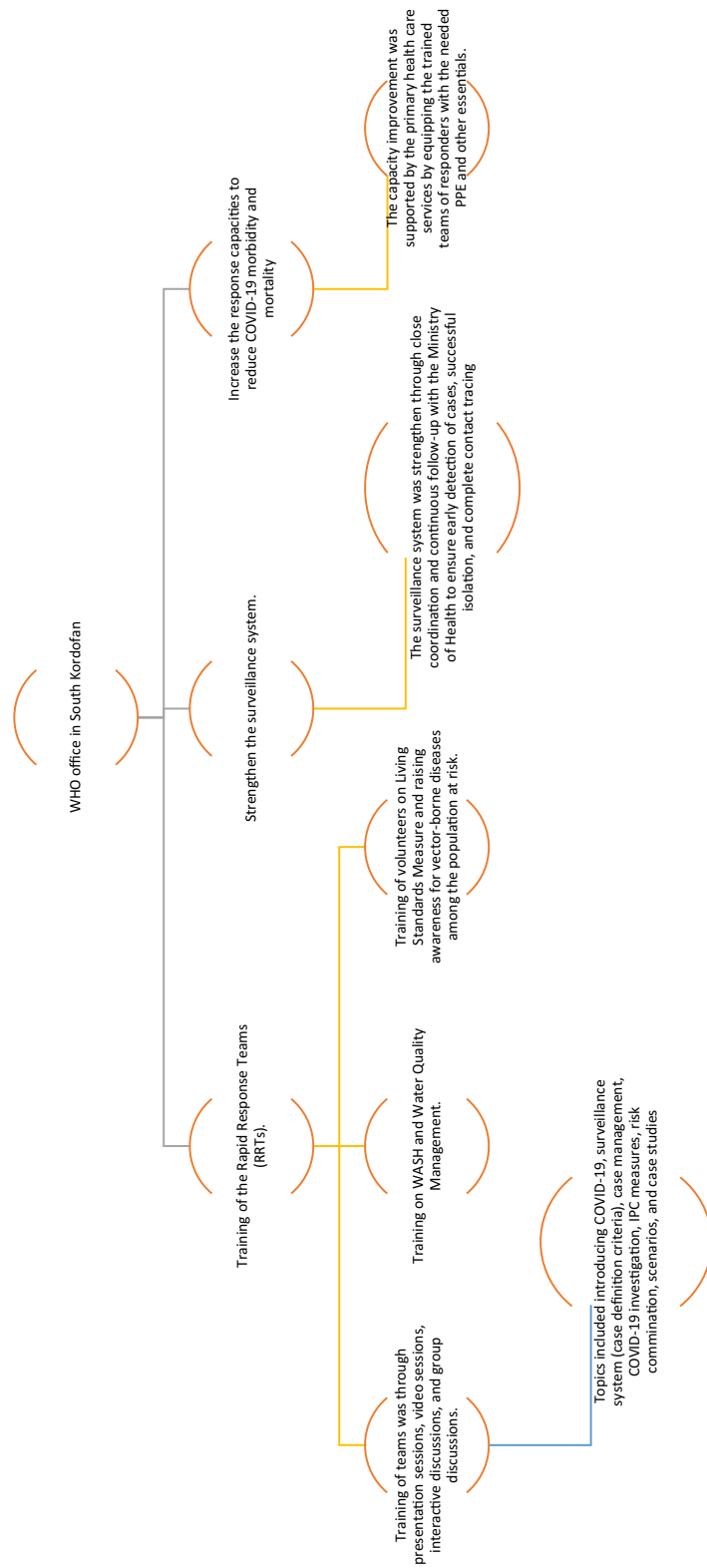


Figure 1. A structured presentation of the integrated programs created by the WHO office in South Kordofan during the training activities and implementation of the integrated program.

The topics covered basic knowledge of and general information about COVID-19; surveillance requirements; waste management; risk communication; how RRTs interact; COVID-19 investigation and response processes; case management; and water, sanitation and hygiene (WASH). Each team aimed to cover one locality. The participants were selected to represent the frontline responders, including emergency teams, laboratory teams, health promoters and medical doctors. For the localities that host refugees, the team covered both the refugees and the IDPs camp. The topics covered included introducing a COVID-19 surveillance system (case definition criteria), case management, investigation, infection prevention and control measures, risk communication, scenarios and case studies. Pre-questionnaires and postquestionnaires were used to assess the training outcomes. The prequestionnaire and postquestionnaire assessment showed a massive difference between the knowledge level before and after the training. Those who scored 20 points out of 20 ranged from 83 to 87 participants out of the 90 participants among the 14 RRTs. Meanwhile, before the training, only five participants scored >10 points among all participants. All the teams became knowledgeable on how to deal with COVID-19 and the associated risks. Besides risk communication and WASH-related activities, participants were also trained in the proper use of personal protective equipment (PPE). Following an assessment of participants' outcomes, the main recommendation was to activate community base surveillance and thus enhance community engagement in identifying and reporting suspected cases.

Before surveillance, capacity improvement was supported by the primary healthcare (PHC) services by equipping the trained teams of responders with the necessary PPE and alcohol sanitizers, and stationary including registration note books. PHC expanded the capacity improvement program by using a mobile clinic to provide access to the essential PHC and referral services for the remote and displaced populations. PHC implemented the surveillance system through close coordination and continuous follow-up with the Ministry of Health to ensure the early detection of cases, successful isolation and complete contact tracing.

Overall, 14 RRTs from 14 localities were fully trained and equipped to respond to COVID-19 and associated risks. Additionally, Early Help Assessment coordinators conducted regular meetings with health services managers, including public health officers (PHOs) and surveillance officers from the 14 localities. Furthermore, to ensure access to healthy water, 30 PHOs, 30 environmental health (EH) officers and 75 workers were trained on WASH and water quality management (WQM). An additional 250 volunteers were trained on the Living Standards Measure and raising awareness of vector-borne diseases among the population at risk.

PHOs and EH officers conducted WQM monitoring in four localities: Deling, Rashad, Abassya and El Ieri. Providing safe water, sanitation and good hygienic conditions are essential to protect human health, especially during outbreaks. Therefore, the proper WASH and waste management guidelines and COVID-19 prevention measures were followed by the trained responders and strictly enforced among the refugees and IDPs in humanitarian camps. A structured presentation of the integrated programs

created by the WHO office in South Kordofan during the training activities is shown in Figure 1.

This early preparedness, including proper training, coordination and follow-up, has significantly contributed to limiting the spread of COVID-19 in this humanitarian region of the country, with the detection of only 50 cases and 4 deaths reported up to 28 April 2021 out of the total state population of 1 862 998 (<https://reports.unocha.org/en/country/sudan/>). These cases and related deaths are significantly low compared with other states of Sudan, such as Khartoum and Gaziera.^{6,7} However, these states are not impaired by the additional risk of a humanitarian situation like South Kordofan. More importantly, considering that all the detected cases of COVID-19 and deaths in the state are travel-related, it appears that this integration and early preparedness have prevented the establishment of community transmission of COVID-19 in South Kordofan. Therefore, following such programs is highly recommended in preventing and controlling COVID-19, particularly in very populated humanitarian settings. Further studies are needed to investigate the success of such integration in the prevention and control of infectious diseases in both humanitarian and non-humanitarian settings.

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References

- 1 World Health Organization. WHO Director-General's opening remarks at the media briefing on COVID-19, 11 March 2020. World Health Organization website. Available at: <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19-11-march-2020> [accessed May 16, 2021].
- 2 Li Q, Guan X, Wu P, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med.* 2020;382(13):1199–207.
- 3 Rashad A, Mousa S, Nafady-Hego H, et al. Short-term survival of critically ill COVID-19 Egyptian patients on assisted ventilation treated by either Dexamethasone or Tocilizumab. *Sci Rep.* 2021;11(1): 8816.
- 4 Chu DK, Akl EA, Duda S, et al. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. *Lancet.* 2020;395(10242):1973–87.

- 5 Bagcchi S. The world's largest COVID-19 vaccination campaign. *Lancet Infect Dis.* 2021;21(3):323.
- 6 Aljak ER, Eldigail M, Mahmoud I, et al. The first laboratory-confirmed imported infections of SARS-CoV-2 in Sudan. *Trans R Soc Trop Med Hyg.* 2021;115(1):103–9.
- 7 Ahmed A, Mohamed NS, El-Sadig SM, et al. COVID-19 in Sudan. *J Infect Dev Ctries.* 2021;15(02):204–8.
- 8 Ruppel A, Halim MI, Kikon R, et al. Could COVID-19 be contained in poor populations by herd immunity rather than by strategies designed for affluent societies or potential vaccine(s)? *Glob Health Action.* 2021;14(1):1863129.
- 9 Ahmed A. Urgent call for a global enforcement of the public sharing of health emergencies data: lesson learned from serious arboviral disease epidemics in Sudan. *Int Health.* 2020;12(4):238–40.