Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Exploring the relationship between national governance indicators and speed of initial government response to COVID-19 in low- and middle-income countries

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ABSTRACT

Objectives: This study aimed to explore the relationship between national governance and country response to the COVID-19 pandemic in low- and middle-income countries, to support preparedness for the next pandemic. We conducted a statistical analysis of 116 countries, examining the relationship between speed of initial response and measures of national governance.
Study design: Observational study, with individual countries as the unit of analysis.
Methods: We used logistic regression to look for associations between quicker initial government response and four national governance indicators: Government Effectiveness, Political Stability and Absence of Violence/Terrorism, Voice and Accountability, and Corruption Perceptions Index.
Results: A quicker initial government response was associated with countries with higher Government Effectiveness (OR 13.92 95% CI 3.69–52.48, $p < 0.001$) and lower Political Stability and Absence of Violence/Terrorism (OR 0.23, 95% CI 0.09–0.57, $p = 0.002$). There was no relationship observed between speed of initial government response and Voice and Accountability or Corruption Perceptions Index. Other factors associated with quicker initial response were small population size, experiencing first COVID-19 case after the pandemic declaration, not having previous experience with SARS-CoV1 or MERS and not being an island nation.
Conclusions: This study shows that having higher state policy and implementation capacity, and lower political stability was associated with a quicker initial pandemic response. Limitations of this study include the use of crude national level indicators and broad categorisations of countries into quicker and slower responders. Deeper enquiry into the early decision-making processes taken at the national executive level within individual countries may help clarify the observed associations further.

1. Introduction

Prior assessments of the relative preparedness of countries appear to have been poor predictors of early country responses to COVID-19. High-income countries with high levels of technical capacity were some of the worst affected countries [1–3]. The international community has therefore been exploring the causes of national differences, including which public health interventions have been the most effective and which social, geographic and experiential factors placed countries in the best starting positions [3–7].

Governance – the way in which 'societies make and implement collective decisions' – is emerging as a potential important area for studying factors affecting COVID-19 responses [8–10]. There are many collective decisions that affect a country's outcomes to a pandemic; from taking actions to prepare for and prevent an outbreak, to responding and mitigating the effects of an outbreak once established [11]. A country's pre-pandemic governance, influenced by existing socio-political context and institutions, may influence its preparedness and decisiveness of initial actions [12,13]. During the pandemic, governance may affect which public health interventions are taken, the way in which they are taken, and adaptations made as the pandemic evolves [14].

This study aimed to explore the relationship between country governance and initial speed of government response to COVID-19 in 116 LMICs. We used logistic regression to look for associations between how quickly governments initially responded and four governance indicators: Government Effectiveness, Political Stability and Absence of

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Violence/Terrorism, Voice and Accountability and Corruption Perceptions Index. The analysis focused on low- and middle-income countries (LMICs), to help inform future efforts to strengthen public health preparedness and response in these countries.

Box 1

Description of data sources

The WHO Coronavirus Disease (COVID-19) Dashboard was used to identify the date of a country's first case [16].

The Oxford COVID-19 Government Response Tracker Containment and Health index score was used to measure the level of response [15]. At the time of data collection, the score was calculated through combining scores of the level of response of twelve containment and closure or health measures: school closures, workplace closures, cancellation of public events, restrictions on gatherings, closure of public transport, stay at home requirements, restrictions on internal movement, international travel controls, public information campaigns, testing policy, contact tracing, and facial coverings. The index is scaled so that all possible scores lie between 0 and 100 [17].

2. Methods

Abt Associates' Institutional Review Board exempted this study from ethical review as it did not meet the definition of research on human subjects.

2.1. Study design

Individual countries were the unit of analysis. Data for the outcome variable and explanatory variables (described below) for each country were collected or calculated using publicly available sources of data.

Countries were considered for inclusion if they were classified by the World Bank as being LMICs, as of February 1, 2021. Countries were excluded if they did not have data available for the Containment & Health Index (see Box 1), which was used to assess the outcome [15]. China was also excluded from this analysis, as it was the first country to be affected by the virus and so would have been expected to respond to the very first case on a different timescale to the countries that followed.

2.2. Variables, hypotheses and data sources

2.2.1. Outcome variable

Initial speed of government response to COVID-19 was coded as a binary variable: 'quicker' or 'slower', so that logistic regression analysis could be performed. Countries were coded as having a 'quicker' or 'slower' based on whether they had reached a threshold score of 25 on the Containment & Health index by seven days after the date of the country's first case or the WHO pandemic declaration, whichever occurred earlier. The rationale for how speed of response was categorised and the choice of threshold, interval length and trigger date are described below. A description of the data sources used can be found in Box 1.

Trigger date: The included countries were affected by COVID-19 along significantly different timelines; some countries recorded their first case in January 2020, while others had no cases until May 2020. The trigger date (day 0) for assessing level of government response was therefore chosen to reflect the change in understanding about COVID-19 over these first months of 2020. A country's first COVID-19 case may have been the key internal trigger for government action, prior to the WHO declaration of COVID-19 as a pandemic on March 11, 2020. However, for countries that had not yet experienced a case, the WHO pandemic declaration marked the importance of government action even in the absence of cases, and therefore was assumed to be a key external trigger for government action.

Speed of response categorisation: Responses were categorised as 'quicker' if the country had reached a score threshold of 25 (to the nearest integer) by day seven after the trigger date, and 'slower' if not.

Threshold: The threshold of 25 was selected as almost all included countries did reach this threshold but at varying times during the course of the pandemic. As an example, this threshold would be reached by a country implementing total border closures, requirements to cancel all public events and coordinated public information campaigns as their only containment, closure and health measures.

Interval length: The number of days taken to reach the score threshold from the trigger date varied across countries. Fig. 1 displays the proportion of observations categorised as 'quicker' at different score thresholds and interval lengths. Seven days was selected for the interval length as it was the point at which roughly half of the countries reached a score of 25, allowing the analysis to countries to be categorised into roughly equal groups.

Note that a robustness check, described within the statistical analysis section below, was included within the methodology to check how the results changed when using varied score thresholds and interval lengths.

2.2.2. Explanatory variables

Four governance indicators were selected to test for associations with

	Containment & health index score threshold									
Days to reach score threshold	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**
10	95	88	79	72	64	53	46	35	30	24
9	95	85	78	71	61	48	41	33	26	17
8	93	83	72	65	58	41	34	29	22	16
7	93	79	68	58	**49**	34	28	24	17	9
6	91	75	64	53	45	33	27	21	15	7
5	91	72	59	47	39	30	25	16	9	5
4	90	66	51	33	25	17	11	5	3	3
3	86	65	48	31	22	14	8	4	3	2
2	81	61	43	28	19	10	6	3	2	2
1	75	58	37	20	13	6	3	2	1	1

speed of response. These four composite indicators were chosen because they are complete, based on aggregating multiple sources of data, are methodologically reliable and are appropriate for use in cross-country comparisons [18,19]. Following literature review, it was hypothesised that greater transparency, accountability, participation (measured by Voice and Accountability), integrity (measured by Corruption Perceptions Index) and state policy and implementation capacity (measured by Government Effectiveness) would be associated with quicker initial response. It was also hypothesised that countries with higher 'Political Stability and Absence of Violence/Terrorism' would mount a quicker response, due to countries with lower political stability facing capacity constraints and divided political attention [20].

In addition, control variables were included to account for other country-level factors that were hypothesised to be associated with speed of response. These control variables were chosen selectively, because having too many variables would have led to overfitting the logistic regression model. Some variables that were considered as relevant could not be included due to the incompleteness of the data available for many LMICs.

The selected variables are listed in Table 1, and more detailed descriptions and rationale for each variable can be found in Supplementary material 1. All data was extracted on February 1, 2021.

2.3. Statistical analysis

Individual countries were the units of analysis. Following descriptive analysis, univariate analyses were conducted using logistic regression.

Multivariate analysis was initially conducted using all explanatory variables. A parsimonious model was then built from the full model using an iterative method of backwards deletion: the variable with the largest Wald statistic p-value was selected, a partial likelihood ratio test was conducted to identify if its contribution to the model was statistically significant ($p < 0.05$) and it was removed if not. This process was repeated until only statistically significant variables were left within the model. We present results from both the model with all explanatory variables and the parsimonious model.

Assumptions were checked by calculating the variance influence factor (for multicollinearity) and Box-Tidwell test (for linearity of continuous explanatory variables with the logit of the outcome variable). The effects of observations with greatest residuals, leverage and influence on the model and coefficients were checked by excluding those observations and assessing the impact on the model. The model was checked for specification error, and goodness-of-fit using the Hosmer-Lemeshow test.

Robustness check: Multivariate regressions of the parsimonious model were repeated using different score thresholds (20, 25, 30) and interval lengths (6, 7 and 8 days), to assess whether the direction and statistical significance of the included variables changed.

All statistical analysis was conducted using STATA version 16.1.

3. Results

One-hundred and thirty-five LMICs were considered for inclusion. In addition to China, 18 countries were excluded because they did not have data for the Containment and Health index at the time of analysis. One-hundred and sixteen countries were included in the analysis. All data used for the analysis are publicly available [40].

The descriptive characteristics of the included countries can be found in Table 2. Forty-eight (41.4%) of the countries had a small population size of 10 million or less, 27 (23.3%) were low-income countries and 17 (14.7%) were island nations. Seventeen (14.7%) of the countries had prior experience with cases of SARS-COV1 or MERS and 46 (39.7%) experienced their first case of COVID-19 prior to the WHO pandemic declaration.

Two explanatory variables had missing data: Corruption Perceptions Index had data for 112 observations and Domestic General Government Health Expenditure as % of General Government Expenditure had data for 114 observations. The observations with missing data were therefore excluded in the multivariate model with all explanatory variables included.

Fifty-seven countries (49.1%) were classified as having a quicker initial government response, i.e., reached a score of 25 on the Containment and Health index within 7 days of the country's first COVID-19 case or WHO pandemic declaration, whichever occurred

Containment & health index score threshold

Days to reach score threshold	5	10	15	20	25	30	35	40	45	50
10	95	88	79	72	64	53	46	35	30	24
9	95	85	78	71	61	48	41	33	26	17
8	93	83	72	65	58	41	34	29	22	16
7	93	79	68	58	**49**	34	28	24	17	9
6	91	75	64	53	45	33	27	21	15	7
5	91	72	59	47	39	30	25	16	9	5
4	90	66	51	33	25	17	11	5	3	3
3	86	65	48	31	22	14	8	4	3	2
2	81	61	43	28	19	10	6	3	2	2
1	75	58	37	20	13	6	3	2	1	1

Fig. 1. Percentage of countries classified as responding 'quicker' at different Containment & health index score thresholds and different interval lengths.

Table 1
Explanatory and control variables, the hypothesised direction of association with the outcome variable, and their data sources.

Explanatory variables	Hypothesised relationship	Data source – data year
Government Effectiveness	Countries with higher Government Effectiveness are associated with a quicker initial response [7,21,22].	World Bank Governance Indicators Databank – 2019 [23]
Political Stability and Absence of Violence/ Terrorism	Countries with higher Political Stability are associated with a quicker initial response [22].	World Bank Governance Indicators Databank – 2019 [23]
Voice and Accountability	Countries with higher Voice and Accountability are associated with a quicker initial response [9].	World Bank Governance Indicators Databank – 2019 [23]
Corruption Perceptions Index	Countries with higher Corruption Perceptions Index are associated with a quicker initial response [24,25].	Transparency International Corruption Perceptions Index – 2020 [19]
Control variables		
Population size group	Countries with a smaller population size are associated with a quicker initial response [26].	World Bank Development Indicators – 2019 [27]
Income group	Countries from higher income group are associated with a quicker initial response [28–30].	World Bank Open Data – 2021 [31]
Island nation classification	Countries that are island nations are associated with a quicker initial response [3].	Worldatlas.com – 2021 [32]
Prior experience with cases of SARS-CoV1 or MERS-CoV	Countries with prior experience are associated with a quicker initial response [3,22,33].	World Health Organization Factsheets [34,35]
First case of COVID-19 prior to pandemic declaration	Countries with their first case of COVID-19 prior to the pandemic declaration are associated with a slower initial response [36].	World Health Organization Coronavirus dashboard – 2021 [16]
Domestic General Government Health Expenditure as % of General Government Expenditure	Countries with higher % Domestic General Government Health Expenditure are associated with a quicker initial response [37,38].	World Health Organization Global Health Expenditure Database – 2018 [39]

earlier.

3.1. Univariate and multivariate analyses

Associations between the outcome and explanatory variables are shown in Table 3, in the form of unadjusted and adjusted odds ratios. Small population size and island nation had statistically significant associations with the outcome in all three models (univariate, full multivariate, and parsimonious multivariate).

In the univariate analysis, the odds of a quicker initial response were higher in countries with a small population size than countries with larger population sizes (OR 2.53, 95% CI 1.18–5.41, p = 0.02), and lower in countries that were island nations than countries that were not island nations (OR 0.27, 95% CI 0.08–0.88, p = 0.03). The odds of a quicker initial response were higher in countries from the upper-middle income group than countries from the low-income group in both the univariate analysis (OR 2.87, 95% CI 1.06–7.77, p = 0.04) and in the multivariate model with all explanatory variables included (OR 5.95, 95% CI 1.10–31.84, p = 0.04).

Table 2
Descriptive statistics.

Variable		N (%)
World Bank Region (n = 116)	East Asia & Pacific	16 (13.8)
	Europe & Central Asia	17 (14.7)
	Latin America & Caribbean	22 (19.0)
	Middle East & North Africa	12 (10.3)
	South Asia	7 (6.0)
	Sub Saharan Africa	42 (36.2)
Population size group (n = 116)	Small (≤10 million)	48 (41.4)
	Medium (>10 million, ≤100 million)	57 (49.1)
	Large (>100 million)	11 (9.5)
Income group (n = 116)	Upper-middle	43 (37.1)
	Lower-middle	46 (39.7)
	Low	27 (23.3)
Island nation (n = 116)	Island nation	17 (14.7)
	Not an island nation	99 (85.3)
Prior experience with cases of SARS-CoV1 or MERS-CoV (n = 116)	Previous cases	17 (14.7)
	No previous cases	99 (85.3)
First COVID-19 case prior to WHO pandemic declaration (n = 116)	First case before pandemic announcement	46 (39.7)
	First case after pandemic announcement	70 (60.3)
Speed of response to first case or WHO pandemic declaration (n = 116)	Quicker response	57 (49.1)
	Slower response	59 (50.9)

Variable	**Observed range**	**Mean**	**Standard Deviation**
Government Effectiveness (n = 116)	−2.5 to 1.0	−0.58	0.66
Political Stability & Absence of Violence/Terrorism (n = 116)	−2.8 to 1.2	−0.56	0.90
Voice & Accountability (n = 116)	−2.2 to 1.1	−0.48	0.80
Corruption Perceptions Index (n = 112)	12 to 68	33.29	10.93
Domestic General Government Health Expenditure as % of General Government Expenditure (n = 114)	1.13 to 27.82	8.65	4.63

In the parsimonious multivariate model, the odds of a quicker initial response were greater with each additional unit increase in the Government Effectiveness score (OR 13.92 95% CI 3.69–52.48, p < 0.001). The odds of a quicker initial response were lower with each additional unit increase in the Political Stability and Absence of Violence/ Terrorism score (OR 0.23, 95% CI 0.09–0.57, p = 0.002). The odds of a quicker initial response were higher in countries with small population size than larger population sizes (OR 5.53, 95% CI 1.83–16.71, p = 0.002). The odds of a quicker initial response were lower in countries with prior experience with cases of SARS-CoV1 or MERS than countries without prior experience (OR 0.19, 95% CI 0.04–0.87, p = 0.03); countries that were island nations than non-island nations (OR 0.18, 95% CI 0.04–0.83, p = 0.03); and countries that experienced their first COVID-19 case prior to the pandemic declaration than countries that experienced their first case after the pandemic declaration (OR 0.22, 95% CI 0.07–0.68, p = 0.008).

Five countries were identified as potentially having leverage or influencing the model. The effects of each of these single observations on the model were examined and the conclusions drawn did not change.

3.2. Robustness check of the thresholds selected for the outcome variable

Table 4 displays the variables from the parsimonious model that remained statistically significant in robustness checks regressions. All variables retained the same direction of association with the outcome variable in robustness checks. Small population size and Government Effectiveness were statistically significant in 100% of the models; First COVID-19 case prior to pandemic declaration was statistically

Table 3
Unadjusted and adjusted odds ratios (full model and parsimonious model) of the outcome for each explanatory variable, with respect to the base variable.

Variable		Unadjusted odds ratio (95% confidence interval) n = 116	P value (Wald statistic)	Adjusted odds ratio in full multivariate model (95% confidence interval) n = 112	P value (Wald statistic)	Adjusted odds ratio in parsimonious model (95% confidence interval) n = 116	P value (Wald statistic)
Government Effectiveness		1.44 (0.82–2.52)	0.21	8.22 (1.43–47.27	**0.02**[a]	13.92 (3.69–52.48)	**<0.001*****
Political Stability & Absence of Violence/Terrorism		0.99 (0.66–1.49)	0.97	0.21 (0.07–0.57)	**0.002****	0.23 (0.09–0.57)	**0.002****
Voice & Accountability		1.32 (0.83–2.10)	0.24	1.87 (0.78–4.46)	0.16		
Corruption Perceptions Index		1.02 (0.99–1.06)	0.23	0.99 (0.91–1.08)	0.91		
Small population size (<10 million)		2.53 (1.18–5.41)	**0.02**[a]	4.83 (1.46–15.98)	**0.01**[a]	5.53 (1.83–16.71)	**0.002****
Income group	Upper-middle	2.87 (1.06–7.77)	**0.04**[a]	5.93 (1.10–31.84)	**0.04**[a]		
	Lower-middle	1.31 (0.49–3.47)	0.59	2.00 (0.56–7.16)	0.29		
	Low	1.00 (base)		1.00 (base)			
Island nation		0.27 (0.08–0.88)	**0.03**[a]	0.13 (0.02–0.81)	**0.03**[a]	0.18 (0.04–0.83)	**0.03**[a]
Prior experience with cases of SARS-CoV1 or MERS		0.38 (0.12–1.15)	0.09	0.22 (0.04–1.13)	0.07	0.19 (0.04–0.87)	**0.03**[a]
First COVID-19 case prior to pandemic declaration		0.59 (0.28–1.26)	0.17	0.13 (0.04–0.49)	**0.002****	0.22 (0.07–0.68)	**0.008****
Domestic General Government Health Expenditure as % of General Government Expenditure		1.06 (0.98–1.16)	0.14	0.95 (0.84–1.08)	0.46		

[a] $p < 0.05$; **$p < 0.01$, ***$p < 0.001$.

significant in 77.8%; Prior experience with cases of SARS-CoV1 or MERS, and Political Stability and Absence of Violence/Terrorism were statistically significant in 66.7%; and Island nation was statistically significant in 33.3%.

4. Discussion

4.1. Main findings of this study

This study examined, through a regression analysis, whether national governance indicators may have been associated with the speed with which LMICs initially responded to the COVID-19 pandemic. Having higher Government Effectiveness and lower Political Stability and Absence of Violence/Terrorism before the pandemic were associated with quicker initial government responses. Scores of Voice and Accountability and Corruption Perceptions Index were not associated with speed of initial response.

Quicker initial government response to the pandemic was associated with a higher score on Government Effectiveness, a composite indicator of state capacity, measuring factors such as bureaucracy, public infrastructure, policy stability, public administration and financial management [18]. This finding aligned with the hypothesised relationship. The indicator used here is broad, is not specific to public health and covers a large range of state functions. Nonetheless, it indicates broadly how effectively a government is functioning, which is helpful as national responses to COVID-19 were primarily led by government and involved significant state participation. This finding therefore may therefore reinforce the value of state policy and implementation capacity in helping to mount a rapid and decisive initial response to such a crisis. Two studies have shown that higher Government Effectiveness was also associated with lower COVID-19 related mortality risk, suggesting that having higher state capacity may also improve health outcomes [21,41].

The study also found that quicker response was associated with countries with lower Political Stability and Absence of Violence/Terrorism, a composite measure combining indicators of unrest, tensions, violence and terrorism [18]. This finding ran counter to the hypothesised relationship. On the surface, this may suggest that stable governance does not necessarily lead to quicker decision making, and vice versa. As this indicator is a crude measure, which does not reveal the ways in which political stability has been achieved, this finding merits further and more nuanced examination and consideration of how different governance structures and processes, such as participation, may hinder and help rapid decision making in times of crises. One explanation could be that countries with lower political stability have more experience of crises; Capano et al. have suggested that countries with previous experiences of crises may have greater awareness of their own capacities and are therefore more likely to respond earlier [22]. Less politically stable countries may have also had other characteristics discussed in the literature as favouring a quicker initial response, such as fewer veto players or a more autocratic leadership style [42,43].

In the regression analysis conducted, there was no association observed between the indicators of government transparency, accountability, participation and integrity (Voice and Accountability, and Corruption Perceptions Index) and initial speed of government response. It is likely that such governance factors do not operate in a unidirectional or simplistic manner, particularly during a crisis; during COVID-19 it has been noted that mechanisms for community participation in decision-making were changed and often limited, transparency of information was variable, and numerous challenges to integrity arose. [24,25,38] Therefore, while it is unclear how these factors impact upon speed, they have been shown to be important with other important elements of national response, such as public trust and equity. [14] For example, state-enabled civil society participation has been cited as an important way of improving community trust and uptake of measures, observed in places like Kerala [44,45]. Community-driven and locally tailored strategies appear to have been important for successful strategies during COVID-19 [46–49].

Other country factors associated with quicker initial government response were small population size, not having previous experience with SARS-CoV1 or MERS, experiencing first COVID-19 case after the

Table 4
Variables from the parsimonious model that were statistically significant ($p < 0.05$) in each regression conducted as robustness checks at different Containment and Health index score thresholds and interval lengths.

	Containment and health index score threshold			
		20	25	30
Days to reach score threshold	**8**	Small population size First case before WHO pandemic declaration Island nation Government Effectiveness	Small population size Prior experience with cases of SARS-CoV1 or MERS-CoV First case before WHO pandemic declaration Government Effectiveness Political Stability & Absence of Violence or Terrorisim	Small population size Prior experience with cases of SARS-CoV1 or MERS-CoV First case before WHO pandemic declaration Government Effectiveness
	7	Small population size Island nation Government Effectiveness Political stability	Small population size Prior experience with cases of SARS-CoV1 or MERS-CoV Island nation First case before WHO pandemic declaration Government Effectiveness Political Stability & Absence of Violence or Terrorisim	Small population size Prior experience with cases of SARS-CoV1 or MERS-CoV First case before WHO pandemic declaration Government Effectiveness
	6	Small population size Government Effectiveness Political Stability & Absence of Violence or Terrorism	Small population size Prior experience with cases of SARS-CoV1 or MERS-CoV First case before WHO pandemic declaration Government Effectiveness Political Stability & Absence of Violence or Terrorism	Small population size Prior experience with cases of SARS-CoV1 or MERS-CoV First case before WHO pandemic declaration Government Effectiveness Political Stability & Absence of Violence or Terrorism

pandemic declaration, and not being an island nation (which had limited robustness to sensitivity analysis).

Countries with small population sizes may have benefited from less complex governance arrangements, which may have enabled faster and more decisive action.

The wider literature suggests that experience of similar outbreaks, such as SARS or MERS, helped prepare countries to respond [3,22,33]. However, the association found in this study, between quicker government response and not having any previous experience of SARS or MERS, ran in the opposite direction. Simply having had any experience of SARS or MERS did not necessarily lead to a rapid large-scale responses to COVID-19 of the type that would have reached the threshold needed in this study. This may have been due to several reasons. Countries' experiences of SARS or MERS ranged widely and therefore their felt impact and responses are likely to have also varied; while there are examples in the literature of countries such as Vietnam responding rapidly, countries like Indonesia and Thailand were notably slower. [50] Furthermore, in some of the previously affected countries, early responses may have been more targeted or driven by the community; for example, some authors have noted that civil societies in these countries may have started taking actions, such as mask-wearing, earlier than in other countries. This may have reduced the need for early large-scale government measures. [51].

Countries experiencing their first case before the pandemic declaration had limited information to act upon, and so may have responded more cautiously and more slowly to the trigger of their first case, than countries that were triggered into response by the declaration of the pandemic. One study (in preprint) that found that the pandemic declaration led countries to start exhibiting herd behaviour, i.e. implementing the same control measures as other countries, regardless of whether they had had a case [52].

The association of a slower initial response with island nations, though the least robust of the findings, was opposite to the hypothesised relationship. This finding may have been due to island nations not requiring large-scale government measures other than border closures during the initial period, therefore not reaching a threshold of 25 [3].

Although income group was not included in the parsimonious model, in the full model, the odds of a quicker response were higher in upper-middle income countries than low-income countries. It has been noted that governments in low-income countries had fewer resources available to rapidly implement large-scale measures, and may have been more cautious about imposing restrictive measures due to the potential consequences on people's livelihoods, the economy and other parts of the health system [52,53].

The finding that Domestic General Government Health Expenditure as a percentage of General Government Expenditure was not associated with initial speed of response was notable. Further work is needed to understand how and whether the extent of prioritisation of health within state budgets, and the areas of public health prioritised, impacted the speed and quality of national COVID-19 responses [53].

4.2. Limitations of this study

The categorisation of countries into either 'quicker' and 'slower' responders may have masked subtleties in the order, targeting and speed of specific measures that may be of importance. Additionally, initial speed of response only examined one dimension of national response, and while this may indicate a government's ability and willingness to take decisive and precautionary action, this may not have translated into improved outcomes for health.

The indicators used were national level composite indicators, which may have limited the specificity of the findings. A lack of access to information at the subnational levels also constrained the assessment of, for example, the effects of decentralisation and regional inequities.

A number of control variables of possible importance, such as health system capacity, political trust and informal employment could not be included due to inadequate indicators, missing data and limits imposed by the size of the sample. This may have led to missing variable bias.

The impact of governance and speed of response on important health outcomes (excess mortality, COVID-19 related mortality, COVID-19 related cases) could not be assessed, because at the time of study, the reliability and availability of data was variable across countries and may have biased the results.

This study was limited to analysis of low- and middle-income countries and therefore the analysis of the association between national income level and speed was limited.

5. Conclusion

Rapid initial government response could indicate early decisive and precautionary action that may have helped to prevent or reduce COVID-19-related health burden in some countries during the early months of the pandemic. This study shows that having higher state policy and implementation capacity, and lower political stability was associated with a quicker initial pandemic response. Deeper enquiry into the early decision-making processes taken at the national executive level within individual countries may help clarify the observed associations further.

While the indicators measuring transparency, accountability, participation and integrity did not appear to be associated with speed of initial response, these factors appear to have influenced public trust and supported better-informed decision-making during COVID-19 and remain important, for example, in the ensuring the success of vaccination rollout.

Speed of initial action did not only depend upon government decision-making, as several other factors, such as population demographics, geography, and previous experiences, also likely impacted the time at which a country first got affected and the extent to which COVID-19 was perceived as a risk. The extent to which countries have adapted their responses over the course of the pandemic have likely impacted their health burdens. Examining the influence of governance arrangements, such as leadership, composition of committees and intergovernmental and intersectoral communication and coordination, on effective decision making, implementation and adaptation may support future pandemic response. Intra- and after-action reviews, the open sharing of experiences and further country response comparisons can help to identify lessons that can be incorporated into future preparedness planning [[54–58]].

Ethics

Abt Associates' Institutional Review Board exempted this study from ethical review as it did not meet the definition of research on human subjects.

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Data availability statement

All data are incorporated into the article and its online supplementary material.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.puhip.2022.100309.

References

[1] Global Health Security Index, Nuclear Threat Initiative, Johns Hopkins Center for Health security, 2019. www.ghsindex.org. (Accessed 1 February 2021).
[2] E.J. Abbey, B.A.A. Khalifa, M.O. Oduwole, et al., The Global Health Security Index is not predictive of coronavirus pandemic responses among Organization for Economic Cooperation and Development countries, PLoS One 15 (10) (2020), e0239398.
[3] F. Baum, T. Freeman, C. Musolino, et al., Explaining covid-19 performance: what factors might predict national responses? BMJ 372 (2021) n91.
[4] J. Braithwaite, Y. Tran, L.A. Ellis, et al., The 40 health systems, COVID-19 (40HS, C-19) study, Int. J. Qual. Health Care 33 (1) (2020).
[5] N. Haug, L. Geyrhofer, A. Londei, et al., Ranking the effectiveness of worldwide COVID-19 government interventions, Nat. Human Behav. 4 (12) (2020) 1303–1312.
[6] A. Teslya, T.M. Pham, N.G. Godijk, et al., Impact of self-imposed prevention measures and short-term government-imposed social distancing on mitigating and delaying a COVID-19 epidemic: a modelling study, PLoS Med. 17 (7) (2020), e1003166.
[7] B. González-Bustamante, Evolution and early government responses to COVID-19 in South America, World Dev. 137 (2021), 105180-80. [published Online First: 2020/09/04].
[8] M. Kosinska, Foreword, in: Scott L. Greer, Matthias Wismar, J. Figueras (Eds.), Strengthening Health System Governance: Better Policies, Stronger Performance, Open University Press, Maidenhead, 2016.
[9] M.J. Moon, Fighting COVID-19 with agility, transparency, and participation: wicked policy problems and new governance challenges, Publ. Adm. Rev. 80 (4) (2020) 651–656.
[10] A. Dutta, H.W. Fischer, The local governance of COVID-19: Disease prevention and social security in rural India, World Dev. 138 (2021), 105234.
[11] World Health Organization, Novel Coronavirus (2019-nCoV): Strategic Preparedness and Response Plan Geneva, World Health Organization, 2019–2020. https://www.who.int/publications/i/item/strategic-preparedness-and-response-plan-for-the-new-coronavirus. (Accessed 5 January 2021).
[12] OECD, The Territorial Impact of COVID-19: Managing the Crisis across Levels of Government, OECD Publishing, 2020. https://www.oecd.org/coronavirus/policy-responses/the-territorial-impact-of-covid-19-managing-the-crisis-across-levels-of-government-d3e314e1/. (Accessed 2 December 2020). accessed.
[13] S.L. Greer, E.J. King, E.M. da Fonseca, et al., The comparative politics of COVID-19: the need to understand government responses, Global Publ. Health 15 (9) (2020) 1413–1416.
[14] A.Z. Chowdhury, K.S. Jomo, Responding to the COVID-19 pandemic in developing countries: lessons from selected countries of the global south, Development 63 (2) (2020) 162–171.
[15] T. Hale, N. Angrist, R. Goldszmidt, et al., A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker), Nat. Human Behav. 5 (4) (2021), https://doi.org/10.1038/s41562-021-01079-8, 529-171.
[16] World Health Organization, WHO Coronavirus (COVID-19) Dashboard, World Health Organization, 2021. https://covid19.who.int/. accessed 1 February 2021.

[17] T. Hale, T. Boby, N. Angrist, et al., Variation in Government Responses to COVID-19, Version 9.0 2020 [updated 24 November 2020], https://www.bsg.ox.ac.uk/sites/default/files/2020-11/BSG-WP-2020-032-v9.pdf. accessed 1 February 2021.
[18] D. Kaufmann, A. Kraay, Worldwide governance indicators, World Bank, 2019. https://info.worldbank.org/governance/wgi/. accessed 15 January 2021.
[19] Transparency International, Corruption Perceptions index 2020, Transparency International, 2020. https://www.transparency.org/en/cpi/2020/index. accessed 1 February 2021.
[20] OECD. Covid-19, Crises and Fragility, OECD Publishing, 2020. https://www.oecd.org/coronavirus/policy-responses/covid-19-crises-and-fragility-2f17a262/. accessed 15 January 2021.
[21] L.-L. Liang, C.-H. Tseng, H.J. Ho, et al., Covid-19 mortality is negatively associated with test number and government effectiveness, Sci. Rep. 10 (1) (2020), 12567-67.
[22] G. Capano, M. Howlett, D.S.L. Jarvis, et al., Mobilizing policy (In)Capacity to fight COVID-19: understanding variations in state responses, Policy and Society 39 (3) (2020) 285–308.
[23] The World Bank, The World Bank, 2021. DataBank Worldwide Governance Indicators, https://databank.worldbank.org/source/worldwide-governance-indicators. accessed 1 February 2021.
[24] S. Herbert, H. Marquette, in: COVID-19, Governance, and Conflict: Emerging Impacts and Future Evidence Needs Brighton, Institute of Devleopment Studies, UK, 2021. https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/16477. (Accessed 20 May 2021).
[25] OECD, OECD Publishing, 2020. Public integrity for an effective COVID-19 response and recovery, https://www.oecd.org/coronavirus/policy-responses/public-integrity-for-an-effective-covid-19-response-and-recovery-a5c35d8c/. (Accessed 11 November 2020).
[26] Lowy Institute, Covid Performance Index: Deconstructing Pandemic Responses, Lowy Institute, 2021. https://interactives.lowyinstitute.org/features/covid-performance/. accessed 29 January 2021.
[27] The World Bank, Databank World Development Indicators, The World Bank, 2021. https://databank.worldbank.org/source/world-development-indicators. accessed 1 February 2021.
[28] T. Hale, N. Angrist, B. Kira, et al., Pandemic Governance Requires Understanding Socioeconomic Variation in Government and Citizen Responses to COVID-19, 2020 [Preprint] [cited 2021 May 20], https://ssrn.com/abstract=3641927.
[29] A. Glassman, K. Chalkidou, R. Sullivan, Does One Size Fit All? Realistic Alternatives for COVID-19 Response in Low-Income Countries, Center for Global Development, 2020. https://www.cgdev.org/blog/does-one-size-fit-all-realistic-alternatives-covid-19-response-low-income-countries. accessed 10 January 2021.
[30] Z. Barnett-Howell, A.M. Mobarak, Should Low-Income Countries Impose the Same Social Distancing Guidelines as Europe and North America to Halt the Spread of COVID-19? Yale University, 2020. https://som.yale.edu/sites/default/files/mushifiq-howell-v2.pdf. (Accessed 23 January 2021).
[31] The World Bank. World Bank Open Data, The World Bank, 2021. https://data.worldbank.org/. accessed 1 February 2021.
[32] J. Chepkemoi, Island Countries of the World: WorldAtlas, 2018. Available from: https://www.worldatlas.com/articles/which-are-the-island-countries-of-the-world.html. accessed 1 February 2021.
[33] H.M. Baniamin, M. Rahman, M.T. Hasan, The COVID-19 pandemic: why are some countries coping more successfully than others? Asia Pacific J Public Admin. 42 (3) (2020) 153–169.
[34] World Health Organization, Summary of Probable SARS Cases with Onset of Illness from 1 November 2002 to 31 July 2003, World Health Organization, 2015. https://www.who.int/publications/m/item/summary-of-probable-sars-cases-with-onset-of-illness-from-1-november-2002-to-31-july-2003. accessed 1 February 2021.
[35] World Health Organization, Middle East Respiratory Syndrome Coronavirus (MERS-CoV), World Health Organization, 2019. https://www.who.int/news-room/fact-sheets/detail/middle-east-respiratory-syndrome-coronavirus-(mers-cov. (Accessed 1 February 2021).
[36] S.-P. Jun, H.S. Yoo, J.-S. Lee, The impact of the pandemic declaration on public awareness and behavior: focusing on COVID-19 google searches, Technol. Forecast. Soc. Change 166 (2021), 120592.
[37] N.A. Erondu, J. Martin, R. Marten, et al., Building the case for embedding global health security into universal health coverage: a proposal for a unified health system that includes public health, Lancet 392 (10156) (2018) 1482–1486.
[38] B. Oppenheim, M. Gallivan, N.K. Madhav, et al., Assessing global preparedness for the next pandemic: development and application of an Epidemic Preparedness Index, BMJ Global Health 4 (1) (2019), e001157.
[39] World Health Organization, Global Health Expenditure Database, World Health Organization, 2021. https://apps.who.int/nha/database/Select/Indicators/en. accessed 1 February 2021.
[40] Ahimza Nagasivam, National governance indicators and speed of response to COVID-19 in LMICs, Mendeley Data (2022), https://doi.org/10.17632/2sstw869xj.1.
[41] B. Serikbayeva, K. Abdulla, Y. Oskenbayev, State capacity in responding to COVID-19, Int. J. Publ. Adm. (2020) 1–11.
[42] C.M. Egger, R. Magni-Berton, S. Roché, et al., I do it my way: understanding policy variation in pandemic response across Europe, Frontiers in Political Science 3 (2021) 17, https://doi.org/10.3389/fpos.2021.622069.
[43] L. Krizan, N. Arya, Steering countries through crisis: evaluating approaches to political leadership during pandemic times, Balsillie Papers 3 (2020), https://doi.org/10.51644/BAP31.
[44] S. Mustafa, A. Jayadev, M. Madhavan, COVID-19: need for equitable and inclusive pandemic response framework, Int. J. Health Serv. 51 (1) (2021) 101–106.
[45] M. Casale, COVID-19: can this crisis be transformative for global health? Global Publ. Health 15 (11) (2020) 1740–1752.
[46] USAID. Blueprint for Global Health Resilience, USAID, 2021. https://www.usaid.gov/global-health/health-systems-innovation/health-systems/resources/blueprint-resilience. accessed 8 April 2021.
[47] Oliu-Barton M, Pradelski BSR, Aghion P, et al. SARS-CoV-2 elimination, not mitigation, creates best outcomes for health, the economy, and civil liberties. Lancet doi: 10.1016/S0140-6736(21)00978-8.
[48] D. Rajan, K. Koch, K. Rohrer, et al., Governance of the Covid-19 response: a call for more inclusive and transparent decision-making, BMJ Global Health 5 (5) (2020), e002655.
[49] O. Eyawo, A.M. Viens, U.C. Ugoji, Lockdowns and low- and middle-income countries: building a feasible, effective, and ethical COVID-19 response strategy, Glob. Health 17 (1) (2021) 13.
[50] S. Rahayu, W. Sulistiadi, The effectiveness of COVID-19 countermeasure policy implementation in seven ASEAN countries, J Indonesian Health Policy Admin 5 (2) (2020).
[51] C.T. Leffler, E. Ing, J.D. Lykins, et al., Association of country-wide coronavirus mortality with demographics, testing, lockdowns, and public wearing of masks, Am. J. Trop. Med. Hyg. 103 (6) (2020) 2400–2411.
[52] T. Hale, N. Angrist, B. Kira, et al., Pandemic Governance Requires Understanding Socioeconomic Variation in Government and Citizen Responses to COVID-19, 2020 [Preprint] [cited 2021 May 20], https://ssrn.com/abstract=3641927.
[53] A. Lal, N.A. Erondu, D.L. Heymann, et al., Fragmented health systems in COVID-19: rectifying the misalignment between global health security and universal health coverage, Lancet 397 (10268) (2021) 61–67.
[54] L.N. Mayigane, C.C. de Vázquez, C. Vente, et al., The necessity for intra-action reviews during the COVID-19 pandemic, Lancet Global Health 8 (12) (2020) e1451–e1452.
[55] World Health Organization, Guidance for Conducting a Country COVID-19 Intra-action Review (IAR), World Health Organization, Geneva, 2020. https://www.who.int/publications/i/item/WHO-2019-nCoV-Country_IAR-2020.1. accessed 10 April 2021.
[56] World Health Organization, Guidance for after Action Review (AAR), World Health Organization, Geneva, 2019. https://www.who.int/ihr/publications/WHO-WHE-CPI-2019.4/en/. accessed 10 April 2021.
[57] V. Haldane, C. de Foo, S.M. Abdalla, et al., Health systems resilience in managing the COVID-19 pandemic: lessons from 28 countries, Nat. Med. 27 (2021) 964–980, https://doi.org/10.1038/s41591-021-01381-y.
[58] Independent Panel for Pandemic Preparedness and Response, COVID-19: Make it the Last Pandemic, 2021. https://theindependentpanel.org/. accessed 20 June 2021.