**Title:** Revised Guidelines for Cremation/Burial of COVID19 - Need of the Hour

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**Abstract:**

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus.Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. People in extremes of age and those having pre-existing disease are more prone to the infection. Transmission is by droplet/contact route or by airborne transmission in special circumstances i.e endotracheal intubation, bronchoscopy, tracheostomy, cardiopulmonary resuscitation etc.

Not only the treatment of living infected subjects, handling of COVID-19 dead bodies is also having utmost importance to prevent the transmission of deadly virus to the body handlers (hospital staff/cremation staff/family members) in the hospital or at the cremation/burial site. Here in this review paper, we have discussed about the pros and cons of the cremation and burial of the body keeping in mind that no further spread of the virus could occur to the community. However for eg China and Sri Lankan authorities made cremation compulsory by official order while WHO, India and many other did not objected to either of them. In our opinion, cremation should be preferred for complete elimination of chances of infection. However keeping in mind the religious views of the family, if the burial of the body is requested, then it should be assured that the body is buried in a thick, air tight coffin and placed at normal depth of about 2 meter. It is recommended that the area above and adjacent to the grave should be cemented immediately as an additional precautionary to avoid scavenging by animal.

**Keywords:** COVID-19, Cremation, Burial

**Introduction:**

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus.Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment.  Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness1. Infection can be transmitted from droplets of different sizes or contact routes or by airborne transmission in special cirumstances i.e. endotracheal intubation, bronchoscopy, open suctioning, administration of nebulized treatment, manual ventilation before intubation, turning the patient to the prone position, disconnecting the patient from the ventilator, non-invasive positive-pressure ventilation, tracheostomy, and cardiopulmonary resuscitation2. There is some evidence that COVID-19 infection may lead to intestinal infection and be present in faeces. However, to date only one study has cultured the COVID-19 virus from a single stool specimen3.

**Indian Stand:**

Being a new disease there is knowledge gap on how to dispose of dead body of a suspect or confirmed case of COVID-19. The main driver of transmission of COVID-19 is through droplets. There is unlikely to be an increased risk of COVID infection from a dead body to health workers or family members who follow standard precautions while handling body4. However MOHFW, India issued guidelines on management of COVID-19 dead bodies4.

As per the MOHFW, India guidelines4, the crematorium/ burial ground staff should be sensitized that COVID 19 does not pose additional risk.The staff will practice standard precautions of hand hygiene, use of masks and gloves. Viewing of the dead body by unzipping the face end of the body bag (by the staff using standard precautions) may be allowed, for the relatives to see the body for one last time. Religious rituals such as reading from religious scripts, sprinkling holy water and any other last rites that does not require touching of the body can be allowed. Bathing, kissing, hugging, etc. of the dead body should not be allowed. The funeral/ burial staff and family members should perform hand hygiene after cremation/ burial. The ash does not pose any risk and can be collected to perform the last rites. Large gathering at the crematorium/ burial ground should be avoided as a social distancing measure as it is possible that close family contacts may be symptomatic and/ or shedding the virus.

As per the protocol5 of dignified management of the COVID-19 dead bodies released by Dept of Forensic Medicine & Toxicology, AIIMS, New Delhi, cremation should be preferred for complete elimination of chances of infection in either electric or gas crematorium in situ in zipped body bag. However keeping in mind the religious views of the family, if the burial of the body is requested, then it should be assured that the body is buried in a thick, air tight coffin and placed at normal depth of burial (4 to 6 feet). It is recommended that the area above and adjacent to the grave should be cemented immediately as an additional precautionary measure and the space should be marked and required precautions should be taken to avoid scavenging by animals. As a precautionary measure large gathering at the crematorium/ burial ground should be avoided to maintain a healthy distancing. The remains of the last rites like ashes do not pose any risk of infection and can be collected for religious immersion. Remove personal protective equipment after handling of the dead body. Then, perform hand hygiene immediately.

**WHO Stand:**

Transmission of COVID-19 pathogen is through droplets, fomites and close contact, with possible spread through faeces. It is not airborne2.

Except in cases of hemorrhagic fevers (such as Ebola, Marburg) and cholera, dead bodies are generally not infectious. Only the lungs of patients with pandemic influenza, if handled improperly during an autopsy, can be infectious. Otherwise, cadavers do not transmit disease. It is a common myth that persons who have died of a communicable disease should be cremated, but this is not true. Cremation is a matter of cultural choice and available resources. To date there is no evidence of persons having become infected from exposure to the bodies of persons who died from COVID-19. The dignity of the dead, their cultural and religious traditions, and their families should be respected and protected throughout. Hasty disposal of a dead from COVID-19 should be avoided. Authorities should manage each situation on a case-by-case basis, balancing the rights of the family, the need to investigate the cause of death, and the risks of exposure to infection6.

People who have died from COVID-19 can be buried or cremated. Confirm national and local requirements that may dictate the handling and disposition of the remains. Family and friends may view the body after it has been prepared for burial, in accordance with customs. They should not touch or kiss the body and should wash hands thoroughly with soap and water after the viewing; Those tasked with placing the body in the grave, on the funeral pyre, etc., should wear gloves and wash hands with soap and water after removal of the gloves once the burial is complete6.

Burial by family members or for deaths at home6: In contexts where mortuary services are not standard or reliably available, or where it is usual for ill people to die at home, families and traditional burial attendants can be equipped and educated to bury people under supervision. Any person (e.g. family member, religious leader) preparing the deceased (e.g. washing, cleaning or dressing body, dying hair, trimming nails or shaving) in a community setting should wear gloves for any contact with the body. For any activity that may involve splashing of bodily fluids, eye and mouth protection (face shield or goggles and medical mask) should be worn. Clothing worn to prepare the body should be immediately removed and washed after the procedure or an apron or gown should be worn. The person preparing the body should not kiss the deceased. Anyone who has assisted in preparing the body should thoroughly wash their hands with soap and water when finished. Apply principles of cultural sensitivity and ensure that family members reduce their exposure as much as possible. Children, older people (>60 years old), and anyone with underlying illnesses (such as respiratory illness, heart disease, diabetes, or compromised immune systems) should not be involved in preparing the body. A minimum number of people should be involved in preparations. Others may observe without touching the body at a minimum distance of 1 meter.

Family and friends may view the body after it has been prepared for burial, in accordance with customs. They should not touch or kiss the body and should wash their hands thoroughly with soap and water following the viewing. Physical distancing measures should be strictly applied (at least 1 meter between people). People with respiratory symptoms should not participate in the viewing or at least wear a medical mask to prevent contamination of the place and further transmission of the disease to others. Those tasked with placing the body in the grave, on the funeral pyre, etc. should wear gloves and wash hands with soap and water once the burial is complete.

Cleaning of reusable PPE should be conducted in accordance with manufacturer’s instructions for all cleaning and disinfection products (e.g. concentration, application method and contact time, etc.). Children, adults > 60 years, and immunosuppressed persons should not directly interact with the body. Although burials should take place in a timely manner, in accordance with local practices, funeral ceremonies not involving the burial should be postponed, as much as possible, until the end of the epidemic. If a ceremony is held, the number of participants should be limited. Participants should observe physical distancing at all times, plus respiratory etiquette and hand hygiene.

The belongings of the deceased person do not need to be burned or otherwise disposed of. However, they should be handled with gloves and cleaned with a detergent followed by disinfection with a solution of at least 70% ethanol or 0.1% (1000 ppm) bleach. Clothing and other fabric belonging to the deceased should be machine washed with warm water at 60−90°C (140−194°F) and laundry detergent. If machine washing is not possible, linens can be soaked in hot water and soap in a large drum using a stick to stir and being careful to avoid splashing. The drum should then be emptied, and the linens soaked in 0.05% chlorine for approximately 30 minutes. Finally, the laundry should be rinsed with clean water and the linens allowed to dry fully in sunlight7

**Global Stand**:

China, where novel *Coronavirus* outbreak took place first in December, decided to cremate the bodies. In many cases, bodies of COVID-19 were cremated immediately after the death and even in the absence of family members without giving any consideration if the religious belief of the coronavirus victim and released a formal order directing the local authorities to immediately cremate bodies of COVID-19 victims and laid out procedure on how to do it8.

In neighbouring Sri Lanka too, the government made cremation of body mandatary if the deceased is a COVID-19 patient or suspected to have novel coronavirus infection. The order has been resented by Muslims in Sri Lanka. But the government has cited the highly infectious nature of novel coronavirus to dismiss the objections on account of health9.

**Pros and Cons in relation to Burial/Cremation:**

As of today (19/05/2020), total confirmed cases of COVID are 4618821 worldwide12 and 97975 in India13 & the number of deaths are 311847 worldwide12 and 3163 in India13. There is currently a disproportionate focus on the living instead of the dead. India is the largest democracy in the world and having about 1.4 billion population and accomodating people of almost all religions with different cultural practices while performing the last rites of the individual/family member. Hindu practices cremation while Christians and Muslims perform burial as per religious belief and practices. In this paper we will discusss about the pros and cons of various practices of last rites in current scenario of COVID-19 pandemic irrespective of his/her religion faith keeping in mind that no further spread of the virus could occur to the community.

In the case of COVID-19, the pathogen is highly infectious and transmits from one person to another through droplets or contact. This means it requires body fluid to keep finding new victims. So theoretically, novel coronavirus can be transmitted during preparing the body for burial to body handlers. Secondly, body inside the earth usually takes 8x times10 to decompose in comparision if body is in the open air posing risk of animal scavanging and tranmission. However, cementing the grave immediately can be done as an additional precautionary measure to prevent animal scavanging.

While cremation invloves 1400 to 1800 degree fahrenheits11 of temperature to cremate the body. At this high temperature, chances of infection from viable virus particles in the ashes is not questionable. However transmission can occur while preparing the body for cremation from bodiely secretions as while preparing for burial. In addition, there will no danger for animal scavanging activity after cremation.

**Suggestions:**

We propose to suggest following measures, in addition to the COVID-19 guidelines on dead body management4, published by the MOHFW, GOI.

1. Instead of handing over the body (confirmed/suspected COVID-19) to the relatives in cases of hospital deaths, we suggest the body should be transferred directly to the place of cremation/burial by the designated health worker person who is involved primarily in packing of the body to ensure minimal exposure to others including family members.
2. In case of death at home with suspicion of having COVID-19, it should be mandatory to inform the local authorities which will ensure transportation and packing of the body to the cremation/ burial site as per the guidelines. This will also help the local authorities in contact tracing.
3. Personell from the local authorities and staff of cremation/burial site should be well trained in infection prevention control practices.
4. Cremation/burial staff should be duty bound to complete the last rite process (cremation/burial) without involving family members or relatives.
5. Proper treatment and handling instructions of the belongings and clothing of the deceased should be given to the family members by the staff involved in packing of body, if willing to take these items with them.
6. Mandatory presence of police and a health care worker/worker from local authorities to be present at the time of cremation/burial to ensure proper adherence to the guidelines. This will ensure smooth implementation of the guidelines without any delay, deviation or any violence at the cremation or burial site.
7. Specify the number of mourners permitted to be present at the crematorium/burial ground instead of mentioning the word “Large gathering should be avoided”. We suggest the number to be limited to maximum 10.

**Opinion:**

In our opinion, cremation should be preferred for complete elimination of chances of infection. However keeping in mind the religious views of the family, if the burial of the body is requested, then it should be assured that the body is buried in a thick, air tight coffin and placed at normal depth of burial (about 2 meter). It is recommended that the area above and adjacent to the grave should be cemented immediately as an additional precautionary measure to avoid scavenging by animals. As a precautionary measure large gathering at the crematorium/ burial ground should be avoided to maintain a healthy distancing. The remains of the last rites like ashes do not pose any risk of infection and can be collected for religious immersion. The number of mourners should be limited as less as possible subject to maximum of 10.

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