Introduction

The death certificate (DC) is a legal document that provides families with the cause and manner of death, which may be required to settle estates, property disputes, insurance claims and other survivor benefits. The DCs have direct implication on civil and criminal legal proceedings and these serve as important piece of evidence in the court of law. Besides the individual consideration for survivor's family, DC data are used to monitor local, regional and national mortality trends, which may be helpful in improving and planning public health and public safety. Mortality analysis is a cornerstone of epidemiology and with the continuous upsurge in the mortality due to coronavirus disease-19 (COVID-19), it is a valuable tool in addressing the current pandemic.

As per the International Health Regulations (IHR, 2005) on 30 January 2020, World Health Organization (WHO) declared the 2019-nCoV outbreak as a public health emergency of international concern (PHEIC), and later on 11 March 2020 as a Global Pandemic. On 30 January 2020, India reported its first COVID-19 positive case – a student from Wuhan University (China) on vacation at his hometown in Kerala. Since then, in a short span of five months, as of 13 July 2020, the number of positive cases in India rose to 8,88,944 with a total of 23,333 notified deaths due to COVID-19. On 12 July, India recorded 29,108 new cases with 500+ deaths and accounted for maximum number of new cases and deaths due to COVID-19 in 24 hrs. Considering the global impact of COVID-19 and to
As per the [7], in order to implement the [6], the data that can be used to guide the disease surveillance, as give rise to legal implications. Meticulously filled DCs generate also substantially impairs the quality of public health data as well as their underlying medical conditions and co-morbidities. It is important to understand that the quality of public health mortality data depends on the quality of information filled in the DCs, however the proper death certification has long been a challenge in our country. Most of the times either the information is improperly filled or is incomplete and of no use. In the wake of COVID-19 pandemic, such improper documentation, may severely compromise an accurate count of COVID-19 deaths, which in turn can adversely affect the prevention and mitigation strategies.

Certification becomes more problematic in ‘brought dead’ cases, where there is no/improper history of previous disease more so, when patient is unknown. Earlier it was suggested to have nasopharyngeal swab taken from all such suspected cases at emergency/casualty department of the hospital and sent for testing. The dead body should also be accordingly segregated for preservation in the mortuaries till the time report comes, to have a robust system of reporting. However, later on it was done away by many states because of certain administrative reasons. This certainly has affected the accurate data gathering. Also some of the state governments announced the huge monetary compensations to the tune of INR 10 million (1,40,000$) for the so called ‘Corona Warriors’ that is health care workers, police personnel etc., who die due to COVID-19, while on duty. If any such person dies and there is no proper Medical Certificate of Cause of Death (MCCD), it may be difficult for the family members to avail the aforesaid benefit. Moreover as the COVID-19 is now being covered under insurance claims, the lack of proper MCCD may increase unnecessary litigations.

Although the treating physicians complete the COVID-19 DCs, there is a training gap about proper death certification, which leads to improperly filled certificates. This not only limits the ability to track the possible source and contacts of COVID-19 cases but also substantially impairs the quality of public health data as well as give rise to legal implications. Meticulously filled DCs generate the data that can be used to guide the disease surveillance, quarantine and containment measures, and more importantly to optimize the scarce medical resources. In order to initiate broader responses to the pandemic any dataset generated in context of COVID-19 cases/deaths is currently being transmitted to Indian Council of Medical Research – National Center for Disease Informatics and Research (ICMR–NCDIR), and any inaccurate/incomplete information; if provided can adversely affect the local and national responses to this overwhelming global pandemic.

In India, ‘MCCD is issued by the attending medical practitioner who had treated the person during admission in a medical institution or in the last illness (prior to death) while taking treatment from a physician outside a medical institution. Medical certification of cause of death is the process of recording and reporting death using standard Form 4 (institutional deaths) and Form 4A (non-institutional deaths) as per the rules of the Registration of Births and Death Act, 1969. The MCCD form contains Part 1 to record the immediate and antecedent causes, and Part 2 to record the significant conditions that contributed to the death but were not part of the sequence of events leading to death’.[7]

The ICMR–NCDIR recently released guidelines for the certification of COVID-19 deaths with an attempt to streamline the disease’s mortality surveillance in the country.[7] As per the aforesaid guidelines, the deaths related to COVID-19 may be categorized mainly in two groups:

a. Those in which the person has died from direct complications of laboratory confirmed severe acute respiratory syndrome corona virus-2 (SARS-CoV-2) infection (pneumonia, acute respiratory distress syndrome, cardiac injury, disseminated intravascular coagulation), and it is likely that COVID-19 is the underlying cause of death (UCOD) that may have lead to any of the aforesaid fatal complications. In these cases COVID-19 must be mentioned in Part 1 of MCCD form 4/4 A

b. Patients may also present with other pre-existing co-morbidities such as chronic obstructive pulmonary disease (COPD) or asthma, chronic bronchitis, pulmonary tuberculosis, ischemic heart disease, cancer, diabetes mellitus, etc., Such conditions increase the risk of developing respiratory infections, and may lead to severe complications in a COVID-19 positive patient. These conditions are not considered as UCOD as they have directly not caused death due to COVID-19. Also a patient may have many co-morbid conditions, but only those that have contributed to the mortality should be recorded in Part 2 of MCCD form 4/4 A.

Although, objective findings such as laboratory tests, are an integral part of medicine, but clinical realities must be considered. Considering the technical or procedural errors, tests for SARS-CoV-2 may be false negative (e.g., PCR inhibition) or false positive (e.g., cross contamination) results, and at instances the initial COVID-19 tests may be negative and subsequent test may turn out to be positive. Recent example is of a junior doctor from Delhi, who had COVID-19 symptoms, but tested...
negative twice for the same, yet died later. He was posted in the department of oral surgery of a dental institute and had complained of chest congestion and breathlessness hours before his death.[8] Another similar example is the case of Delhi’s health minister who initially tested negative but a repeat test conducted next day turned out to be positive.[9] Death, in any such case before the positive test, would otherwise not be recorded as a laboratory confirmed COVID-19 death. Any such case, in which a laboratory diagnosis cannot be made but SARS-CoV-2 infection is suspected or likely, clinicians may use their clinical acumen and based on the patient’s history, symptoms, physical and clinical examination should certify the death due to COVID-19 with a phrase as ‘acute respiratory illness due to probable COVID-19 infection’. Considering the same, recent ICMR–NCDIR guidelines[7] state, that, deaths with inconclusive test results but in which COVID-19 symptoms are present will be recorded as ‘probable COVID-19’ fatalities. Deaths in which COVID-19 symptoms were present but laboratory confirmation of the same is still awaited, will be recorded as suspected deaths, while those tested negative but have symptoms will be mentioned as ‘clinically-epidemiologically diagnosed COVID-19’. The detailed guidelines regarding appropriate recording of COVID-19-related deaths in India are available at NCDC website: www.ncdirindia.org/Downloads/CoD_COVID-19_Guidance.pdf.[8]

COVID-19 cases are rampant all over the country, affecting masses in all areas. Family medicine and primary care physicians are among the first line medical care givers particularly in the rural and resource-constrained settings and need to be well informed about any latest guidelines pertaining to COVID-19. The information collated in this review will not only help to generate accurate and reliable data regarding COVID-19 deaths but will also help to tailor the prevention and mitigation strategies accordingly.

**Conclusion**

Analysis of clinical sequences from MCCCD can be useful to guide priorities and resource allocation for critical care management as well as enhance our understanding of epidemiological patterns and causal pathways to mortality from COVID-19. The information gained can be helpful in taking important public health measures, such as personal protection, community quarantine and other suppression or mitigation strategies to control any further spread of COVID-19. In addition to disease and intervention monitoring MCCCD can also be helpful in assessing mortality risks across a population and reinforcing accountability and transparency for good governance. Given that COVID-19 DC substantially affects the local as well as national responses towards disease prevention and transmission, the importance of the accuracy and quality of information in these certificates cannot be understated. A multifaceted approach involving treating physicians, public health professionals, state medical societies, hospital associations and forensic medicine societies can surely be helpful in timely and accurate acquisition of information required for evaluation and management of the COVID-19 pandemic.

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**Conflicts of interest**

There are no conflicts of interest.

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