

A rapid review of quarantine and/or other public health measures to control COVID-19



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1 | BACKGROUND

Nussbaumer-Streit et al. (2020) published a rapid review (an abbreviated systematic review) in April 2020 on the effects of quarantine in controlling the spread of the novel coronavirus, SARS-CoV-2 (severe acute respiratory distress syndrome coronavirus-2) which causes Coronavirus disease (COVID-19). The review was updated in September 2020.

COVID-19 was first reported in Wuhan, China, on 31 December 2019 and declared a global pandemic by the World Health Organization (WHO) by 11 March 2020 (World Health Organization [WHO], 2020). SARS-CoV-2 is genetically similar to severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS), also caused by coronaviruses. It is transmitted via infective droplets during close unprotected proximity to infected persons or their environment. It has higher transmissibility than both SARS and MERS with a basic reproduction rate (R_0) between 1.5 and 6.49 without quarantine and social distancing (Liu, 2020). To compare,

the R_0 for SARS is 3.0 (Bauch, Lloyd-Smith, Coffee, & Galvani, 2005), MERS is 1.0 (Park et al., 2020) and the seasonal influenza is 1.8 (Biggerstaff, Cauchemez, Reed, Gambhir, & Finelli, 2014).

The pathogenicity of SARS-CoV-2 is lower than that of SARS and MERS with most COVID-19 patients developing mild cases of dry cough, fever and fatigue while only 5%–6% become critically ill. Fatality is estimated at 0.7%, and initial data indicate this increases with age. There are no known effective treatments or vaccines for COVID-19 (World Health Organization [WHO], 2020). Public health measures (PHM) such as quarantine, physical distancing and isolation remain the few interventions available to control it.

2 | OBJECTIVE

The primary objective of this rapid review was to determine the effectiveness of quarantine on coronavirus outbreaks to support the WHO quarantine recommendation. Quarantine alone was compared to no intervention. Quarantine in combination with other PHM was compared to other PHM without quarantine to control COVID-19. The comparative effectiveness sought was decreased transmission, incidence, mortality and resource use.

- Quarantine means separating healthy people from other healthy people in case they might have and could spread the virus.
- Other PHM include isolation of those infected from those who are not, physical distancing, personal protective equipment (PPE), hand hygiene, school and workplace measures and/or closures and crowd avoidance.

3 | INTERVENTION AND METHODS

Non-randomized interventional studies are considered the best available empirical evidence since randomization of quarantine is unethical. COVID-19 is a new disease with minimal evidence, so studies of SARS and MERS are included as well. Included are cohort and case-control studies; case, time and interrupted-time series; and mathematical modelling studies because empirical studies were not yet available. These studies reveal case quantity, spread and fatality as well as costs of quarantine.

Interventions include voluntary and mandatory quarantine of individuals in private residences, hospitals, public institutions and a

cruise ship. Other interventions included quarantine of individuals or community in combination with PHM.

Control measures were no quarantine, different types and locations of quarantines and PHM without quarantine.

Case reports and travel bans as the only intervention were excluded.

Participants included those in contact with suspected or confirmed cases, those living in areas of high transmission rates and those returning from countries experiencing an outbreak.

During the update, of 4,667 records, 4,535 were excluded at the abstract level for design, intervention or outcome ineligibility. After further review, 22 new studies were eligible. In combination with the studies identified in the original review, this resulted in 51 included studies.

4 | RESULTS

The evidence found in this review consists of four observational studies and 28 modelling studies for COVID-19; 15 modelling and four observational studies for SARS and MERS. The authors rated the evidence certainty as low to very low using the GRADE approach. However, these studies consistently found that quarantine was important in reducing incidence and fatality, averting 44%–96% of cases and 31%–76% of deaths in modelling study simulations. With very low certainty, earlier quarantine measures resulted in greater cost savings. When quarantine was combined with other PHM, models suggest a larger effect on the reduction of new cases and fatality.

5 | CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

Though there is limited evidence of quarantine on the spread of COVID-19, all modelling studies indicate that quarantine is an important measure to reduce cases and fatalities, especially when implemented earlier in an outbreak. The evidence suggests that implementation of quarantine early in a pandemic and combining quarantine with other public health measures can help slow the spread of COVID-19. However, it is difficult to determine what combination of measures is best to reduce the number of cases and deaths.

Nurses recognize that testing is the key to understanding the prevalence of COVID-19 disease in the population. Quarantine alone can mitigate the spread of infectious diseases, but considering the transmissibility of SARS-COV-2, quarantine in combination with other PHM is required to contain its spread. Further research including non-randomized interventional and strategy combination studies are

needed on the various global pandemic responses to adequately evaluate control and spread of COVID-19. SARS-CoV-2's influence on the pandemic derives from its transmissibility and pathogenicity, while its prevalence could be determined by the behaviours of the public. Nurses understand the importance and the impact of quarantine measures, duration and compliance of those quarantined as well as the use of other PHM such as face masks, hand hygiene, physical distancing and workplace measures to control transmissible diseases. Decision makers must design a public health response that weighs the benefits of quarantine and other PHM on the pandemic with the impact it has on the individuals, families and the communities they serve.

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