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by Meita V

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Correlation between local Eid-al-Fitr homecoming (mudik) with COVID-19 during Ramadhan season amidst large-scale social distancing in Indonesia

Abstract

Background: In anticipation of Covid-19's transmission peak, *Eid-al-Fitr* homecoming (*mudik*) has officially been banned by the Indonesian government interlocal but not local in welcoming this religious Muslim celebration. This local mudik is held by traveling among regional provinces, and is still allowed by each local government, including Java, which has the highest transmission of COVID-19 in Indonesia.

Objective: This study aims to present the difference between COVID-19 status before and during local mudik on Java during *Ramadhan* with the implementation of large-sale social distancing (LSSD) applied in Jakarta, Indonesia.

Method: This research was employed by secondary data analysis that was obtained from surveillance data from related authorities, including the Ministry of Health and all local governments of Java, which consisted of four provinces and Jakarta. Incidence and suspect statuses of Covid-19, which were examined in the study, were presented in daily rates with before and during local mudik in four provinces: Jawa Barat, Yogyakarta, Banten, and Jawa Tengah.

Results: The number of positive confirmed patients differed significantly with before and during local mudik (p-value < 0.05; mean difference = -/negative values).

Conclusion: This study's findings showed that the local mudik increased the number of COVID-19 cases in four provinces in Java, which these provinces were designated as *mudik* destinations by travelers coming from Jakarta during the end of Ramadhan season.

Keywords: coronavirus, homecoming, religious travel, social distancing, Eid-al-Fitr

1. Introduction

COVID-19 is a well-known infectious disease that is borne rapidly across the globe [1,2]. When COVID-19 cases were first reported China was celebrating the Chinese New Year, an event that potentially drove the disease around the world [3,4]. The many people travelling home from around the world enabled mass gatherings of big families, which transmitted the virus from where they lived [5]. This also happened in the hajj [6] and the *Eid-al-Fitr* celebration after the month of *Ramadhan* for Muslims in Indonesia.

The *Eid-al-Fitr* homecoming (*mudik*) is a routine and temporary migration in Indonesia, a country known for having the largest Muslim population in the world [7]. This migration is massive and done by long and short-distance travelers in celebrating the Eid-al-Fitr with family [8], which mass gathering is also potentially happening at this circumstance [9]. Mudik season usually lasts from the first day of *Ramadhan* until day one before (D-1) the month of *Syawal,* which has the *Eid-al-Fitr* celebration on the Islamic calendar of *Hijr*.

There are four provinces that are usually designated as mudik destinations in Indonesia, all of which are located on Java [10]. Jawa Barat, Special Region of Yogyakarta (DIY), Banten, and Jawa Tengah experienced more than 50% of all *mudik* travelers, leaving from the capital city of these provinces - including Bandung (Jawa Barat), Yogyakarta City (DIY), Tangerang (Banten), and Semarang (Jawa Tengah) [11] – to the center of COVID-19 pandemic in Java. In fact, these capitals contributed the most mudik travelers to the area known as the capital and the center of business in each province, as well as Indonesia. These capitals of the provinces were also

designated as *mudik* destinations by travelers coming from other Indonesian regions, as well as from travelers and repatriations from abroad [11].

Since this Indonesian religious custom is a mass gathering that risks the spread of COVID-19, the Indonesia government banned all *Ramadhan* celebration activities using LSSD measures in this region. Although it was banned nationally, local mudik was still allowed [12]. Since local mudik potentially blew up COVID-19 transmission, evidence of it related to COVID-19 incidence rate is essential to know, particularly during this hardest time of the COVID-19 pandemic.

2. Methods

2.1 Study area

Four provinces have become local mudik destinations in Java, Indonesia: Jawa Barat, Yogyakarta, Banten, and Jawa Tengah. These regions, including all Indonesian territories, face *mudik* season, which started on 1st *Ramadhan* 1442 in the Islamic calendar of *Hijriah* - or 24 April 2020. This temporary travelling lasted until the end of *Ramadhan* or day one before (D-1) Eid-al-Fitr, which on this year falls on 24 May 2020.

Instead of applying "lockdown", a policy that consists of the full closure of all activities and entry-exit in a territory to cut down the transmission of COVID-19 [13,14], the Indonesian government is applying LSSD. LSDD defined as massive restrictions in response to the COVID-19 pandemic that are followed by public place closures, public transportation restrictions, and a travel ban on leaving or entering a region. Other restrictions also include the disallowance of online-ordered motorcycle taxis (*ojek*) from carrying passengers (they are only allowed to carry food and goods), restricted dine-in at food cafes/restaurants (only takeaway is allowed), and the

closure of all shops and workplaces except for those supplying basic needs. Places being shut down also include schools, worship places like mosques, and entertainment sites. LSSD measures consist of public transportation operating at fifty percent capacity[12]. This policy is still being carried out in several regions, particularly those with a high index of transmission, including Jakarta and most territories on Java.

2.2 Data collection

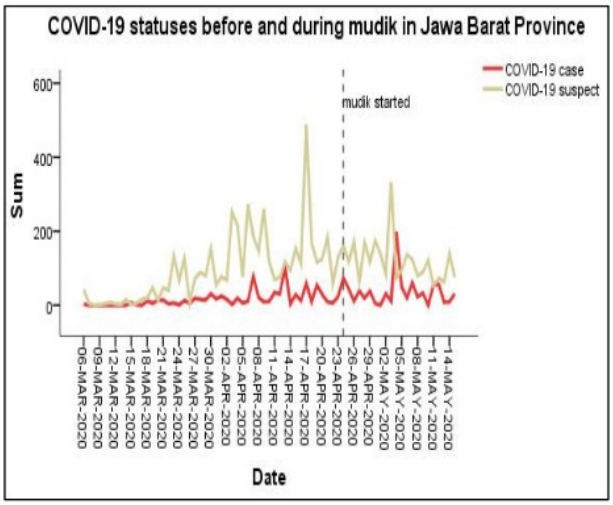
A COVID-19 dataset that ran from 6 March to 16 May 2020 was derived from each provincial authority, namely Jawa Barat, Yogyakarta, Banten, and Jawa Tengah. In this study, local *mudik* was measured in the month of *Ramadhan* based on the Islamic calendar, ranging from 24 April to 2 May 2020. The daily incidence and suspected cases of COVID-19 came from the local government public data for COVID-19. These data were collected according to LSSD, which started on 10 April 2020. This means that before LSSD implementation ranged from 2nd March to 9 April 2020, while on-going LSSD was implemented starting on 10 April 2020 of the dataset.

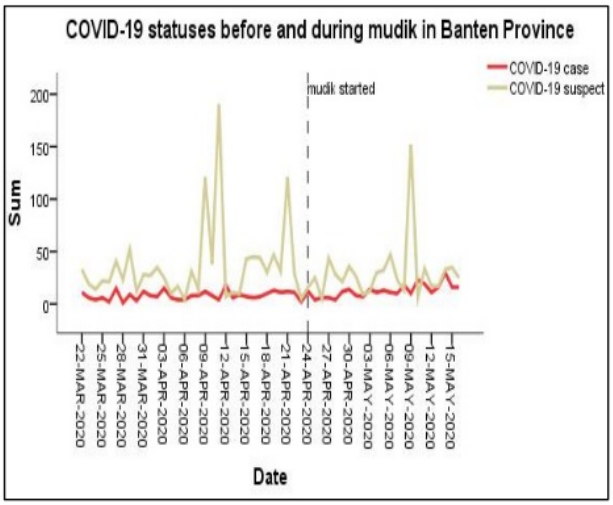
2.3 Data analysis

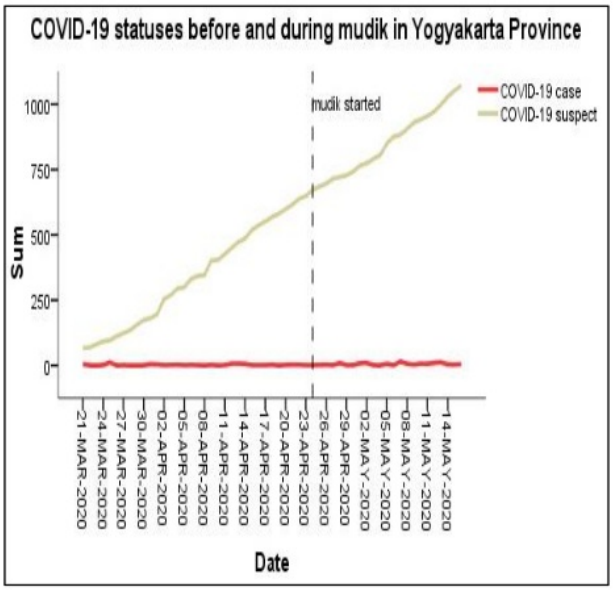
An independent sample t-test was performed to analyze the mean difference according to normality data distribution (p value of Kolmogorov-Smirnov test > 0.05). The test was performed to present the mean difference between continue/numeric and discrete/categorical variables with two-tailed 95% CI or 5% alpha and 80% power of tests. The difference between the before and during local *mudik* season in *Ramadhan* season while LSSD was implemented was assumed when there was a mean difference between these groups in determining the number of COVID-19 positive cases and suspected cases.

3. Results

According to Figure 1, both incidence and suspected cases of COVID-19 increased from before and during the local mudik in Java during *Ramadhan* while LSSD was applied in Jakarta. This shows that both incidence and suspected cases of COVID-19 increased daily since LSSD was first implemented in Jakarta.







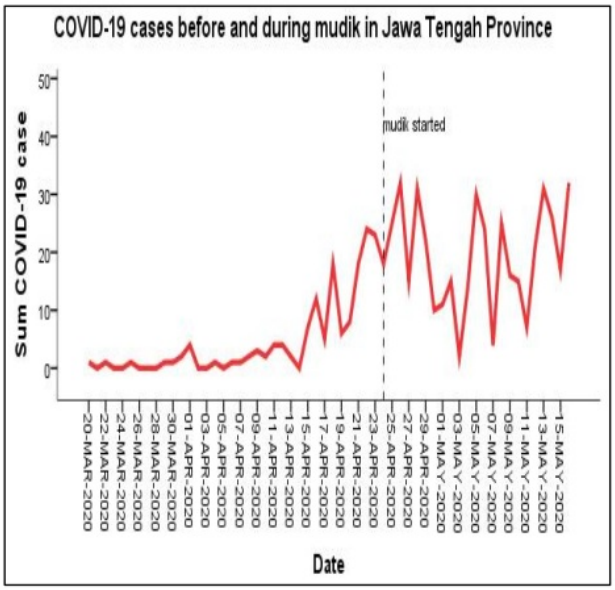


Figure 1. Covid-19 statuses before and during local mudik in four provinces in Java

Table 1. Independent-t-test's mean difference between before and during local mudik in Java, Indonesia

Covid-19 status	Independent-t-test's mean difference
Jawa Barat Province	
Incidence	-21.041*
Suspect	-23.940
Yogyakarta Province	
Incidence	-2.852**
Suspect	-511.712**
Banten Province	
Incidence	-4.622**
Suspect	6.538
Jawa Tengah Province	
Incidence	-14.915**
Jawa Barat Province	
Incidence	-21.041*
Suspect	-23.940
Yogyakarta Province	
Incidence	-2.852**
Suspect	-511.712**
Banten Province	
Incidence	-4.622**
Suspect	6.538

*Difference is significant at the 0.05 level (2-tailed); **Difference is significant at the 0.01 level (2-tailed)

Table 1 shows that suspected cases of COVID-19 did significant from before and during local mudik in Yogyakarta Province. Meanwhile, incidence cases of COVID-19 did significant from before and during local mudik in all provinces in Java, Indonesia.

4. Discussion

Being the region with the biggest Muslim population in the world, Indonesia has the potential to massively spread COVID-19 during the mudik season [15]. In this period of time, Java usually has a high number of local mudik travelers who could potentially increase the number of COVID-19 incidence this season [11]. In fact, most of Java's local mudik travelers come from pandemic centers, including each of the province capitals, as these are the entry point areas for those travelling from abroad [16].

In this study, we found that the local *mudik* season was related to more cases of COVID-19 among this population (negative value of mean difference). This result is in line with previous evidence that traditional celebration is associated with the spread of COVID-19, which increases COVID-19 incidence rates [3,4,17]. At the same time, in other related circumstances in the Middle East, Iraq has reported higher COVID-19 incidence rate than Saudi Arabia and Kuwait, but lower than Iran, Turkey and Jordan. This scenario can help us improve the pandemic incidence rate when we welcome the *Eid-al-Fitr* [18].

Sitting in the western part of Indonesia, Java has the most complete, hybrid, and multiple modes of transportation than any other part of Indonesia [19,20]. Zones included in this area contain three provinces that are namely Jawa Barat, Banten, and Jawa Timur. People that originate from these buffer regions are able to travel around the regions, particularly leaving and entering the capital city of these provinces [21,22].

Since they are easily connected to these zones, people who originated from around Java traveled home when mudik started to apply on 27 April 2020. This Muslim tradition is a time to seek forgiveness from relatives, especially from core families, and then welcoming the victory day

as *Eid-al-Fitr* day [23]. Local mudik not only attracted travelers for the *Eid-al-Fitr* celebration, but they also enjoyed a vacation with their visit to their hometown[24].

Despite the significant finding of how local mudik during LSSD in Jakarta during is related with COVID-19 incidence rates, this study has limitations. The incident rate of COVID-19 could be affected by the effectiveness of travel bans, which varied by the district and by how provincial local governments applied the LSSD. Additionally, the travel ban has not optimally applied before implementation of LSSD, as it allowed travelers to go back to their hometown permanently due to the joblessness created by the COVID-19 pandemic.

5. Conclusion

This study shows that *mudik* was significantly associated with COVID-19 incidence among the population in Java, Indonesia during *Ramadhan* with LSSD implementation in Jakarta. This preliminary study needs to be further developed, as *mudik* could potentially increase COVID-19 incidence not only in Indonesian Muslims, but also in other countries, religions, and cultures, especially in homecoming travel traditions during this pandemic.

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