Challenges and accurate estimates of mortality and case-fatality rates due to COVID-19

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Abstract

Many reasons restrict obtaining an accurate estimate of Case Fatality Rate (CFR) and Mortality Rate (MR) by COVID-19. The main concern is the number of infected people and deaths. We aimed to discuss some solutions for accurate estimating of CFR and MR.
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Many estimates have been documented for mortality rate (MR) and case-fatality rate (CFR) of coronavirus disease 2019 (COVID-19). MR is the measure of frequency of death in a defined population during a specified period. MR is commonly based on vital statistics. The size of the population at the middle of the time period under study is the denominator. CFR is the number of people who die from the disease under study among all individuals diagnosed with the disease during a specified time interval. CFR typically is used as a measure of disease severity [1].

Several reasons make it hard to obtain accurate estimates of the MR and CFR of COVID-19. The virus's morphology and clinical features are novel. We have little information about various features of the virus. Sources for vital statistics are different in many countries. Health systems' readiness and capacity vary greatly, affecting outcome measures of the disease. System facilities, availability of health service providers, unavailability of tests at a wide level and countries' preventive and control policies are different. Some countries, but not others, are able to conduct screening programmes, contact tracing, quarantine and isolation of patients infected with or suspected to be infected with the disease [2].

The CFRs reported vary from 0.4% to 15% [1]. The main concern in calculating CFR is the number of people who are infected (denominator). As a result of the high proportion of infected patients with nonclinical or no symptoms, misdiagnoses and false-negative test results are common; in addition, Polymerase chain reaction (PCR) care provided in a nonhospital setting, various and even unknown policies applied by governments, social stigma and inaccurate statistics have led to underestimation or overestimation of the outcome measures of the disease (CFR and MR). The underestimation or overestimation of CFR in COVID-19 has direct effects on MR [3]. We recommend the following solutions to obtain a more accurate estimation of CFR and MR in COVID-19.

Estimating excess death

The comparison of vital records and statistics of all the current deaths with the previous COVID-19–free months and years at the same time of year can help in obtaining an accurate number of deaths due to COVID-19.

Developing a dynamic and efficient surveillance system

A strong surveillance system in addition to covering many aspects of disease surveillance—including contact tracing, rapid disease detection and screening, principles of appropriate outbreak management at the local level, infectivity and secondary attacks rates of virus, prehospital and hospital care, quarantine and isolation, border and airport care and telemedicine—can also cover other aspects of disease care and prevention, such as report and reporting processes, knowledge transfer and reporting in a suitable format for decision makers to assess accurate outcome measures [4].

Defining assessment measures and indicators

Assessment measures and indicators should be defined for calculating the validity, capacity and reliability of the COVID-19

surveillance system. Sensitivity, specificity and positive and negative predictive value are important measures. However, as a result of the low sensitivity of COVID-19 diagnostic tests and the high percentage of false-negative results, as well as the long interval between initial diagnosis and laboratory confirmation, reliability indicators such as percentage of positive agreement and kappa statistics are recommended.

Screening via phone and electronic methods

Phone and electronic screening that permits the general population and at-risk people to report probable signs and symptoms to identify suspected cases can increase the number of infected patients identified (denominator of CFR) [5].

Educating healthcare providers

It is important to educate healthcare providers who issue death certificates in order to obtain accurate statistics, especially for COVID-19 patients with comorbidities, as comorbidities may be recorded as cause of death rather than COVID-19, thereby masking the true effects of the disease.

Conflict of interest

None declared.

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