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THE VULNERABILITY TO A COVID-19 OUTBREAK IN MALAYSIA: PANEL ANALYSIS DURING THE ENDEMIC PHASE

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ABSTRACT

Reaching the endemic phase of COVID-19 starting April 1, 2022, Malaysia had move forward for their normal norm. No more home isolation and even mask mandate is unnecessary. With the vaccination status (completed 2nd dose), people can freely access the premises. However, Ministry of Health did not take COVID-19 for granted. The ministry keeps updating daily new cases to remind public the urgency to prevent the COVID-19 outbreak. This study describes the vulnerability of the COVID-19 outbreak in Malaysia by assessing relationship between the vaccination status to the number of COVID-19 cases. The data is taken from the ministry and panel data is taken to test within the period of endemic phase (April 2022- June 2022). The key findings will provide the relationship between the access variables and further research should be conducted to provide relevancy of this matter especially during endemic phase.

Keywords: COVID-19, Vulnerability, Vaccination Program, Malaysia.

INTRODUCTION

Oxford Dictionary define vulnerability as "the quality or state of being exposed to the possibility of being attacked or harmed, either physically or emotionally". In this study, the term vulnerability is widely being used to infer the test or analysis conducted to measure the weightage of vulnerability factors (vaccination status) affecting the COVID-19 cases in Malaysia. This study assume that high vulnerability will lead to high number or exposure to the COVID-19 outbreak.

In Malaysian, more than 4.83 million people was affected by COVID-19 and number of deaths cases reaching 36,350 people by end of September 2022 (Ministry of Health Malaysia, 2022. To lessen the impact, vaccines have been regards as the alternative to combat the outbreak. (Wong et al., 2021). A study on the relevancy of the National COVID-19 Vaccination Program during the endemic phase is still lacking. This study regards vulnerability assessment as the way to conceptualize the interaction between vaccination status (Booster, 2nd dose, and 1st dose) as the chosen vulnerability variables to the empirical cases of COVID-19 in Malaysia.

The statistics from "Coronavirus (COVID-19) vaccinations," (n.d), shows that 72.1 million doses had been given to the citizen of Malaysia and 27.5million people or equivalent to 85 percent of the population is fully vaccinated (complete at least 2 dose). Figure 1 provided more detail on the vaccination progress by state and the percentage of 85 percent is taken based on the overall progress. In theory, as some vaccines require more than 1 dose, the number of fully vaccinated people is often lower. The British Society for Immunology (n.d) explain why we need multiple doses of a vaccine as per study, immune memory is boosted by the second dose. Multiple doses are used to maximize the protection as per virus that mutate rapidly. As according to Figure 2, the population vaccinated is considered up to 2nd dose, as government make it compulsory to complete these 2 doses of vaccination for allowing many of the social activities.

The National COVID-19 Immunisation Programme or in Malay, *Program Imunisasi COVID-19 Kebangsaan)*, abbreviated as NIP or PICK is among the largest immunization program implemented

by government of Malaysia to curb COVID-19 outbreak. To attain its goal in 2021, The Special Committee for Ensuring Access to COVID-19 Vaccine Supply (JKJAV) or in Malay, *Jawatankuasa Khas Jaminan Akses Vaksin COVID-19*, hold responsibility to ensure highest immunization rate. Having the same role, The COVID-19 Immunisation Task Force or CITF (or in Malay: *Jawatankuasa Petugas Khas Imunisasi COVID-19)* and the COVID-19 Immunisation Task Force-Adolescent (CITF-A) was formed. Basically, all these committee lead by Khairy Jamaluddin, who was the coordinating minister for the National COVID-19 Immunisation Programme.
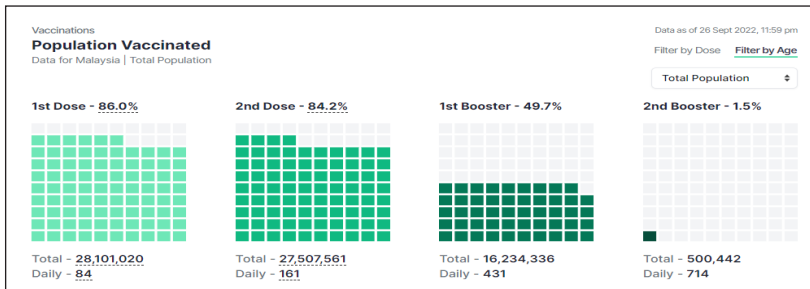
Figure 1

Vaccination Progress by State, as at 3rd September 2022
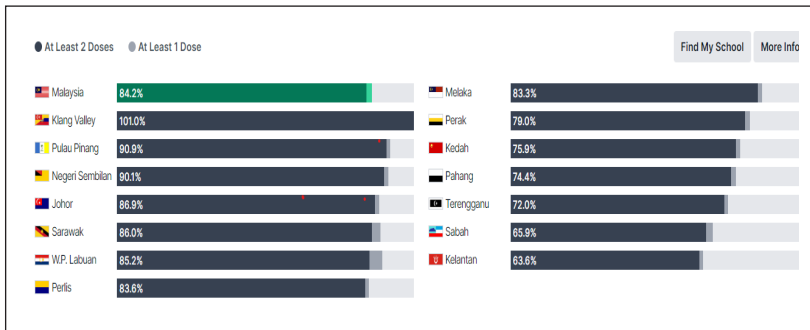
Source: An image from a website (COVIDNow, 2022)

Figure 2

Population Vaccinated

Source: An image from a website (COVIDNow, 2022)

Among the reasons of why relevancy of vaccination program is being accessed due to the amount of money spend by the government. Based on record, RM 44.8 million (Pfizer/BioNTech), RM12.8 million (Oxford/ AstraZeneca), RM12.4 million (Sinovac), and RM3.5 million (CanSino) (Chandran Shankar & Arjuna, 2021). Additionally, the government also come out with the phases of the immunization program to ensure the efficiency of the program. The phase is divided into 5 phase include Phase 1 (Healthcare workers and frontliners comprising essential services, defense and security personnel), Phase 2 (High-risk groups; including disabilities, senior citizens and elderly people with comorbidities), Phase 3 (Adults aged 18 and above consisting of citizens and non-citizens), Phase 4 (Workers in critical industries: food, manufacturing, construction, retail, plantation, and hospitality) and finally Phase 5 (Adolescents aged from 12 to 17 with underlying medical conditions) and Adolescents aged from 12 to 17 with no medical issues based on age de-escalation.

To provide a smooth process of vaccination program, 605 sites were first identified as Vaccination Administration Centres (Malay: *Pusat Pemberian Vaksin*), commonly known as PPVs. These temporary vaccine centres utilize government facilities such as stadiums, convention centres, public halls, universities, and other appropriate facilities were also included to vaccinate the population as quickly as possible (Free Malaysia Today, 2021). However, it is not always easy to achieve it. This vaccination program face various issues and controversies. The claims include empty syringes or reduces doses by the medical practitioner and the staff not allowing recordings, slow rollout rate, poor prioritization of recipient, informal waitlist, poor appointment booking system, sale of fake vaccine, choosy recipient, sale of fake vaccine certificate, inconsistent vaccine supply, discrimination towards migrants, overcrowding at vaccination centres, COVID-19 outbreaks at vaccination centres and many others make it a challenge to co-operate with the vaccination program. Not only that, to enforce vaccination program, the government making it compulsory for 2 doses of vaccines for entering premises in Malaysia. This rule also bound for those who want to travel locally or internationally.

There are variety of research and themes covered the effectiveness of COVID-19 vaccination program. However, the focus is different from the current study aim. For example, Ng et al. (2022) conduct a

systematic review and meta-analysis for the COVID-19 before the vaccination program. Each case was staged according to clinical severity; stage I: asymptomatic case, stage 2: symptomatic without pneumonia, stage 3: pneumonia without hypoxia, stage 4: pneumonia with hypoxia requiring oxygen supplementation therapy and stage 5: critically ill. Close monitoring for signs of early deterioration and appropriate aggressive interventions were instituted (Sim et al., 2020). Before the vaccination program, this meta-analysis suggested a high prevalence of COVID-19 occurred in Stage 2 (Ng et al., 2022).

Another study also significant to be discuss on this study is based on the effectiveness of the vaccination program. The study proves the vaccine is the best strategy to combat COVID-19 but the scope is limited to Kuala Lumpur, Penang, Sabah, and Sarawak (Wong et al., 2022). Further study is required to prove the vaccine effectiveness especially in the scope of generalization as Malaysia as a whole.

To this period, not many studies had been done by focusing on endemic phase of COVID-19. The present study adds to the limited based on integrating vaccination status to COVID-19. Besides that, the "vulnerability assessment variables" such as vaccination status had widely been discussed by previous studies but too regional creating the new methodological gap. Most studies rather highlighting the big city (Wong et al., 2021). More importantly, there are limited number of studies have using time series or panel data in doing vulnerability assessment compared to 3 months daily duration as per this study. Hence, the aim of the present studies is to assess relationship between the vaccination status to the number of COVID-19 cases. The data is taken from the ministry and panel data is taken to test within the period of endemic phase (April 2022- June 2022).

METHODS

The data is being collected in Microsoft Excel before being analyzed using SPSS. First, the information on the number of COVID-19 (dependent variables) and the variables assesses are collected as per Table 1. It is important to highlight that the data taken for these studies is starting from the endemic period of April 2022 to June 2022. In this paper, the researcher refers measure vaccination status in term of

three different indicators: Booster, 2nd dose, and 1st dose. Align with the study by Wong et al. (2022) on the effectiveness of combating COVID-19 using vaccination, this study come out with positive hypothesis supporting the claim. The hypotheses indicate that high number of people taking vaccination status (especially up to 2nd Dose) indicate high immunity against COVID-19 and this led to the decrease vulnerability rate to a COVID-19 Outbreak. Second, the information is being transformed to obtain descriptive statistics and hypothesis testing using multiple linear regression. Multiple linear regression is the best test to identify the significant factors causing (influencing) the dependent variable.

Table 1

Data Measure and Sources

Variables	Measure	Indicator	Hypotheses	Sources
Vaccination Status	Booster	High=Good	High number of people taking Booster vaccination indicate high immunity against COVID-19 that decrease the vulnerability to a COVID-19 Outbreak	MOH
	2nd Dose	High=Good	High number of people taking 2nd dose vaccination indicate high immunity against COVID-19 that decrease the vulnerability to a COVID-19 Outbreak	MOH
	1st Dose	High=Good	High number of people taking 1st dose vaccination indicate high immunity against COVID-19 that decrease the vulnerability to a COVID-19 Outbreak	MOH
Number of COVID-19 Cases	Number of cases	High=Bad	High number COVID-19 cases indicate high vulnerability to this outbreak	MOH

RESULTS AND DISCUSSION

Figure 3

Vaccination Tracker, April to June 2022
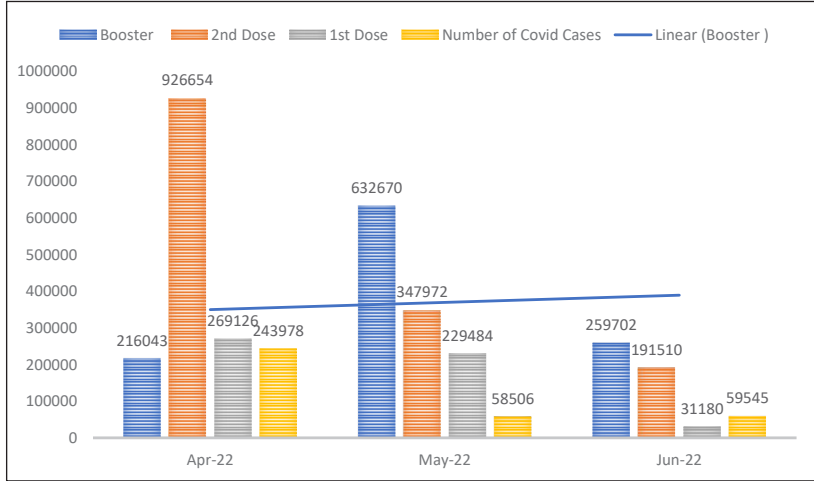
Source: Compiled by the authors.

Figure 3 is the graph compiled by the authors in determining the trend of vaccination status. The dots represent the trendline for Booster vaccination that show gradual growth from the month of April 2022 to June 2022. The further discussion explains why the growth is not as per significant or high compared to the 2nd dose due to this Booster shot is not compulsory order by the government. Again, relate to Figure 2 above, this trend explains the population vaccinated for 2nd dose up to 84.2 percent but the 1st booster is only 49.7 percent.

This study put attempt to provide relationship between the vaccination status and the number of COVID-19 cases. The author compiles the number of COVID-19 cases as per April 2022 (243978 cases), May 2022 (58506 cases) and June 2022 (59545 cases). This trend shows the number of COVID-19 cases is significantly decrease from April 2022 to May 2022, which is the early period of endemic phase. This shows that the vaccination program is success in reducing the number of COVID-19 cases. There are increase in COVID-19 cases in June 2022 compared to May 2022, but the number is slightly increase compared to significant decrease from April 2022 to May 2022.

Based on SPSS Output, it shown that three independent variables (Booster, 2nd Dose, and 1st dose are significantly influence the number of COVID-19 cases. The result shown that all the independent variable explained 83.2 percent (refer Adjusted R Square) of the total variation in the number of COVID-19 case. As overall the model is good fit (p-value=.001). The summary of the results is presented in Table 2.

Table 2

Relationship between Vaccination Status and COVID-19 Cases, April - June 2022

Hypothesis	Decision
There is a relationship between the Booster dose and number of COVID-19 cases	Significant (p-value =0.001)
There is a relationship between the two dose and number of COVID-19 cases	Significant (p-value =0.001)
There is a relationship between the one dose and number of COVID-19 cases	Significant (p-value =0.008)

CONCLUSION

In conjunction with the continuous risk to Malaysia posed by COVID-19 outbreak, it is essential to have a clear understanding on the current vulnerabilities across the vaccination status. This study has developed vulnerability assessment tool for Malaysia landscape as a tool to help identifying either vaccination status is still relevant to the COVID-19 outbreak even during the endemic state. This information can help the government to allocate and prioritize their programs for their area of weaknesses proactively to decrease the number of COVID-19 outbreak. This paper identified the relationship between the vaccination status and COVID-19 cases during endemic phase (April 2022 to June 2022). Based on the results, it shows that all the variables of vaccination status (Booster, 2nd dose, and 1st dose) is significant relationship to the COVID-19 cases.

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