

A Review of Corpse Handling Guidelines in the Backdrop of Covid-19 Pandemic

Dr. Saman Nanayakkara¹, Dr. Indumathie Nanayakkara²,
Dr. Mahen Kothalawala³

¹Department of Anesthesiology & Critical Care, Faculty of Medicine, University of Peradeniya, Sri Lanka.

²Department of Physiology, Faculty of Medicine, University of Peradeniya, Sri Lanka. ³Department of Microbiology, National Hospital, Kandy, Sri Lanka.

*Corresponding Author: Dr. Saman Nanayakkara
Mobile: +94 718511212, email: nsaman@y7mail.com

ABSTRACT:- The World Health Organization (WHO) and many health authorities of different countries have laid down corpse handling guidelines for bio-risk reduction after a death from Covid-19. It is still a mystery whether dead bodies pose a risk in spread of SARS-CoV-2, the incriminated agent of Covid-19. The virus itself is categorized under Hazard group 3 by the Advisory Committee for Dangerous Pathogens (ACDP) as it can be a serious hazard to employees and the possibility of community spread. WHO, in its guidelines released on 24th of March 2020 on burial of COVID-19 victims, state that dead bodies are generally not infectious and the virus is transmitted only by droplets, fomites and close contact, with possible spread through faeces. The four main diseases that can be acquired from handling dead bodies are Cholera, Ebola, typhus and plague. However, there are many other diseases that pose a threat of infection for body handlers. There is a significant risk of acquiring gastrointestinal infections like typhoid/paratyphoid, salmonella, cholera, E. coli, hepatitis A and rotavirus, blood borne infections like HIV, Hepatitis B & C and as well as infections spreading through the respiratory route like tuberculosis from dead bodies. There are also reports of contracting Nipah virus by people who touched corpses of Nipah- encephalitis patients.

Since SARS-CoV-2 is viable on plastic and stainless steel surfaces for 72 hours, 3-4 hours in air, and on copper and cardboard for 4 and 24 hours respectively, greater precautions may be required during funerals until further information becomes available. Since it is still controversial whether SARS-CoV-2 could be transmitted during the handling of dead bodies, under the present circumstances it may be safer to take all possible precautions during handling bodies of patients infected with this virus.

Key words: SARS-CoV-2, Infection, corpse,

I. BACKGROUND:

This review is an attempt at analyzing recommended guidelines for handling of dead bodies of Covid-19 patients to minimize the risk to corpse handlers of getting infected and the risk of spreading the infection. The immediate reason for investigating this area was a social issue that arose in Sri Lanka on correct body disposal practices as advised by health authorities and the religious beliefs of certain groups of people regarding body disposal.

Do dead bodies pose a risk in spread of covid-19 virus?

Recently there was a suspicion of a forensic practitioner in Bangkok, Thailand contracting Covid 19 and dying after handling a corpse of an infected person, although later he was thought not to have contracted it from the corpse. Since local spread of SARS-CoV-2 in the community in Thailand was limited and there is a very low chance of forensic medicine professionals coming into contact with infected patients, initially it was strongly suspected that this forensic practitioner contracted the illness from an corpse and it was supposed to be the first reported death of a judicial medical personnel from Covid-19.¹ The All India Institute of Medicine stated that as the risk of infection with SARS-CoV-2 was high, it was dangerous to perform autopsies and that they would not perform autopsies on corpses of proven or suspected Covid-19 bodies.² Sarah et al mentioned that in the Ebola crisis, handling the dead was one of the main modes of transmission of the disease and special precautions needed to be taken when handling corpses of people who died from very contagious diseases.³

The World Health Organization (WHO) in its guidelines released on 24th of March 2020⁴ regarding burial of COVID-19 victims, stated that dead bodies of COVID-19 victims are generally not infectious. They also stated that COVID-19 virus is transmitted between people through droplets, fomites and close contact, with possible spread through faeces while the patient is alive. They also stated that once the patient is dead, the risk of transmission will automatically drop and just observation of standard precautions is sufficient for protection.

However, doubts continue to surface as to whether the virus is airborne and since this is a new virus whose source and disease progression are not yet entirely clear, greater precautions may be used until further information becomes available. WHO recommendations which highlight that relatives do not touch or kiss the body and emphasize rules on social distancing to prevent the spread of disease have upended important funeral and death rituals in virtually all of the world's faiths. The United States and most countries and religious authorities around the world now restrict gatherings for funerals.

WHO interim guidelines published in October 2017⁵ for a suspected or proven Ebola or Marburg infection state there is no evidence that corpses pose a risk of epidemic disease after a natural disaster, contrary to common belief. It also states that human remains pose an infection risk only with corpses of patients dying of cholera and haemorrhagic fevers. There is a significant risk of acquiring gastrointestinal infections by body handlers by direct contact of faeces within and outside the body, on clothes, mortuary trolleys or a coffin. *Salmonella typhi/paratyphi*, other salmonella species, *Vibrio cholerae*, *Escherichia coli*, hepatitis A and rotavirus could be transmitted through direct contact and also indirect contact through contamination of water sources used for drinking and other domestic purposes.⁵ Morgue workers and embalmers can also acquire blood borne infections like HIV, Hepatitis B & C by splashing of blood and body fluids via mucous membranes or breached skin. Sharp injuries by scalpels, needles and bone fragments could also cause this. Tuberculosis could also be contracted by inhaling secretions or residual air from lungs under specific situations.⁵

Specific advice issued by WHO regarding burial of corpses of people who have died of highly infectious diseases states that graveyards should be at least 30m from groundwater sources used for drinking-water. It also states that grave floors must be at least 1.5m above the water table, with a 0.7 m unsaturated zone and surface water from graveyards must not enter inhabited areas.⁵

Can microorganisms survive for years and cause infections later?

Correia et al demonstrated that *Mycobacterium tuberculosis* can remain viable after death for up to 36 days.⁶ Similarly, spores of Anthrax bacillus can also be infectious for many days after death of the host. There are many instances where viruses and bacteria, particularly bacterial spores have survived for many long years in soil and later caused infection. Tubercle bacilli may persist somewhat longer, and Schottelius claims to have demonstrated virulent tubercle bacilli in bodies buried between one to two years.

On the other hand, *Vibrio cholerae* was not demonstrable for up to thirty days after burial in cadavers of patients who have died from this disease. *S. typhi* was not found in bodies of patients with typhoid fever buried for three months. *Corynebacterium diphtheriae*, pyogenic organisms, *Clostridium tetani* and *Bacillus anthracis* have all have been found to disappear from the body a few days to two months after burial of patients who died of diseases caused by them. The remains of rabid animals lose their infectious powers in two to five weeks after burial. The only organisms that are reported to possibly infect the adjacent earth in case of improper burial are *Bacillus anthracis* and *Clostridium tetani*, due to the production of spores.⁷

Though there are no direct evidence to demonstrate possibility of seepage of enteric pathogens into ground water following burial of persons who died of enteric diseases such as cholera or shigellosis, there is ample evidence to show contamination of ground water from indicator organisms which can co-exist with enteric pathogens.⁸

Virus shedding from a live SARS-CoV-2 virus infected person

Those who survived an infection had a median of 20.0 day duration (IQR 17.0–24.0 and a range of 8 to 37 days) of viral shedding from onset of illness. However, the virus was continuously detectable until death in non- survivors. It is also reported that, among 29 patients who received lopinavir/ritonavir and were discharged, the median duration of viral shedding was 22.0 days (IQR 18.0–24.0). The median duration of viral shedding was 19.0 days (IQR 17.0–22.0) in patients with severe disease status and 24.0 days (IQR 22.0–30.0) in patients with critical disease status.⁹

Those presenting particular risks to body handlers include tuberculosis, streptococcal infection, gastrointestinal pathogens, the agents causing transmissible spongiform encephalopathies (e.g. Creutzfeldt-Jakob disease), hepatitis B and C, HIV infection, Middle East respiratory syndrome (MERS), haemorrhagic fever viruses such as Ebola, and possibly meningitis and septicaemia (especially meningococcal). None of the organisms that have caused mass deaths in the past (e.g. plague, cholera, typhoid, tuberculosis, smallpox) is likely to survive for a long time in burials.¹⁰

In United States, it is becoming more and more customary to inject dead human bodies with formalin solutions; it is probable that considerable direct destruction of bacteria is accomplished through the action of the formalin. As decomposition advances in cadavers, the pathogenic forms are crowded out by the saprophytes.

Environmental stability of SARS-CoV-2 virus

SARS-CoV-2 virus is known to be more stable on plastic and stainless steel surfaces for 72 hours and for about 3-4 hours in air indicating the possibility of disease transmission with the absence of an infected person around for hours¹¹. In contrast, the sustainability of viable virus on copper and cardboard surfaces is much lower (4 and 24 hours respectively). The viable virus was detected on treated wood and cloth for not more than 24 hours. A noticeable amount of virus was found on the outer layer of a surgical mask for 7 days¹². Moreover, SARS-CoV-2 RNA was found on "a variety of surfaces" in cabins of both symptomatic and asymptomatic people who were infected with COVID-19 on the Diamond Princess cruise ship, up to 17 days after the passengers disembarked, according to a new analysis from the Centres for Disease Control and Prevention (CDC)¹³. However, this was before disinfection procedures took place and "data cannot be used to determine whether transmission occurred from contaminated surfaces," according to the analysis. In other words, it's not clear if the viral particles on these surfaces could have infected people.¹⁴

Another study published in February, in *The Journal of Hospital Infection* analyzed several dozen previously published papers on human coronaviruses (other than the new coronavirus) to get a better idea of how long they can survive outside of the body. They concluded that if this new coronavirus resembles other human coronaviruses, such as its "cousins" that cause SARS and MERS, it can stay on surfaces such as metal, glass or plastic for as long as nine days (In comparison, flu causing viruses can last on surfaces for only about 48 hours.)¹⁵

Risk for handlers of dead bodies during the COVID pandemic

The British government has introduced changes to its emergency coronavirus bill, assuring Muslim and Jewish communities that they will have their religious burial rights respected and there will not be mandatory cremations. Their Health Secretary Matt Hancock is supposed to have said that the government recognized the need to "accede to the wishes of the families and faith communities" and had therefore, accepted the burials. This acceptance came after several members of parliament and religious groups raised fears that the corona virus bill would allow local authorities to cremate bodies without the consent of the families of the deceased. However public health authorities of England warns the employees of morgues on the risk of transmission and need to be cautious during handling of dead bodies.¹⁶ In spite of WHO and UK recommendation, some countries have given different recommendations. National Health Commission of China has said "Bodies of SARS-CoV-2 victims should be cremated closed and immediately". They announced that burials or the transfer of bodies is not allowed and funerals will not be allowed to avoid spread of the virus.

In January 2010, active Nipah virus encephalitis (NiV-infection) surveillance identified an encephalitis cluster and sporadic cases in Faridpur, Bangladesh. 16 cases were identified of which 14 died. It is interesting to note that for one of these patients the only contact was hugging a deceased while for another it was involved in preparing the same corpse for burial with bare hands. In the same study they reported a physician who examined Nipah virus encephalitis patients without gloves or a mask also dying of the infection. Efforts to prevent transmission should focus on reducing caregivers' exposure to infected patients' bodily secretions during care and traditional burial practices.¹⁷

The dead bodies of all NiV-infected patients in Bangladesh have had the same traditional bathing process, but corpse-to-human transmission had not been previously recorded. In other NiV outbreaks when NiV infection developed in family members, many persons had contact with the source case-patient during illness and when preparing the corpse. Therefore, it is not possible to say whether the transmission of infection was from the living patient or the corpse. This investigation suggests that occasional NiV transmission could occur during the Muslim ritual purification of a corpse before burial.¹⁷

A study done in Sri Lanka among funeral industry workers has shown that they had moderate knowledge (52%), moderate practices (53%) and poor attitudes (42%) regarding infection control and a poor use of personal protective equipment highlighting the need to improve awareness, practices and availability of facilities for personal protection from infection in this occupational risk group.¹⁸

Currently there is inadequate knowledge about Covid-19, the world needs more research and time to understand about the “novel Corona virus”. Looking at the devastation that Covid-19 has already done, at least till substantial research is carried out to see whether dead bodies still harbor live viruses and will be a source of infection for body handlers it would be prudent to stick to safe corpse handling guidelines as recommended by the WHO.

II. SUMMARY

With the highly contagious nature of SARS-Cov-2 and increasing panic among nations, the world is waiting for definitive newer treatment and a vaccine. Since SARS-Cov-2 virus can survive on many surfaces for hours to days, there is a possibility of SARS-Cov-2 virus surviving on human dead bodies for quite some time. However multiplication of the virus will cease on the grounds that there is no living host for the virus to replicate on and unless a corpse is touched there is no way of the virus spreading to other humans because this is a respiratory virus largely spread by respiratory secretions. Whether a Covid-corpse is infective or not is still a mystery and it is advisable to take all possible precautions during handling corpses by professional embalmers and performing final rites to prevent infection outbreaks.

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