Presidential Vote Share and COVID-19 Vaccination Rate in Indonesia: A District-level Cross-Sectional Ecological Study

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Abstract

Political affiliation has been reported as a determinant of COVID-19 vaccine acceptance in some countries, although few studies have examined the Asian context. This study aimed to fill this gap by employing an ecological study design using Indonesian regions as data points. Political affiliation was represented by incumbent President Joko "Jokowi" Widodo's vote share in the 2019 presidential election. Potential confounders included population density, human development index, availability of hospitals and primary health care, 2019–2020 economic growth, COVID-19 mortality rate, and proportion of Muslims in the population. The final analysis included 201 out of 501 districts and cities in Indonesia. Controlling for confounders, multivariate regression found that Jokowi's vote share was an independent predictor of vaccination rate, with standardized β and R2 values of 0.350 and 0.734 for the first dose vaccination rates and 0.251 and 0.782 for the second dose, respectively. This association may be underpinned by differences in religiosity, public trust, and vulnerability to misinformation between Jokowi's supporters and the opposition. Improving public trust in a politically polarizing society is crucial to improving future coverage of COVID-19 and other vaccines.

Keywords: COVID-19, Indonesia, politics, vaccine hesitancy, vaccine inequality

Introduction

The distribution of the COVID-19 vaccine seems to be slower than otherwise expected, and considerably unequal distribution has been observed between countries or even between regions in the same country.[1] This inequality in vaccination rate has led to the emergence of COVID-19 variants of concern, which threaten to prolong the pandemic further.[2] Inequal coverage of the COVID-19 vaccine was not limited to country-by-country variation. Inequality also exists at the subnational level. The geographic disparity is the most visible aspect of the unequal COVID-19 vaccination rate. For instance, the Indonesian figure showed that some provinces, especially developed ones like Jakarta and Bali, have reached over 100% of targeted vaccination coverage (partly due to inaccurate demographic data used in setting up the target), while others have lagged far behind.[3] The latest wave of COVID-19 cases, caused by the new Omicron variant, emphasized the need for sustained immunity against SARS-CoV-2 at the community level.[4]

There are several barriers that limit the COVID-19 vaccination rate, including structural factors, such as the policy environment and health care access, and hesitancy to receive the vaccine among the population. Prior to vaccine distribution, several studies reported that willingness to receive the COVID-19 vaccine varied between 40–70% of the Indonesian population, depending on the region.[5-7] Several factors have been identified as factors affecting COVID-19 vaccine acceptance, including sociodemographic characteristics and health beliefs regarding the vaccine.[8] Other studies also showed the importance of beliefs, including health beliefs and general worldviews, in predicting COVID-19 acceptance.[6,8,9] One aspect that remains understudied is the role of political beliefs in predicting vaccine acceptance.

A case in point was the 2020–2021 period in the United States under the Trump administration. Hesitancy played an important role here, where the Republicans, one of the main political parties, routinely undermined the vaccine and, indeed, the pandemic.[10] Multiple other studies have found that Republican voters showed higher vaccine hesitancy.[11,12] Using a method similar to the one

used in this study, a county-level cross-sectional analysis showed that Democratic-leaning counties tend to have higher COVID-19 vaccine coverage.[13]

Despite being well documented in the international literature, few studies, if any, have reported the role of political affiliation as a determinant of COVID-19 vaccine acceptance in Asian countries. Indonesia is especially interesting, as it has a political situation similar to that of the United States. Despite the lack of a clear left–right divide among mainstream Indonesian political parties, Indonesia faces an increasingly polarized political landscape with a rising right-wing conservative faction coalescing around certain political figures.[14-16] Similar to the United States, Indonesia entered the pandemic in April 2020, fresh out of a divisive general election one year prior that included large protests against the certification of Joko "Jokowi" Widodo reelection in October 2019.[15,16] Afterward, Jokowi administration policies regarding the forceful disbandment of conservative Islamic groups, which previously supported Prabowo Subianto and Sandiaga Uno (the Subianto-Uno ticket), strengthened the anti-Jokowi sentiment among a considerable portion of the populace.[17]

Identifying the factors affecting COVID-19 vaccine acceptance led one step closer to identifying effective policies to tackle the barriers to more equitable COVID-19 vaccine coverage and inform policymakers on how to improve COVID-19 vaccination coverage for the ongoing booster campaign. As such, this study investigated the potential role of political affiliation as a determinant of COVID-19 vaccine acceptance in Indonesia based on publicly available data.

Method

Study Settings

Indonesia is an island nation with over 17,000 islands. Major landmasses include Sumatra, Java, Kalimantan, Sulawesi, and the western half of Papua. At the time of analysis, the country is divided into 34 provinces, which are further subdivided into 514 districts and cities.[18] Districts and cities were used as data points for this analysis in this study.

Political affiliation in Indonesia cannot be explained by party-line affiliation. It has been observed that there is little policy differentiation among Indonesian political parties, except concerning religious issues.[19] However, political polarization has emerged surrounding the political figures.[14] The 2019 presidential election has been noted as especially divisive and polarizing.[16] It was a "rematch" between the incumbent President Jokowi and Gen. (Ret.) Prabowo Subianto, who ran against other in 2014. The use of personal attacks as a campaign strategy, ideological differences regarding the role of Islamic religion in governance, and general misinformation led to a climate of uncertainty and division immediately following the election.[14,16,20]

Interestingly, there have been studies that have identified religion's association not only with voting choice during an election but also with vaccine hesitancy.[9,21-23] One study identified that one of the main ideological differences between Jokowi and Subianto voters concerned their support for the wider role of Islamic religion in governance.[21] At the same time, religion has also been observed to be associated with vaccine acceptance for COVID-19 and other vaccines.[9,21,23]

Despite both Subianto and Uno eventually joining the Jokowi's cabinet, the political divide carried over well into the pandemic period and even into 2022, three years after the election. Part of the reason was the forceful disbandment of Islamic organizations, such as the Hizb ut-Tahrir Indonesia and the Islamic Defender Front, which previously supported the Subianto-Uno ticket, thus cementing conservative Islam against the Jokowi administration.[17] Another factor is the fact that Indonesia is due for another election in 2024, looking to replace Jokowi, who cannot run for another term. The lack of an obvious political successor has led to a loud and messy political situation, with various factions trying to form coalitions.[24]

Parallels between pro- and anti-Jokowi polarization with the left–right divide in United States politics can be drawn. Polarization persisted at the grassroots level, substantially fueled by the political pundits and influencers in social media (known as buzzers in Indonesia). Pundits and influencers who previously supported the Subianto-Uno ticket in the election have since shifted to simply oppose the current administration, entrenching the pro- and anti-Jokowi divide among the general populace.[25]

Regarding the COVID-19 pandemic, the Indonesian government under the Jokowi administration has been criticized for its inconsistent response in both policy and communication. The administration officials expressed dismissive comments during the early phases of the pandemic, only to later backtrack and attempt to promote awareness.[26] However, the administration has consistently supported COVID-19 vaccination efforts, with President Jokowi taking the first shot, which was aired on live television, kicking off mass vaccination in January 2021.

In stark contrast to the United States, none of the Indonesian opposition figures attempted to undermine vaccination efforts. Nevertheless, acceptance was slow, with only around 10% of the target population receiving at least one jab as late as July 2021.[3] Rapid acceleration of COVID-19 vaccine acceptance then occurred in late August and September 2021 onward, mostly coinciding with the emergence of the Delta variant, which caused a surge of COVID-19 cases in Indonesia.[3,27]

Study Design

A district-level cross-sectional analysis was conducted using association analysis between publicly available regional indicators described in previous studies.[13,28] A cross-sectional ecological study design analyzes patterns and differences at the population level (e.g., districts, cities, counties, countries) as opposed to between individuals.[13,28] Districts and cities (hereafter referred to as "districts") were used as data points in the analysis as the lowest population level with readily available data for the required indicators. The inclusion criteria were based on data availability for all indicators required. Only districts with available data for all independent, dependent, and confounding variables were included in the analysis.

Variables

The main independent variable in this study was district-level vote share for the incumbent President Jokowi in the 2019 presidential election, as obtained from the Indonesian Election Commission. The dependent variable was district-level COVID-19 vaccine coverage, as reported in the Indonesian Ministry of Health COVID-19 vaccine dashboard as of January 14, 2022.[3]

The association between presidential vote share and COVID-19 vaccination rate was controlled by potential confounders, including administrative status (districts vs. cities), health care availability, socioeconomic indicators, and COVID-19 risk, which reflected the complacency, confidence, and convenience (3Cs) model of vaccine hesitancy and determinants of COVID-19 prevention at the ecological level.[9,29]

These confounders were selected based on evidence from previous similar studies. Previous studies linked provincial healthcare availability and demographics with COVID-19 outcomes.[28] A similar study in the United States also noted the role of socioeconomic status and demographics in vaccine coverage.[13]

Diverging from previous similar studies,[13,28] the district-level proportion of Muslim residents was included as a variable due to evidence of its association with voting behavior.[21] Religion has also been associated with vaccine acceptance for both COVID-19 and non-COVID-19 vaccines.[9,23] Together, this evidence led to the inclusion of Muslim residents as a confounder in this analysis.[9,21,22]

Healthcare availability indicators represented the convenience of access to the vaccine and included the ratio of hospitals per 1 million residents as well as primary health care (PHC) per 100,000 residents. Hospital and PHC availability was selected as indicators, as they were the main implementors of COVID-19 vaccination in Indonesia. Socioeconomic indicators represented both conveniences of access to the vaccine and confidence in the science behind the vaccine and included the human development index (HDI) as well as gross regional product (GRP) growth in 2019–2020.

While, COVID-19 indicators represented complacency levels in the population and included district-level COVID-19 mortality rates in late August 2020. This period was selected because it coincided with the peak of the Delta variant wave and came immediately prior to the rapid acceleration of COVID-19 vaccination in Indonesia.[3,27]

Data Sources

All the data analyzed in this study were publicly available online. The data for vote share in the 2019 presidential election was obtained from the website of the Indonesian Electoral Commission. COVID-19 vaccination coverage data were obtained from the Indonesian Ministry of Health's COVID-19 vaccine portal. District-level socioeconomic data, including GRP and HDI, were obtained from Statistics Indonesia. Religion distribution data were obtained from the Indonesian Ministry of Home Affairs. Lastly, demographic and healthcare availability data were obtained from annual health profiles published by provincial health offices. All data sources used in this study are presented in more detail in the Supplementary Material section.

Statistical Analysis

Continuous data were tested for normality using the Kolmogorov–Smirnov test. Normally distributed data are presented as the mean and standard deviation (SD), while non-normally distributed data are represented as the median and interquartile range (IQR). Parametric and non-parametric bivariate correlation analyses were conducted depending on the results of normality tests to identify the association between the vote share for incumbent President Jokowi in 2019 and the COVID-19 vaccination rate as of January 2022. Finally, multivariate linear regression was conducted to investigate the association between vote share and COVID-19 vaccination rate, controlling for the effect of potential confounders, including administrative status, population density, HDI, availability of hospitals and PHCs, GRP growth, the proportion of Muslims in the population, and COVID-19 mortality rate. All statistical analyses were conducted using the free version of IBM SPSS 23.0 (IBM Corp, Armonk, NY, USA).

Results

The final analysis included 201 out of 514 districts in Indonesia, with detailed characteristics available in Table 1. Exclusion from the analysis was based on the unavailability of data, especially health system–related data, which was reliant on the availability of 2019 provincial

health profiles obtained from provincial government websites. The 201 districts were divided into 160 districts and 41 cities. All continuous variables were found to be non-normally distributed; hence, they were presented as medians and IQRs. Overall, the median vaccination rate was 70.25% (IQR = 58.97–79.63%) for the first dose of the COVID-19 vaccine and 44.06% (IQR = 33.16–66.06%) for the second dose. While, the median vote share for the incumbent in the 2019 presidential election was 57.75% (37.32%–73.82%).

There are considerable differences between the districts and cities, as shown in Table 1. In terms of vaccination rate, cities were likely to have higher vaccination rates for both the first and second doses of COVID-19. However, cities were likely to have a lower vote share for the incumbent president in the 2019 election. Cities seemed to be generally more developed compared to districts. Other than the obvious difference in population density, cities also had higher median HDI and health care availability and were more diverse, with a lower median Muslim population percentage. However, cities were more affected by the pandemic, with lower economic growth and higher COVID-19 mortality rates.

In Table 2, the bivariate analysis revealed a statistical-ly significant moderate positive correlation between incumbents' vote share in the 2019 election and COVID-19 vaccination rates, both for the first and second doses, with Pearson's rho values of 0.551 and 0.545, respectively. The linear correlation is clearly visible in the scatter plot depicted in Figure 1. The bivariate analysis also found that vaccination rates were associated with all potential confounders. COVID-19 vaccination rate was positively correlated with population density, HDI, hospital availability, and COVID-19 mortality rate. While, it was negatively correlated with PHC availability, economic growth, and the proportion of the Muslim population.

Table 3 shows the results of the linear regression analyses for COVID-19 vaccination rates. The results showed that Jokowi's vote share in the 2019 presidential election was significantly associated with COVID-19 vaccination rates after controlling for the effects of potential confounders. It was also found to be the strongest predictor for the first dose vaccination rate, although the effect was weaker for the second dose. Another interesting finding was that the proportion of Muslims in the population was negatively correlated with the COVID-19 vaccination rate for both the first and second doses.

Table 1. Descriptive Data of Analyzed Variables

Variable	Total (n = 201)	Administrative Status	
		District (n = 160)	City (n = 41)
Population density (per km²)	675 (110–1,392)	556 (91–976)	4,431 (1,613–7,833)
Human development index	70.56 (68.37–74.07)	69.90 (68.06–71.91)	77.96 (74.64–81.32)
Hospitals (per 1 million)	8.92 (5.06–14.41)	19.97 (12.95–32.061)	7.19 (4.77–11.07)
PHCs (per 100,000)	3.16 (2.41–5.03)	3.16 (2.12–4.56)	3.15 (2.48–5.30)
COVID-19 mortality (per 100,000)	67.59 (36.10–115.63)	58.46 (33.59–101.30)	114.89 (69.75–166.68)
2019–2020 economic growth (%)	-0.32 (-1.59–0.49)	-0.17 (-1.54–0.70)	-0.78 (-1.68 - -0.27)
Muslim population (%)	97.44 (91.86–99.25)	97.27 (94.46–99.45)	92.47 (88.58–96.65)
Incumbent's vote share (%)	57.74 (37.32–73.82)	60.75 (37.67–75.36)	52.73 (30.77–69.97)
First-dose vaccination rate (%)	70.25 (58.97–79.63)	66.15 (57.03–74.63)	89.72 (77.48–102.40)
Second-dose vaccination rate (%)	44.06 (33.16–66.06)	40.81 (31.08–55.92)	68.08 (55.23–88.33)

Notes: PHC = Primary Health Care. All figures are presented as medians and interquartile ranges (IQRs).

Table 2. Bivariate Correlation between Independent Variables with First and Second COVID-19 Vaccination Rates

Variable	Category	First Vaccination	p-value	Second Vaccination	p-value
Administrative status	District	66.15 (57.03–74.63)		40.81 (31.08–55.92)	
	City	89.72 (77.48–102.40)	<0.001	68.08 (55.23–88.33)	<0.001
Population density		0.588	<0.001	0.609	<0.001
Human development index		0.622	<0.001	0.657	<0.001
Hospital availability		0.443	<0.001	0.457	<0.001
PHC availability		-0.313	<0.001	-0.347	<0.001
COVID-19 mortality rate		0.598	<0.001	0.636	<0.001
2019–2020 economic growth		-0.432	<0.001	-0.463	<0.001
Muslim population		-0.497	<0.001	-0.476	<0.001
Incumbent's vote share		0.551	<0.001	0.545	<0.001

Notes: PHC = Primary Health Care. All p-values were derived from non-parametric analyses.
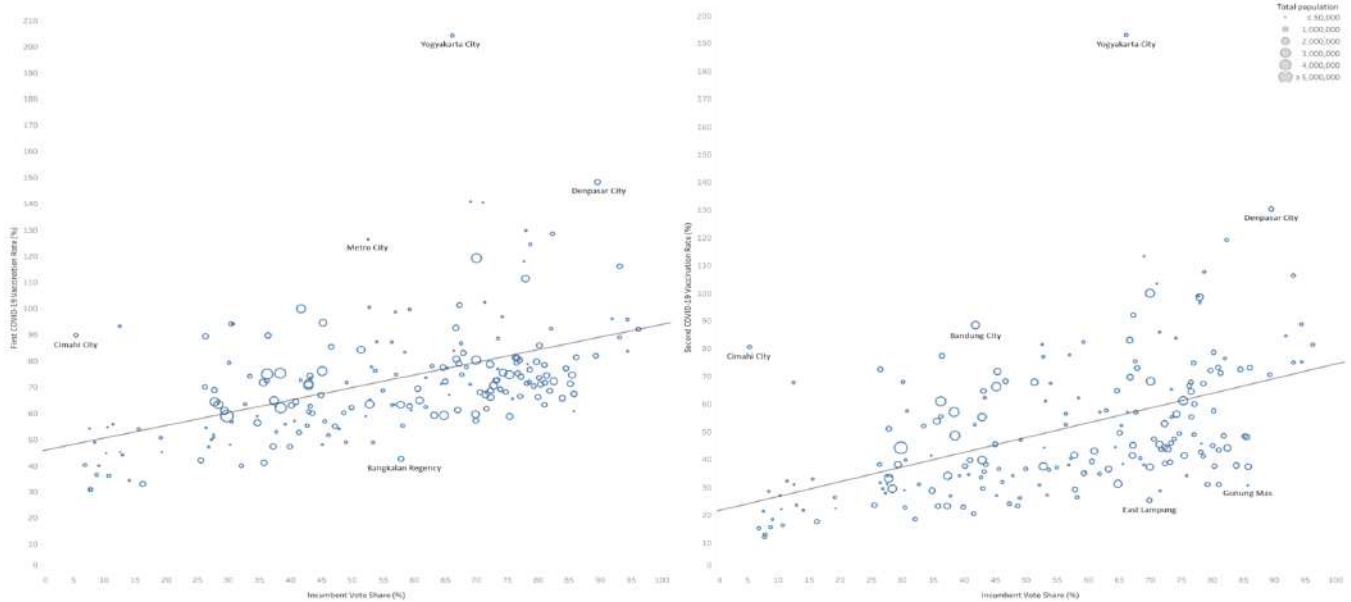
Figure 1. Scatter Plot of Incumbent's Vote Share with First (Upper) and Second (Lower) Vaccination Rates

Table 3. Multivariate Linear Regression for the Prediction of First and Second COVID-19 Vaccination Rates

Variable	First Vaccination		Second Vaccination	
	Standardized β	R^2	Standardized β	R^2
Administrative status, city, cities	0.094	0.734	-0.064	0.782
Population density	0.282**		0.281**	
Human development index	0.212**		0.313**	
Hospital availability	0.144**		0.146**	
PHC availability	-0.055		-0.091*	
COVID-19 mortality	0.129*		0.195**	
2019-2020 economic growth	-0.041		-0.041	
Muslim population	-0.106*		-0.161**	
Incumbent's vote share	0.350**		0.251**	

Notes: PHC = Primary Health Care, *p-value <0.05, **p-value <0.01.

Discussion

This study is one of the first to investigate the role of political affiliation, represented by presidential vote share, as a determinant of COVID-19 vaccination rates. The analysis showed that the district-level presidential vote share in the 2019 presidential election independently predicted COVID-19 vaccination rates in 2022. Interestingly, religious affiliation, as indicated by the proportion of Muslims in the population, was also independently associated with COVID-19 vaccination rates. These results closely resemble the situation in the United States.[30]

It is remarkable to find that the 2019 presidential vote share is associated with COVID-19 vaccine acceptance in 2021. As noted earlier, the opposing presidential candidates in the 2019 election joined Jokowi's cabinet in the months preceding the pandemic. Subsequently, the Jokowi administration, including his former rivals, attempted to dismiss the risk of the COVID-19 pandemic in early 2020.[26] Despite these developments, the analysis showed that the district-level vote share for Jokowi in 2019 remained positively correlated with COVID-19 vaccination rates.

However, the association between presidential vote share and COVID-19 vaccination rates should not be considered causal. Instead, it can be seen as the outcome of underlying differences in characteristics. Several studies showed shared characteristics among Subianto voters

in 2019 and vaccine-hesitant groups in 2021, including religiosity, distrust toward the incumbent Jokowi administration, and conspiracy beliefs.[20,31,32]

One study highlighted how Subianto supporters support a more dominant role of religion in public life, including in governance.[21] Religiosity has also been reported to be associated with attitudes toward vaccines in Indonesia.[22,23] In particular, some hesitancy toward the COVID-19 vaccine is attributable to religion, as there are concerns regarding the halal certification of the vaccine.[33] This issue tracks well with the results of this study, which found Islamic religious homogeneity in a district as an independent predictor of COVID-19 vaccination rates.

Another factor that could explain the result is the distrust toward the incumbent Jokowi administration. It is safe to assume that Subianto voters in 2019 were somewhat distrustful toward the then-incumbent candidate, Jokowi. Despite Subianto later joining Jokowi's cabinet, the distrust may have persisted and spilled over toward their responses to the COVID-19 pandemic, including the vaccination policy.[34]

At the same time, another study on the 2019 election showed that Subianto supporters were more prone to misinformation.[20] In particular, Subianto supporters' vulnerability to misinformation attacking Jokowi and his governance translated well to prevailing misinformation during the pandemic, which attacked COVID-19-related policies launched by the administration.[35] Based on this evidence, it is safe to hypothesize that distrust against the Jokowi administration combined with vulnerability to misinformation regarding COVID-19, might lead to vaccine hesitancy in Subianto-affiliated districts. Further surveys have also supported this hypothesis.[36]

Issues regarding distrust were especially crucial. The Jokowi administration has been criticized for contradictory statements regarding the pandemic, lack of transparency on COVID-19 data, and its policies at the beginning of the pandemic.[21,37,38] Another issue that fueled distrust was the perception that government policies were aimed at protecting the economic interest of the Indonesian oligarchy—if not outright self-enrichment—at the expense of ordinary people.[21]

Improving trust and combating misinformation are important issues that should be tackled on several fronts. Tracking trust in various actors and institutions may allow health authorities to select the most effective messengers for their COVID-19 vaccine promotion.[12] In Indonesia, political and religious opposition figures may be more effective in addressing vaccine-hesitant segments of society. Religious figures and institutions are especially important, as fractured messages given by different members of the religious establishment support the controversy regarding vaccine acceptability and fuel vaccine

hesitancy.[39] Support from conservative religious figures would also help increase trust in the government, which would, in turn, help improve confidence in the government-run COVID-19 vaccination program.[40]

Nevertheless, this study was not without its limitations. One potential concern was the issue of data availability. As the pandemic disrupted district-level administration, it delayed the publication of district-level statistical reports, which resulted in the unavailability of data and the exclusion of several districts from the analysis. Although several confounders have already been controlled for, controlling for the possibility of vaccine supply issues contributing to variations in coverage still poses a challenge. The data presented in the Indonesian Ministry of Health dashboard show the real-time stockpile situation but do not report past scarcity events.[3] The ecological study design used in this study should also be considered in the interpretation of the results. A population-based survey should be conducted to confirm the association between political affiliation or beliefs and COVID-19 vaccine acceptance in Indonesia.

Conclusion

This study shows the importance of political beliefs, among other predictors, in facilitating vaccine hesitancy. The association between political beliefs and COVID-19 vaccination may be facilitated by religiosity, trust, and vulnerability to misinformation. Health promotions promoting the vaccine should consider this by improving public trust and incorporating the target population's belief system, including their political beliefs and affiliations, as part of the health communication strategy.

data that may have changed from the time of publication.

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