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General Article

FUNERAL PRACTICES WITH DEAD BODIES OF COVID-19 INFECTED PATIENTS, SCIENTIFIC MODIFICATIONS NEEDED IN WHO'S RECOMMENDATIONS

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ABSTRACT

Background: COVID-19 was detected by the end of 2019 and is reported to be highly contagious. Previously, world has recorded similar outbreaks in the form of influenza, SARS, MERS, EBOLA and so on. Being highly contagious, corpses handling is considered a highly sensitive issue. World over there are different types of funeral practices among which, main types are cremation [by Hindus] and Burials [by Christians, Muslims, and Buddhists]. Every country has certain updated funeral guidelines for deaths occurring from such infectious diseases but the guidelines are more designed looking at the religious customs prevailing in their societies. WHO has though released certain guidelines related to the funeral procedure of such dead bodies/Corpses but there are flaws in them.

Methods: WHO guidelines were analyzed based on the published references consulted here.

Interpretation: Sincere rectifications are recommended in the guidelines of the WHO. In this article, cremation of corpses has been recommended over other funeral processes giving valid reasons so as to completely curb down the possibilities of reoccurrence of these infections from the corpses in future.

INTRODUCTION

COVID-19 caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS CoV-2) was first reported in Wuhan, Hubei province of China in December 2019. Within next 2-3 months time it spread to various parts of the world causing thousands of causalities. Looking at the number, frequency of casualties and worldwide spreading of this infection, WHO has declared it as a public health emergency, on Jan 30, 2020 (WHO, 2020). Already more than 2,450,000 are affected with more than 170,000 deaths worldwide [till 20 April, 2020), from this disease.

COVID-19 was reported by the end of 2019 and is very new to the scientific world (Wu, 2020).

This disease is highly contagious and has universally caused pandemic; so, an obvious question is often raised, as to how to perform the funerals of such dead bodies. Broadly, there are few types of funeral practices. Among which, main types are cremation [by Hindus] and Burials [by Christians, Muslims, and Buddhists]. Many countries have certain updated funeral guidelines for such deaths (MHFW, 2020; Bettiza, 2020). WHO has released certain guidelines related to the funeral procedure of such dead bodies/corpses still there is urgent need to analyze and rectify these guidelines (WHO, 2020b). In this article these guidelines have been critically analyzed and suggestions are made to make it more perfect. WHO guidelines are italicized, followed by their analysis and recommendations.

Search strategy and selection criteria

References for this personal view were identified through searching 'Google' 'Pubmed' for articles, by use of the terms "life of virus and bacteria in dead bodies", "funeral practices with dead bodies of COVID-19 patients", "live virus and bacteria isolated near dead bodies", "reoccurrence of Ebola", "live virus and bacteria isolated near coffin", "reoccurrence of Infectious Disease", "Virus from Glaciers", and "Funeral Practices in SARS CoV-2 infected corpses" "risk of burial over cremation corpses". Relevant articles published were identified. Articles resulting from these searches and relevant references cited in those articles were reviewed. Articles published in English were only considered.

Risks posed by dead bodies after disasters

I. *Contrary to common belief, there is no evidence that corpses pose a risk of epidemic disease after a natural disaster.*

No evidence doesn't mean that, it has been experimentally proved, that corpses can not pose any epidemic risk. Such evidence can appear in future. Live pathogens have been reported from dead bodies of animals (Zhong *et al.*, 2020; Timofeev *et al.* 2019). And such evidence could take hundreds thousands of lives as SARS CoV-2 is doing with covid-19. Scientific sense does say that corpses can pose future problem.

II. *Most agents do not survive long in the human body after death. Human remains only pose a substantial risk to health in a few special cases, such as deaths from cholera or haemorrhagic fevers.*

Most, but not all pathogens. That means some can survive. This can only be proved experimentally which pathogen will survive and which will not and for how long. Viruses are at the border line of living and non living organisms and even we now know that viruses which were buried for thousands of years inside the icescapes are coming out and might infect human beings in future (Zhong *et al.*, 2020). *Bacillus anthracis* strains was isolated during an outbreak of anthrax on the Yamal Peninsula in the summer of 2016 and independently in Yakutia in 2015. A common feature of these strains is their conservation in permafrost, from which they were extracted either due to the thawing of permafrost (Yamal strains) or as the result of paleontological excavations (Yakut strains) (Timofeev *et al.* 2019). Because of high virulence of *B. anthracis*, the stability of endospores and the simplicity of its cultivation, this bacterium can be turned into a potential biological weapon or tool for bioterrorism as illustrated by the anthrax contaminated letters in 2001 in the USA (Inglesby *et al.*, 2002; Spencer, 2003).

III. *Workers who routinely handle corpses may however risk contracting tuberculosis, blood borne viruses (eg hepatitis B and C and HIV) and gastrointestinal infections (e.g. cholera, E. coli, hepatitis A, rotavirus diarrhoea, salmonellosis, shigellosis and typhoid/paratyphoid fevers):*

If people or relatives of the dead person are being asked to stay away from the corpses, then how could the workers be safe? WHO should add Covid-19 along with other pathogens in the list.

IV. Tuberculosis can be acquired if the bacillus is aerosolized – residual air in lungs exhaled, fluid from lungs spurted up through the nose or mouth during handling of the corpse. Blood borne viruses can be transmitted via direct contact of non-intact skin or mucous membrane from splashing of blood or body fluid or from injury from bone fragments and needles. Gastrointestinal (GI) infections can easily be transmitted from faeces leaked from dead bodies. Transmission occurs via the faecal–oral route through direct contact with the body, soiled clothes or contaminated vehicles or equipment. GI infections can also be spread as a result of contamination of the water supply with dead bodies.

Everywhere not every authority knows the water tunnel/underground water channel beneath or near the graveyard. Even if it is there the authority might ignore it. This is recently seen where mass burial of dead bodies of covid-19 patients were buried near water body in the Hart Island in New York (Figure 1) (Reuters, 2020).

V. *Specific advice for workers handling corpses Graveyards should be at least 30 m from groundwater sources used for drinking-water. Grave floors must be at least 1.5 m above the water table, with a 0.7 m unsaturated zone. Surface water from graveyards must not enter inhabited areas. Exercise universal precautions taken when handling blood and body fluids. Use gloves once only and dispose of correctly. Use body bags. Wash hands with soap after handling bodies and before eating. Disinfect vehicles and equipment. Be vaccinated against hepatitis B. There is no need to disinfect bodies before disposal (except in case of cholera).*

Relative depth of graveyard and groundwater may not be accurately measured in different places. There are several places where the water table is quite high, particularly in the tropical areas. Seepage of liquid from corpus could be devastating in such case. In case of flood and heavy rain no one can guarantee that the water from the graveyard will not enter the inhabited areas (Figure 1).

VI. Information on these risks should be provided to both emergency workers and the general public to ensure adequate disposal of bodies, appropriate precautions when handling bodies and to avoid panic and misunderstanding.

There are stories where doctors who are treating SARS Covid-2 patients are not having personal protective equipment (PPE) kits (Farmer and Wallen, 2020). Every country doesn't have that much resources so that sensitive and scientific burial procedure could be strictly followed. Fault of one or few such nations could cost heavy loss to rest of the world too.

General advice

VII. In the case of mass casualties and where identification of victims is no longer possible, burial is preferable to cremation.

Cremation leaves no trace of corpus, means there is zero risk after the funeral. So it is better than burial.

VIII. *Burial in mass graves is not a recommended public health measure. It can violate important social norms and waste scarce resources. The families' needs and social customs for funerals should be respected.*

WHO's recommendations should be more focused on saving humanity than saving customs. This world has bizarre customs looking from scientific eyes. Single wrong custom could affect remaining world. There are funeral customs which are ecologically incorrect. This includes Sky Burials practiced in various parts of world particularly by Tibetan buddhist populations (Shank, 2019). Here Some scholars, argue that after the flesh has been consumed by vultures and the bones are left bare, the skeleton is ground into a paste with barley flour and fed to the birds (Goss, Klass, 1997; Logan, No date).

IX. If customs vary, each social group should be provided with a designated area, with the relevant materials, to be able to exercise their own traditions with dignity. Where existing facilities such as graveyards or crematoria are inadequate, alternative facilities should be provided.

It is continuously published by the health workers and doctors that the care of an individual infected with Ebola virus disease (EVD), their death, funeral, and burial in the community rather than in an Ebola Treatment Center could pose a serious risk for future disease transmission (Tiffany *et al.*, 2017). Similar deaths were reported in Bangladesh where 14 out of 16 people died due to nipah virus infection occurred

Figure 1: Mass burial of dead bodies (near water body) on New York's Hart Island in the middle of the COVID-19 disease outbreak *(Source: Reuters)*

while handling the corpses (Sazzad et al., 2013). 2013-14 Ebola viral disease outbreak in West Africa, which affected various communities in Guinea, Liberia, and Sierra Leone, Nigeria, Mali, and Senegal, is the largest known outbreak since the discovery of the virus in 1976 (Manguvo and Mafuvadze, 2015). Researchers are continuously pinpointing that the widespread embracing of certain traditional and religious practices among West African communities had tremendous negative effects on the spreading of the disease (Alexander *et al.*, 2015; Paul *et al.*, 2014; Umeora *et al.*, 2014; and Gire *et al.*, 2014). In concurrence, WHO also contents that nearly 60% of all Ebola cases reported in Guinea can be linked to traditional burial practices (WHO, 2015). Therefore researchers also forcing that there should be scientifically-based methods of combating the spread of highly infectious diseases and very little considerations should be given to the impact of traditional and religious practices on preventive measures (Airhihenbuwa, 1995).

This article is more focused in terms of highly contagious diseases such as SARS Covid-2. China, where this disease was first reported, has forcefully started cremation of dead bodies instead of looking at the customs of the people to completely curb down the possibility of disease spread from the dead body (Tanno, 2020; and Fifield and Li, 2020). Only single and scientifically correct funeral process should be recommended. It is much cheaper than lives of millions of people. It might look scary to society not following this custom but for the sake of this society itself it is compulsory to follow this custom.

So it is recommended that cremation should be preferred over burial system of funeral. Cremation leaves zero chance/suspicions of reoccurring of the disease from the dead body. In contrast non cremation based burial customs will always leave a chance of reoccurrence of such pandemic. So WHO must modify its guidelines and make it more scientific rather than making it custom oriented one.

CONCLUSION

We have seen from the published research work that viruses reemerge from the dead bodies of human or animal even after hundreds of years. Even, for few days the decaying body emits fluids — blood, saliva, pus, feces and all of them could carry the contagious virus. WHO has though released certain guidelines related to the funeral procedure of corpses yet the language of the guidelines doesn't give 100% guarantee that these dead bodies cannot lead to re emergence of the diseases in future. This process could curb down the possibility of using these dead bodies as a potential biological weapons in future by various terrorists groups active at national and international levels. As little bit confusion or latency could cause mass deaths in human being which is happening right now due to covid-19 infection. Either WHO should change this language and write that there is zero percent risks associated with burial of such corpses or it should recommend cremation of corpses as country like China has started following it, even though it is not in its custom. How many countries will follow the guidelines is separate matter but facts should be kept in front of the people.

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Contributors

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REFERENCES

Airhihenbuwa CO (1995). Health and culture: beyond the western paradigm. *Sage Publications, CA* 1995; pp. 152. ISBN 0-8039-7157-5. *Available at: https://www.ncbi.nlm.nih.gov/pubmed/27684253* doi: 10.7748/ns.9.42.54.s53 (accessed, Apr 17, 2020).

Alexander KA, Sanderson CE, Marathe M. (2015). What Factors Might Have Led to the Emergence of Ebola in West Africa? *PLoS Neglected Tropical Diseases*;

Available at: https://doi.org/10.1371/journal.pntd.0003652
Bettiza Sofia (2020). Corona virus: How Covid-19 is denying dignity to the dead in Italy. *BBC News, BBC World Service*. *Available at: https://www.bbc.com/news/health-52031539 (Accessed 18 April 2020)*
Farmer B and Wallen J (2020). Doctors in India and Pakistan wear bin bags and raincoats to protect against Covid-19. *The Telegraph***.** *https://www.telegraph.co.uk/global-health/science-and-disease/doctors-india-pakistan-wear-bin-bags-raincoats-protect-against/ (accessed, Apr 15, 2020).*
Fifield A and Li L (2020). Chinese families should be sweeping graves now. But thousands still haven't buried their dead. *Washington Post. Available at: https://www.washingtonpost.com/world/asia_pacific/chinese-families-should-be-sweeping-graves-now-but-thousands-still-havent-buried-their-dead/2020/04/03/5a6daa50-7234-11ea-ad9b-254ec99993bc_story.html (accessed, Apr 16, 2020).*
Gire SK, Goba A, Andersen KG, Sealfon RS, Park DJ, Scheiffelin JS (2014). Genomic surveillance elucidates Ebola virus origin and transmission during the 2014 outbreak. *Science* **345** 1369–1372.
Available at: doi: 10.1126/science.1259657
Goss RE, Klass D (1997). Tibetan Buddhism and the Resolution of Grief: the Bardo-Thodol for the Dying and the Grieving. *Death Studies*, **21** 377–395. *Available at: https://www.ncbi.nlm.nih.gov/pubmed/10170479*
doi: 10.1080/074811897201895
Inglesby TV, O'Toole T, Henderson DA, *et al.* (2002). Anthrax as a biological weapon, 2002: updated recommendations for management. *Journal of American Medical Association*; **287,** 2236-52 *https://www.ncbi.nlm.nih.gov/pubmed/11980524, DOI: 10.1001/jama.287.17.2236*
Logan P (2020). Witness to a Tibetan Sky-Burial: A Field Report for the China Exploration and Research Society. *University of Minnesota*. *Available at: http://www.d.umn.edu/cla/faculty/tbacig/studproj/is3099/skyburial/skybur ial.htm (Accessed, Apr 15, 2020)*
Manguvo A and Mafuvadze B. (2015). The impact of traditional and religious practices on the spread of Ebola in West Africa: time for a strategic shift. *Pan African Medcine Journal* **22** 9. doi: 10.11694/pamj.supp.2015.22.1.6190
MHFW (2020). COVID-19: GUIDELINES ON DEAD BODY MANAGEMENT. *Government of India, Ministry of Health & Family Welfare, Directorate General of Health Services (EMR Division)*. 1-7. Available at*: https://www.mohfw.gov.in/pdf/1584423700568_COVID19GuidelinesonDeadbodymanagement.pdf* (accessed, Apr 17, 2020).
Paul R, Amara J, Ferme MC et al. (2014). Social pathways for Ebola virus disease in rural Sierra Leone and some implications for containment. *PLoS Neglected Tropical Diseases* **8** e30562014. *Available at: doi: 10.1371/journal.pntd.0003567*
Reuters (2020). NY buries dead in trenches on Hart Island as coronavirus toll rises. The Jerusalem Post. *Available at: https://www.jpost.com/international/ny-buries-dead-in-trenches-on-hart-island-as-coronavirus-toll-rises-624251 (Accessed, Apr 18, 2020).*
Sazzad HMS, Hossain MJ, Gurley ES et al. (2013). Nipah Virus Infection Outbreak with Nosocomial and Corpse-to-Human Transmission, Bangladesh. *Emerging Infectious Diseases* **19** 210-2017. doi: http://dx.doi.org/10.3201/eid1902.120971
Shank CH (2019). Sky Burials: Ecological Necessity or Religious Custom? *Relics, Remnants, and Religion: An Undergraduate Journal in Religious Studies*; **4:** 1-14. *Available at: https://soundideas.pugetsound.edu/relics/vol4/iss1/7*
Spencer RC (2003). *Bacillus anthracis. Journal of Clinical Pathology*; **56**: 182–187. *Available at: doi: 10.1136/jcp.56.3.182*

Tanno Sophie (2020). Wuhan crematoriums 'are burning bodies 24/7 to cope with extra workload during coronavirus outbreak'. *Mail Online Available at: https://www.dailymail.co.uk/news/article-7969861/Wuhan-crematoriums-burning-bodies-24-7-cope-extra-workload.html (Accessed, 15 April, 2020).*

Tiffany A, Dalziel BD, Njenge HK *et al.* (2017). Estimating the number of secondary Ebola cases resulting from an unsafe burial and risk factors for transmission during the West Africa Ebola epidemic. *PLoS Negl Trop Dis*; **11**: e0005491. *Available at: https://doi.org/10.1371/journal.pntd.0005491*

Timofeev V, Bahtejeva I, Mironova R *et al.* (2019). Insights from *Bacillus anthracis* strains isolated from permafrost in the tundra zone of Russia. *PLoS One*; **14:** e0209140. *doi: 10.1371/journal.pone.0209140*

Umeora OU, Emma-Echiegu NB, Umeora MC, Ajayi N. (2014). Ebola viral disease in Nigeria: The panic and cultural threat. *African Journal of Medical Health Sciences* [online]. **13** 1-5. http://www.ajmhs.org/text.asp?2014/13/1/1/139434; DOI: 10.4103/2384-5589.139434

WHO (2015). Factors that contributed to undetected spread of the Ebola virus and impeded rapid containment, One year into the Ebola epidemic. January: *Available at:* https://www.who.int/csr/disease/ebola/one-year-report/factors/en/ (accessed, Apr 13, 2020).

WHO (2020a). World Health Organization. Risks posed by dead bodies after disasters. *Available at: https://www.who.int/diseasecontrol_emergencies/guidelines/risks/en/ (accessed, April 12, 2020).*

World Health Organization (2020b). 2019-nCoV outbreak is an emergency of international concern. Available at*: http://www.euro.who.int/en/health-topics/health-emergencies/international-health-regulations/news/news/2020/2/2019-ncov-outbreak-is-an-emergency-of-international-concern (accessed, April 15, 2020)*

Wu A, Peng Y, Huang B *et al.* (2020). Genome composition and divergence of the novel coronavirus (2019-nCoV) originating in China. *Cell Host Microbe*; **27**: 325-328. https://doi.org/10.1016/j.chom.2020.02.001

Zhong Zhi-Ping , Natalie E Solonenko, Yueh-Fen Li *et al.* (2020). Glacier ice archives fifteen-thousand-year-old viruses. *BioRxiv. Available at: https://www.biorxiv.org/content/10.1101/2020.01.03.894675v1 (Accessed 12 Apr, 2020).*