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Review Article

Ramadan and *Eid al-Fitr*: Population movement, mass gathering and escalating of COVID-19 – A perspective from Indonesia

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Abstract

In Indonesia, the most populous Moslem-majority country, despite the possibility of underreported coronavirus disease (COVID-19) cases, 6,248 confirmed cases and 535 deaths have been recorded. With upcoming Ramadan and Eid al-Fitr, between 18-23 million of Indonesians may move from urban locations (with high counts of COVDI-19) to rural areas with fewer cases currently but less laboratory capacity to diagnose cases. This review summaries the current situation of CO.VID-19 in Indonesia and discusses the possible impacts of mass population movement, Ramadan-related activities, and Eid al-Fitr celebration days on COVID-19 transmission in the country.

Keywords: COVID-19, SARS-CoV-2, *Eid al-Fitr*, Ramadan, mass movement

Introduction

As of April 18, 2020, 2,273,382 confirmed cases of coronavirus disease 2019 (COVID-19) have been reported in 185 countries based on COVID-19 Global Cases database (Dong et al., 2020). The infection is caused by a member of genus *Betacoronavirus*, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2); other members of *Betacoronavirus* are SARS-CoV and Middle East Respiratory Syndrome Coronavirus (MERS-CoV) (Burrell et al., 2016; Fehr and Perlman, 2015). Although most cases present with mild clinical manifestations, approximately 20.3% of hospitalized patients have required intensive care unit (ICU) and 32.8% of hospitalized patients have presented with acute respiratory distress syndrome (ARDS) (Rodriguez-Morales et al., 2020). The disease progression and severity are influenced by dysregulation of the host immune responses as well as other factors (Keam et al., 2020).

The main transmission of SARS-CoV-2, person-to-person transmission, occurs among close contacts mainly via respiratory droplets as well as through contaminated fomites (Harapan et al., 2020). The mean of incubation period of COVID-19, time between becoming infected and symptom onset, is approximately 5 days with range of 2–14 (Linton et al., 2020). During incubation period, some infected persons can be contagious and spread the virus to other people, called pre-symptomatic transmission. Some infected persons might remain asymptomatic and the proportion of asymptomatic cases varied among studies: 5% in China,(Tian et al., 2020) 18% among passengers of Diamond Princess cruise ship (Mizumoto et al., 2020) and 31% among Japanese nationals evacuated from Wuhan (Nishiura et al., 2020). Some studies have suggested the existence of asymptomatic transmission of COVID-19 (Bai et al., 2020; Pan et al., 2020; Rothe et al., 2020). Asymptomatic cases may be competent carriers and shed the virus up to 21 days (Hu et al., 2020). All these contribute to high basic reproductive number (R_0) of the virus which is 3.28 (Liu et al., 2020), higher than SARS-CoV.

Indonesia faces particular challenges in controlling the spread of COVID-19. Because no specific therapies have been approved by the US Food and Drug Administration (FDA) for COVID-19 and no vaccine is available, social or physical distancing is one of the best strategies to reduce the spread of the virus (Centers for Disease Control and Prevention, 2020; World Health Organization, 2020). The population density in Indonesia, along with high rates of poverty in parts of the country, can limit how well social distancing can be practiced. Indonesia is the most populous Moslem country and is the fourth most populous country overall, with more than 270 million people. Its capital Jakarta is by some measures the second most populous urban conglomeration, and is located on the densely populated island of Java. Currently, Indonesia has the highest number of COVID-19 cases in Southeast Asia region. As of April 18, 2020, there have been 6,248 confirmed cases (Ministry of Health, 2020).

To control COVID-19 transmission, the Indonesia government officially implemented a Large-Scale Social Restriction (LSSR) strategy which has been adopted by local governments at several provinces in the country. While the transmission of COVID-19 is still in increase trend in the country, Ramadan and *Eid al-Fitr* are approaching where massive population movement and Ramadan-related activities such as mass gatherings are expected. Here, we discuss the possible impacts of this massive population movement (Ramadan exodus) and mass gatherings during Ramadan and *Eid al-Fitr* and their possible consequences on SARS-CoV-2 transmission in Indonesia.

Current situation of COVID-19 in Indonesia: the trend is increasing and most cases are located in Java

As of April 18, 2020, there were 6,248 confirmed COVID-19 in Indonesia (Ministry of Health, 2020). Of the total cases, 631 have recovered and 535 deaths have been reported, with mortality rate was 8.5%. The number of daily cases, recovered cases, death and cumulative cases are presented in Figure 1. The number of cases in Indonesia is still increasing.

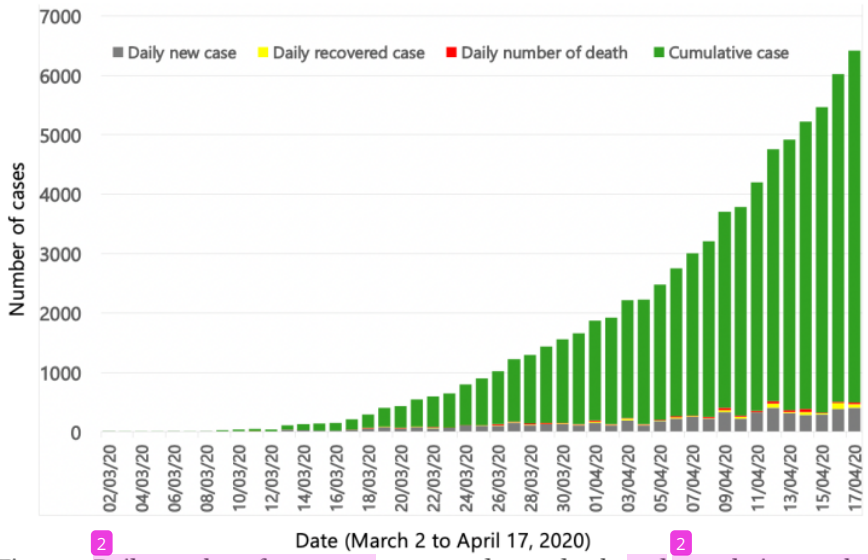

Figure 1. Daily number of new cases, recovered case, death, and cumulative number of COVID-19 cases in Indonesia (March 2 to April 17, 2020, n=5923)

Most COVID-19 cases have been reported in Java (Figure 2), which is the most populous island in Indonesia. The province with the largest number of cases is the capital Jakarta (2,815 cases), followed by the neighboring provinces of West Java and East Java. The only province outside of Java which has had more than 200 cases is South Sulawesi, and most other provinces have had fewer than 100 cases. In summary, the island Java has been the epicenter of COVID-19 in Indonesia.

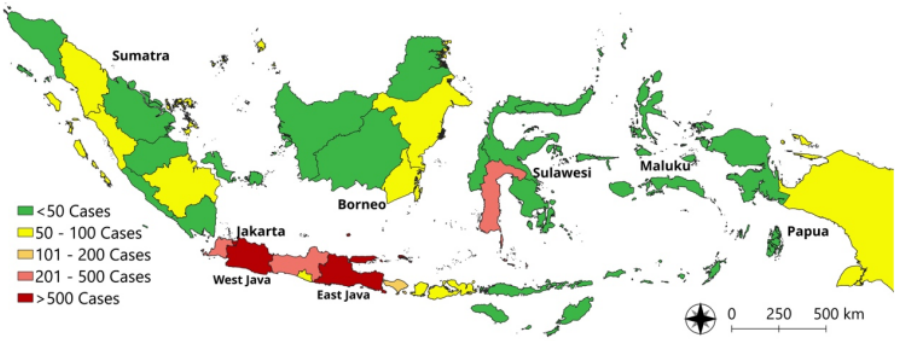

Figure 2. Number of COVID-19 in each province in Indonesia (March 2 to April 17, 2020, n=5923)

Underreported cases issue in Indonesia: the possibility of invisible COVID-19 transmission

Studies of COVID-19 at the beginning of the pandemic suggested that Indonesia is one of the countries with a high import risk (Humboldt University of Berlin and the Robert Koch, 2020; Lai et al., 2020; Salazar et al., 2020), and Jakarta in particular was expected to have the highest number of cases (Humboldt University of Berlin and the Robert Koch, 2020). However, after the outbreak started in Wuhan on December 8, 2019, in China (Lu et al., 2020), no cases were reported in Indonesia before March 2, 2020, making international communities question the surveillance systems within Indonesia (Djalante et al., 2020). One study found that the number of COVID-19 cases in Indonesia was underdetected at an early phase (Salazar et al., 2020). This underdetection was mainly due to lack of diagnostic capabilities. RT-PCR testing was only located in the capital of Jakarta. In the early phase of the COVID-19 outbreak, all samples collected from suspected cases had to be shipped to Jakarta, but now local governments have built up laboratories in other areas of the country. These circumstances suggest that multiple local transmission chains occurred in Indonesia without the knowledge of health authorities in the early phase of the outbreak.

As a result of problems diagnosing COVID-19, Indonesia has one of the lowest proportions of reporting for symptomatic cases. One modeling analysis using a delay-adjusted case fatality ratio estimated that the proportion of symptomatic cases reported in Indonesia is 5.4% (95%CI: 4.3%-12%) (Russell et al., 2020), suggesting that over 94% of symptomatic cases have not been detected by the surveillance system. In comparison, the estimated proportion of detected symptomatic cases is 44% in Malaysia and 33% in China (Russell et al., 2020), Unreported cases may easily contribute to spread of disease without the diagnosis of COVID-19. These unreported cases, along with 176,344 individuals under surveillance (contacts of reported cases) and 12,979 patients under surveillance (Ministry of Health, 2020), are a large pool from which COVID-19 can spread to other community members. This spread could be

facilitated by the mass movements of people that is expected through Ramadan and on *Eid al-Fitr*.

Ramadan and *Eid al-Fitr*: impact on COVID-19 transmission

The first two COVID-19 cases were reported in Indonesia on March 2, 2020, and within a month, the number exponentially increased to be more than 5,000 (Ministry of Health, 2020). With the world's largest Moslem population, Indonesia might face a potential significant increase COVID-19 transmission during the upcoming Ramadan. In countries with a large Moslem population, Ramadan is tightly-linked to an annual mass exodus prior to, during, and slightly after Ramadan, as Indonesians head to their hometown to participate in traditional and social functions and to celebrate *Eid al-Fitr*, one of the biggest holy celebrations in Islam. It is estimated that 18-23 million Indonesians move from one place to another using various mode of transportations at almost the same time (Prasetyo and Warsono, 2018). The Ramadan exodus is the largest annual population movement in Indonesia and should draw attention to the potential of super spreader events. The importance of Ramadan in the culture of Indonesia and its mass movements has been compared to the Chinese New Year, which occurred at the beginning of the outbreak in Wuhan, China (Zhong et al., 2020).

In the Ramadan exodus, the pattern of population movement is from large cities to rural areas. At present, the national capital of Jakarta, and provincial capitals such as Bandung, Jogjakarta, and Surabaya, are located in the provinces with the highest levels of COVID-19 transmission in the country (Figure 2) (Ministry of Health, 2020). Similar to religious pilgrimages such as Umrah and Hajj (Ahmed and Memish, 2020), during Ramadan, it would be hard to be socially distant and a large number of people could potentially be exposed to SARS-CoV-2 and harbor the virus with little or no symptoms. Viral transmission is prone to occur at public places and in the public mass transportations where a large number of people are in confined locations (Zhao et al., 2020; Zhong et al., 2020). Upon arrival in their hometowns, asymptomatic carriers, those in their incubation period or those with mild symptoms may unknowingly introduce SARS-CoV-2 to their families and relatives. Critically, this transmission could further exacerbate difficulties surveilling COVID-19, since the laboratory facilities in rural areas are lacking in diagnostic equipment and could further continue the low case detection rate in Indonesia (De Salazar et al., 2020; Russell et al., 2020).

Indonesian government, supported by major Indonesian Islamic organizations, has appealed to the citizens for not doing the Ramadan exodus until the situation resolves (Fachriansyah, 2020). Large-Scale Social Restriction (LSSR) have been also issued by Indonesian government and has been adopted and implemented by local governments at several provinces to control COVID-19 transmission. However, the implementation was not nationally encouraged and Ramadan exodus is not strictly prohibited (Djalante et al., 2020). If the movement of large numbers of people during Ramadan continues, COVID-19 transmission is predicted to rapidly increase in all parts of Indonesia in the following months.

At present, local transmissions is reported in all provinces in Indonesia. Hospitals with sufficient resources for COVID-19 are vastly limited and pressures to the healthcare systems have begun to escalate. Under such conditions, COVID-19 cases resulting from the mass movement of people during Ramadan and *Eid al-Fitr* will superimpose upon the current burden of healthcare facilities across the nation and could accelerate the collapse of the healthcare system in some places.

The movement of people is only part of difficulties in controlling COVID-19. During Ramadan, Moslems are expected to perform numerous religious activities including

gatherings for Ramadan evening prayer (*tarawih*), in addition to the compulsory five times daily prayers, at mosques. In addition, shopping for food in street markets, breaking of the fast in groups after sunsets (*iftar*), studying together and learn about Islamic knowledge (*halaqah*) are activities that usually involve gatherings of relatives and community members at homes, mosques and in public spaces. Restriction of these mass gathering-related religious functions have been suggested in order to control COVID-19 transmission (Ebrahim and Memish, 2020). The Indonesian Ulema Council (MUI), the highest official Islamic authority in Indonesia, has appealed to the population to restrict these activities issued appeals related to the restriction of these activities (Bhwana, 2020). However, recommendations can challenge individual beliefs about religion and upset the balance between precaution and reliance on God. These problems not only affect Indonesia, but other countries with a high Moslem population, such as Malaysia, Egypt, and those located in Africa and the Middle East region.

Recommendations

Prompt and proper adaptation of Moslems in carrying out social and religious practices during Ramadan are crucial to control COVID-19 transmission in Indonesia and other Moslem-majority countries. There is a need for close observation on the situation to consider the best option to be taken. As a safety measure, this situation should be evaluated by Indonesian government on a daily basis and subject to modification. It is essential to act fast based on the scientific merit and to swiftly communicate the underlying reasons for all policies to all Indonesians. Restrictions should be based on the epidemiology of disease at a local level.

Restrictions on social and religious affairs during Ramadan might not easily applicable in Indonesia given the religious population. However, in the present situation, carrying out large scale restrictions enforced by policies might be an inevitable solution to prevent the escalation of COVID-19 transmission.

Several recommendations will be necessary. Physical distancing (including limiting time spent outside the home), regularly hand washing using soap, and using face masks are essential behaviors to prevent the viral transmission. But in this era, even with physical distancing, people can still connect and socialize. The use of online media such as video conferencing platforms to support Ramadan-related communal affairs virtually is one achievable solution. Increasing slots for Islamic broadcasts such as Qur'an recitation, Islamic teachings and educational activities on the television could also provide support for Moslems to maintain their faith during this crucial time.

For Indonesian Moslems, and perhaps other Moslems worldwide, adaptation to new social and religious norms during this COVID-19 pandemic might be challenging. Therefore, supportive actions from the government are essential to make sure that citizen obedience is balanced with government concerns for the people.

Conclusion

Massive population movement and Ramadan-related activities during the month of Ramadan and *Eid al-Fitr* celebration could increase transmission of COVID-19 not only in Indonesia but also in other countries with a majority Moslem population. Given the possibility of rapid spread of COVID-19 from already hard-hit urban areas into economically less developed rural areas, close observation on a daily basis on the situation is needed to consider the best approaches to be taken during incoming Ramadan and *Eid al-Fitr*. High compliance of Moslems to governmental recommendations will be necessary to successfully combat the spread of COVID-19.

Authors' contributions

Conceptualization: DSA and FN; Data Curation: DSA and FN; Formal Analysis: DSA and FN; Software: DSA; Validation: DSA, FN, ALW and KD; Visualization: DSA and FN; Writing – Original Draft Preparation: DSA, FN, ALW and KD; Writing – Review & Editing: DSA, FN, ALW and KD

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All the authors substantially contributed to the writing the manuscript, interpretation of data, checking and approving the final version of the manuscript.

Conflict of interest

The authors declare that there is no conflict of interest.

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