Association between democratic governance and excess mortality during the COVID-19 pandemic: an observational study

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ABSTRACT

Background Excess mortality has been used to assess the overall health impact of COVID-19 across countries. Democracies aim to build trust in government and enable checks and balances on decision making, which may be useful in a pandemic. But during the pandemic, they have been criticised as being hesitant to enforce restrictive public health measures.

Methods Through linking open-access datasets we constructed univariable and multivariable linear regression models investigating the association between country V-Dem Liberal Democracy Indices (LDI), representing strength of democratic governance and excess mortality rates, from January 2020 to September 2021. We adjusted for several important confounders and conducted a range of sensitivity analyses to assess the robustness of our findings.

Results Across 78 countries, 4.19 million deaths million excess deaths were recorded. On multivariable regression, a one-point increase in V-Dem LDI was associated with a decrease in excess mortality of 2.18 per 100 000 (p=0.004), after accounting for age, gender, wealth and universal health coverage. This association was only partially attenuated by COVID-19 vaccination rates and remained robust in all sensitivity analyses.

Conclusions Democratic governance may have played an important role in mitigating the overall health impact of COVID-19 across countries. This study strengthens the case to broaden the scope of traditional pandemic risk assessment and discussions on preparedness.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Previous studies have found that as countries become more democratic they experience a decline in rates of infant and child mortality, infections such as tuberculosis and non-communicable diseases.
⇒ Within Europe, more democratic countries were initially more reluctant to adopt restrictive COVID-19 measures that could conflict with democratic principles, including lockdowns.
⇒ Existing studies have investigated the relationship between governance and COVID-19 deaths across countries, but these studies fail to capture the indirect impact of epidemics, by excluding deaths not recorded as being due to COVID-19.
⇒ It is not yet clear whether on balance, democratic governance has been beneficial or detrimental to the impact of COVID-19 across countries.

WHAT THIS STUDY ADDS

⇒ Across 78 countries and 4.19 million deaths, stronger democratic governance was significantly associated with fewer excess deaths during the COVID-19 pandemic.
⇒ The robustness of deliberative decision-making processes was the only specific feature of democratic governance found to be associated with fewer excess deaths.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Given the omission of sociopolitical considerations from outbreak risk assessment tools, this study builds the case to broaden of the scope of traditional pandemic risk assessment and discussions on preparedness.
⇒ Future research into the mechanisms underlying our findings will help to understand and address the complex vulnerabilities countries face in a protracted public health emergency.

INTRODUCTION

Excess mortality is widely used as the gold standard in measuring the health impact of COVID-19 across the world.[1] With health systems, services and individual behaviour greatly affected by the pandemic, excess mortality provides an aggregate measure through which to consider both direct COVID-19 and indirect non-COVID-19 deaths due to the pandemic.

Many factors are involved in explaining the variation in excess mortality seen across countries. Studies have clearly demonstrated the importance of pre-existing population-level factors such as age, male gender, comorbidities and obesity in increasing risk of death from COVID-19.[2 3] Government policy responses to epidemics, including restrictions on movement and the reorganisation of health systems, have also been critical predictors of disease control and deaths.[1 4 5] The drastic measures taken by countries to restrict movement and impose penalties on non-compliance represent a trade-off between health protection and individual freedoms. In the initial phase of the pandemic, governments in some countries were reluctant to adopt measures that conflicted with democratic principles[6] leading to suggestions that such countries were too slow to react.[7] Nevertheless, lockdowns and travel restrictions were quickly used across most countries.

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Mortality from other non-COVID-19 conditions may have increased due to reduced healthcare-seeking behaviours,[8 9] the altered provision of routine healthcare, or a rise in mental health issues and risky lifestyle behaviours.[10]

Democracies aim to encourage accountability, transparency, checks and balances on decision-making, and increased community participation,[11 12] all of which may be useful in a pandemic. On the other hand, democratic countries have been criticised as being slow to respond to crises and enabling the 'tyranny of the majority,[13]' when decisions are made in the interests of the majority even if harmful to minorities. With a strong age-based gradient in individual risk due to COVID-19, the pandemic has brought to the fore the inherent tension in restricting the liberties of the masses to protect those more vulnerable.

While governments of all countries are responding to the pandemic, a heated debate rages about which political system, democracy versus authoritarian, is better positioned to respond to a pandemic. Governance lies on a continuum, with democratic principles more firmly embedded in some countries compared with others. This study sought to understand whether strength of democratic governance was associated with the variation in excess mortality (ie, including both COVID-19 and non-COVID-19 deaths) observed across countries. This will help policy-makers to understand how national systems of governance and conditions prior to the pandemic may have altered the overall health impact of COVID-19, informing future plans for preparedness and global health security.

METHODS

Data sources and extraction

All data used for this study were open-access and available online. Excess mortality data were obtained from the World Mortality Dataset,[14] representing all-cause mortality (above and beyond what would have been expected under normal conditions) from 105 countries during the pandemic. Excess mortality data spanned 27 December 2020 to 15 August 2021 (extracted as per the latest update on 1 September 2021), with variation in the time period for which data were available across different countries.

Democratic governance at the national level was measured through the Varieties of Democracy (V-Dem) Liberal Democracy Index (LDI).[15] The V-Dem project distinguishes among five high-level principles of democracy and collects data to measure these principles. The V-Dem Institute's measures of democracy are the most elaborate and granular among several democracy indices and, therefore, used to inform other institutions' governance indicators, including the World Bank's Worldwide Governance Indicators Project.[16] The V-Dem indices have greater validity, precision towards the higher end of the democratic scale, and are better at capturing variation across countries, compared with several other democracy indices.[17] Each country is scored from 0 (least democratic) to 1 (most democratic), and scores were taken from the 2020 Democracy Report, representing the state of democracy over 2019, prior to the onset of the COVID-19 pandemic. The 2019 Economist Intelligence Unit (EIU) Democracy Index[18] (composed of 60 indicators across five domains measuring electoral process, civil liberties, functioning of government, political participation and political culture) was used as an alternative measure of democracy to test the validity of results.

For each country, data were also extracted on a range of routinely available national-level indicators that could confound the relationship between democratic governance and excess mortality. Table 1 shows those selected, their different sources and summary statistics. Data on cumulative COVID-19 cases were obtained from the COVID-19 Data Repository at Johns Hopkins University,[19] for the same period of time as data on excess mortality for each country. Cumulative data on population uptake of COVID-19 vaccination were taken from the start of the pandemic to 2 weeks prior to excess mortality data (ie, up to 1 August 2021), due to the time lag between the administration of a vaccine and impact on registered deaths. The Oxford COVID-19 Government Response Tracker Stringency Index[20] is a score out of 100, combining nine different indicators including school/workplace closures, restrictions on movements and travel. A Stringency Index was obtained for each country at the time of their 1000th identified case. Where dates did not align exactly with these case numbers, the closest date was taken.

Statistical analysis

Distributions for each variable were examined using histograms and the relationship with excess mortality examined using scatter plots. A log transformation was applied to data on population density due to a highly positively skewed distribution. Univariable regression was performed to investigate which of the extracted variables demonstrated a significant relationship with excess mortality (table 2). To check for possible multicollinearity[21] between variables, pairwise Pearson correlation coefficients were calculated (online supplemental table 1), with age ≥65 and prevalence of cardiovascular disease (CVD); age ≥65 and age ≥80; gross domestic product (GDP) per capita and health expenditure per capita; and population in receipt of at least one dose of COVID-19 vaccine and population fully vaccinated, all being highly (>85%) collinear.

A multivariable linear regression model was constructed to investigate the association between V-Dem LDI and excess mortality across countries, controlling for age ≥65, gender, GDP per capita (2019) and Universal Health Coverage (UHC) Service Index. These variables were chosen based through balancing various factors: univariable regression results, multicollinearity (see online supplemental appendix S1), data quality (eg, with data on disease risk factors being less recently collected), and theoretical importance, as assessed by study authors. Variables which were significant on univariable regression but left out of the main multivariable model due to multicollinearity, data quality or the risk of overfitting the model and the need to include theoretically important factors for COVID-19 deaths (such as age), were included in further multivariable model sensitivity analyses. Scatter plots of residuals against fitted values were investigated and showed no violations of heteroskedasticity and quantile plots of residuals showed no departures from normality. For all regression analyses, V-Dem LDI data (scored 0–1) were multiplied by 100 to ensure a consistent scale with other variables and aid interpretation of the regression output.

To understand the potential pathways involved in the identified relationship between democratic governance and excess mortality, we used two approaches. First, we added two variables; vaccination and case rates, one at a time to the main multivariable model to assess their impact on the association between democratic governance and excess mortality (online supplemental tables 2–4). For case rates we also performed a subgroup analysis for high-income countries due to concerns about the accuracy and comparability of COVID-19 testing in middle-income countries. Second, we used five alternative (V-Dem Component Index) scores, representing distinct principles of democratic governance (for definitions see online supplemental

Table 1 Investigated factors, data sources and summary statistics

Type	Domain	Variable	Period	Source (Reference)	Mean (SD)	Range
Outcome	Excess mortality	Excess mortality per 100 000 population	January 2020–September 2021	World Mortality Database[14]	160 (146)	−41.7 to 608
Exposure	Democratic governance	V-Dem Liberal Democracy Index (LDI)	2019	V-Dem Institute[15]	0.544 (0.257)	0.062–0.858
		EIU Democracy Index	2019	EIU[18]	6.66 (1.98)	1.94–9.81
Covariates	Demographic	Population age ≥65(% total)	2019	World Bank[47]	14.3 (6.02)	2.00–28.0
		Population age ≥80(% total)	2019	World Bank[48]	3.58 (1.98)	0–8.56
		Population density (people per sq. km)	2018	World Bank[49]	321 (1153)	2.04–7953.0
		Population female (%)	2019	World Bank[50]	50.3 (3.58)	24.7–54.1
	Economic	GDP per capita (current US$)	2019	World Bank[51]	24 480 (23795)	891–1 14 685
		Gini index	2014–2019	World Bank[52]	34.5 (6.69)	24.6–53.4
	COVID-19 burden	Cumulative COVID-19 cases per 100 000 population	Jan 2020- Sept 2021	Johns Hopkins University[19]	5576 (3962)	38.7–15 649
	Chronic conditions	Prevalence of cardiovascular disease (%)	2019	Global Burden of Disease Study[53]	9.58 (3.48)	3.47–16.5
		Prevalence of chronic respiratory disease (%)	2019	Global Burden of Disease Study[53]	8.13 (3.28)	3.11–16.1
		Prevalence of diabetes and kidney diseases (%)	2019	Global Burden of Disease Study[53]	16.4 (3.53)	8.94–25.4
		Prevalence of neurological disorders (%)	2019	Global Burden of Disease Study[53]	41.2 (4.73)	28.4–50.9
		Prevalence of cancer (%)	2019	Global Burden of Disease Study[53]	11.9 (5.05)	3.77–27.0
	Disease risk factors	Prevalence of adult obesity (BMI >30, %)	2010–2019	World Obesity Federation	20.8 (7.97)	3.60–42.7
		Age-standardised mortality rate attributed to household and ambient air pollution per 100 000 population	2016	World Health Statistics 2020[54]	42.7 (34.9)	5.90–185.2
		Age standardised prevalence of tobacco smoking among persons aged 15 and older (%)	2018	World Health Statistics 2020[54]	24.0 (8.54)	6.90–44.7
	Health system	UHC Service Coverage Index	2017	World Bank[55]	75.2 (7.63)	55.0–89.0
		Current health expenditure per capita (current US$)	2018	World Bank[56]	2088 (22397)	59.8–10 623
		Out-of-pocket expenditure (% current health expenditure)	2018	World Bank[57]	29.2 (16.5)	5.99–84.3
	Vaccination	Population in receipt of at least one dose of COVID-19 vaccine (%)	Jan 2020 - August 2021	Our World in Data[58]	43.0 (22.3)	3.63–78.4
		Proportion fully vaccinated against COVID-19 (%)	Jan 2020 - August 2021	Our World in Data[58]	32.5 (21.7)	0.58–74.4
	Strength of restrictive policies	COVID-19 Stringency Index	Time of 1000th Case	Oxford COVID-19 Government Response Tracker[20]	75 (22.8)	11.1–100

BMI, body mass index; EIU, Economist Intelligence Unit; GDP, gross domestic product; UHC, Universal Health Coverage.

table 5), rather than the V-Dem LDI score for countries. Five separate multivariable regression models were constructed to investigate the relationship between each of these scores and excess mortality.

To test the robustness of the association between democracy scores and excess mortality, we performed sensitivity analyses (online supplemental tables 6–14). This involved constructing further multivariable models to (1) exclude the six lower-middle-income (ie, least wealthy) countries in our dataset in case of data quality issues; (2) use the EIU Democracy Index as the investigated variable of interest rather than the V-Dem LDI; (3) exclude the 11 countries where available excess mortality data did not extend past April 2021 (ie, the bottom decile of duration of excess mortality data); (4) add other predictor variables significantly associated with excess mortality on univariable regression to the previous multivariable model (ie, the prevalence of CVD and cancer, smoking and out-of-pocket expenditure) and (5) alter control variables where data were available (ie, replacing: age ≥65 with age ≥80 and GDP per capita with health expenditure per capita).

RESULTS

A total of 105 countries with data on excess mortality were initially considered. Of these, two countries (Nicaragua and El Salvador) had no excess mortality data from after August 2020, and eight countries had very limited data coverage or data which were based on government forecasts, so were excluded. A further 17 countries had no available V-Dem LDI data so were also excluded. This left 78 countries for analysis: 6 lower-middle

Table 2 Univariable linear regression of factors associated with excess mortality per 100 000 for all countries

Variable	Change in excess mortality per 100 000 for one-unit change in variable	P value	95% CI
V-Dem Liberal Democracy Index (LDI)	−1.50	0.016	−2.71 to −0.29
EIU Democracy Index	−20.3	0.009	−35.5 to −5.15
Age ≥65 years (%)	4.37	0.60	−0.99 to 9.73
Age ≥80 years (%)	10.2	0.21	−5.84 to 26.3
Log population density (ppl/sqm)	−13.5	0.22	−35.2 to 8.23
Population female (%)	8.80	0.04	0.47 to 17.1
GDP per capita (current US $)	−0.002	<0.001	−0.004 to −0.001
Gini index	1.85	0.49	−3.49 to 7.18
Cumulative COVID-19 cases	0.01	0.002	0.005 to 0.02
Prevalence of cardiovascular disease (%)	16.2	0.001	7.18 to 25.2
Prevalence of chronic respiratory disease (%)	−5.83	0.23	−15.4 to 3.77
Prevalence of diabetes and kidney diseases (%)	8.58	0.08	−0.97 to 18.1
Prevalence of neurological disorders (%)	5.02	0.20	−2.75 to 12.8
Prevalence of cancer (%)	7.28	0.02	1.19 to 13.4
Prevalence of adult obesity (BMI >30, %)	0.69	0.33	−3.45 to 4.83
Age-standardised mortality rate attributed to household and ambient air pollution per 100 000 population	0.70	0.13	−0.22 to 1.62
Age standardised prevalence of tobacco smoking among persons aged 15 and older (%)	5.81	0.003	2.07 to 9.56
UHC Service Index	−4.98	0.02	−8.95 to −1.02
Current health expenditure per capita (US$)	−0.02	0.003	−0.03 to −0.007
Out-of-pocket expenditure (% current health expenditure)	2.12	0.03	0.24 to 3.99
Population in receipt of at least one dose of COVID-19 vaccine (%)	−1.92	0.006	−3.26 to −0.58
Proportion fully vaccinated against COVID-19 (%)	−1.13	0.12	−2.57 to 0.30
Stringency Index (at 1000th case)	0.95	0.17	−0.41 to 0.23

BMI, body mass index; EIU, Economist Intelligence Unit; GDP, gross domestic product; UHC, Universal Health Coverage.

income, 26 upper-middle-income and 46 high-income countries (as classified by GDP per capita) (figure 1A). Of these, 32 were classified as liberal democracies by the V-Dem authors, with 23 electoral democracies, 17 electoral autocracies and 6 closed autocracies. Across all included countries a total of 4 185 382 deaths were recorded.

Figure 2 shows the relationship between V-Dem LDI and excess mortality, with a negatively linear association across countries. The mean excess mortality across all countries was 144.6 per 100 000, ranging from −96.2 to 484 per 100 000 (figure 1B). A negative excess mortality, meaning fewer deaths occurred than expected based on the prepandemic trend, was observed in 12 countries (15.4%). The median number of months for which excess mortality data were available across countries was 18 (IQR 17–19). The mean V-Dem LDI was 0.542 (range 0.062–0.858), with mean scores of 0.638, 0.728, 0.718, 0.549 and 0.698 for the electoral, liberal, egalitarian, participatory and Deliberative Component Index (DCI), respectively. Data were >90% complete for all variables except GINI index where data were missing for 12 countries.

Table 2 shows the univariable linear regression models for all included variables and excess mortality. The proportion of the population that were female, COVID-19 case rates, prevalence of CVD and cancer, prevalence of smoking and out-of-pocket health expenditure were all statistically significantly associated with higher rates of excess mortality. V-Dem LDI, EIU Democracy Index, GDP per capita, UHC Service Index, current health expenditure per capita and the proportion of the population in receipt of at least one dose of COVID-19 vaccine, were significantly associated with lower rates of excess mortality.

Table 3 shows the findings of the multivariable linear regression model. For every one percent increase in the proportion of the population aged 65 or above, excess mortality increased by 13.3 per 100 000 (p<0.001). A one-point increase in V-Dem LDI (when scored from 0 to 100) was associated with a statistically significant decrease in excess mortality of −2.18 per 100 000 (p=0.004), after adjusting for cumulative age ≥65, gender, GDP per capita and UHC Service Index. The additional adjustment for number of COVID-19 cases per 100 000 population increased the negative association between V-Dem LDI and excess mortality across all countries (β −2.59, p<0.001), as well as for high-income countries alone. Adjustment for population in receipt of at least one dose of COVID-19 vaccine decreased the negative association between V-Dem LDI and excess mortality (β −2.05, p=0.01) (online supplemental tables 2–4). The remaining covariates were not statistically significantly associated with excess mortality. The association between democratic governance and excess mortality remained robust to all further sensitivity analyses (online supplemental tables 6–14).

Table 4 shows the five multivariable linear regression models for V-Dem Component Indices, representing the different ways of considering principles of democratic governance. After adjusting for age ≥65, gender, GDP per capita and UHC Service Index, only the DCI (assessing the process through which decisions are reached in a polity) was significantly associated with decreased excess mortality, with a one-point increase in the index associated with a decrease in excess mortality of 1.60 per 100 000 (p=0.02).

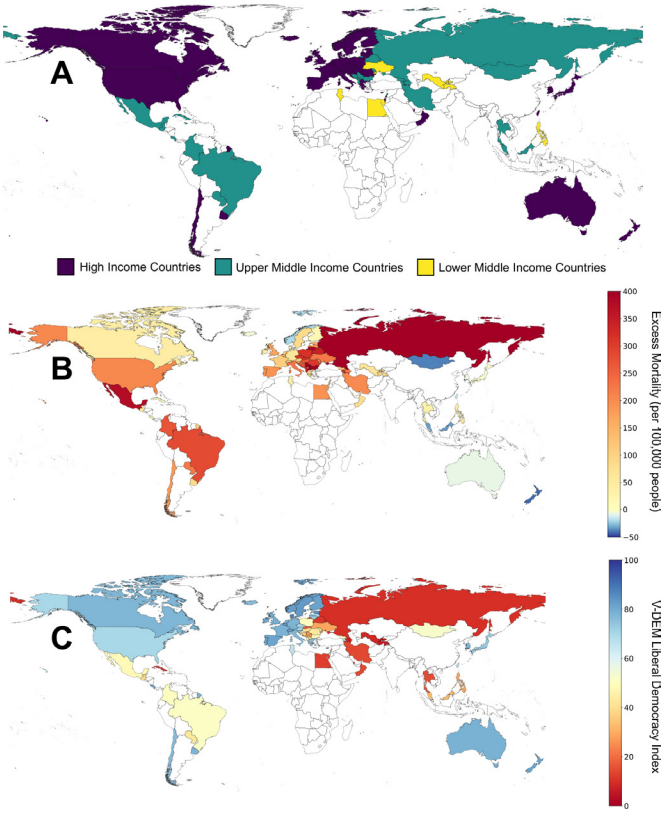

Figure 1 Maps showing the World Bank income classification (A), excess mortality per 100 000 people (B) and V-Dem Liberal Democracy Index (C) of included countries.

DISCUSSION

Countries with higher democracy scores were associated with significantly fewer excess deaths during the first 18 months of the COVID-19 pandemic. This finding remained even after accounting for a range of pre-existing factors that could influence the distribution of both COVID-19 and non-COVID-19 deaths across countries. Higher rates of vaccination helped to explain some but not all of the observed relationship between democratic governance and excess mortality. Having more deliberative decision-making processes, where political decisions are motivated by public reasoning and the common good, was the only specific feature of democratic governance found to be associated with significantly fewer excess deaths.

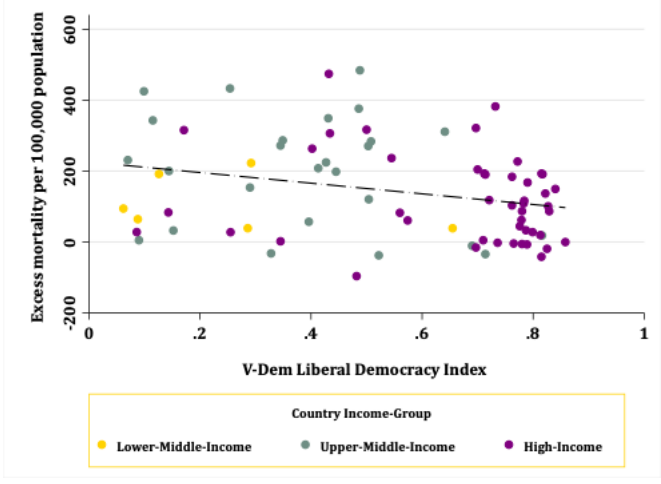

Figure 2 Excess mortality per 100 000 population and V-Dem Liberal Democracy Index across all included countries.

Democratic principles, such as civil and political liberties, representation, universal suffrage, and free, regular, and fair elections produce competition for popular support among politicians. As such, democracy in theory supports health by ensuring accountability for decisions and actions, and focusing attention on social, economic and healthcare inequalities.[22] It has been previously observed that as countries become more democratic, they see reductions in mortality across a range of diseases. An ecological study using a range of empirical methods to investigate the relationship between democratic experience and health[23] found that a one-point increase in democratic experience reduced deaths by roughly 2% from CVDs, tuberculosis, transport injuries and other non-communicable diseases combined. Similar studies have concluded that democratic governance has also led to reductions in infant and child mortality.[24–26]

There may be various mechanisms underlying this, including government accountability and transparency, decision-making processes, the dispersion of power, community participation, social capital, public trust in institutions, inclusive and fair institutions, the sharing of data, media freedoms and well-established processes to appraise and implement public health policies.[6 22 23 27] Many of these factors, although not necessarily unique to democracies, are core features of democratic governance and have been vital in the response to COVID-19, affecting public acceptance of and compliance with public health measures.[11 12]

We found that even after accounting for COVID-19 case rates, more democratic countries had lower rates of excess mortality. This may be in part because more democratic countries are able to diagnose more cases and therefore deaths appear lower, although this would only affect COVID-19 deaths, rather than all excess deaths. But the fact that the relationship persisted after excluding middle-income countries in sensitivity analysis, suggests that the mechanisms through which democracy protects against excess deaths extend beyond those that reduce transmission. A WHO survey found that health services were widely disrupted across nearly all countries in the pandemic, with 77% reporting reductions in outpatient care attendance and 66% reporting the cancellation of elective services.[28] Observational studies have found large falls in emergency department (ED) attendances in several countries during periods of COVID-19 restrictions.[29 30] A difference-in-differences analysis found that in England a decline of 2750 ED visits per week for suspected cardiac disease (representing a 35% decrease on prepandemic levels), was causally associated with an 18% increase in non-COVID-19 cardiac deaths.[31] Although we considered various health system metrics in our analysis, there are no global data on how resilient and adaptive health systems were during the pandemic. The health systems of highly democratic and wealthy nations may have been better prepared to cope with prolonged periods of disruption. They may have benefited from the ability to provide healthcare remotely,[32] strong and flexible leadership and management structures, surge capacity, emergency planning and well-trained staff committed to quality improvement and evidence-based care.[33]

The V-Dem DCI assesses the process by which decisions are reached in a polity. We found that higher DCI scores were significantly associated with fewer excess deaths. A deliberative process is one in which public reasoning, focused on the common good, motivates political decisions—as contrasted with emotional appeals, solidary attachments, parochial interests or coercion. Political decision making has been a critical factor in

Table 3 Association between V-Dem Liberal Democracy Index and excess mortality per 100 000 population (n=75)

Variable	Change in excess mortality per 100 000 for one-unit change in variable	P value	95% CI
V-Dem Liberal Democracy Index (LDI)	−2.18	0.004	−3.64 to −0.72
Age ≥65 years (%)	13.3	<0.001	7.19 to 19.4
Population female (%)	3.31	0.46	−5.65 to 12.3
GDP per capita (current US$)	−0.001	0.15	−0.003 to 0.0005
UHC Service Coverage Index	−3.87	0.11	−8.70 to 0.96

R^2=0.39.
GDP, gross domestic product; UHC, Universal Health Coverage.

determining the timing and use of public health measures across countries. But many countries have changed traditional processes to establish more robust and inclusive decision-making processes in COVID-19 response. For instance, Egypt scored only 0.26 on the DCI in 2019, but the government have been praised for robust, coordinated and effective public governance during the COVID-19 crisis.[34] The more likely reason that the DCI was associated with excess deaths is because the way decisions are made traditionally across government (ie, the culture of decision making) is also reflected in the governance of health systems, which in turn is a key determinant of health system resilience.[35] It is also true that countries with the highest DCI scores, such as Norway, Switzerland and Iceland, benefit from large welfare programmes and well-developed public services.[36] This may have limited the harmful mental and physical health impacts of the pandemic and associated deaths. But this may also be related to a culture of deliberative decision-making, where government policies, plans and strategies are motivated by inclusion, equity and public good.

Although democratic governance covers a range of important factors related to disease control, there are other important social, cultural and political factors that may not be captured by this study. A 2021 cross-country regression analysis[37] found that tight cultures, which have strict norms and punishments for deviance, were better able to respond to COVID-19 compared with loose cultures, which have more permissive norms. Nations with high levels of cultural looseness were estimated to have had five times the number of cases (7132 per million vs 1428 per million, respectively) and almost nine times the number of deaths (183 per million vs 21 per million, respectively) compared with those with high levels of cultural tightness. Similarly, it has been proposed that more collectivist societies have performed better than more individualist societies in combating COVID-19.[38] Hofstede's dimensions of national culture,[39] capturing cultural differences such as individualism versus collectivism, uncertainty avoidance and power distance, may further help to explain the variation in impact of COVID-19 across countries, although many of these factors may overlap with strength of democratic governance to some extent.

Table 4 Association between V-DEM component indices and excess mortality per 100 000 population* (n=75)

Alternative V-DEM component indices	Change in excess mortality per 100 000 for one-unit change in index	P value	95% CI
Electoral	−0.95	0.22	−2.47 to 0.57
Liberal	−0.94	0.24	−2.51 to 0.63
Egalitarian	−1.78	0.08	−3.78 to 0.21
Participatory	0.22	0.82	−1.76 to 2.21
Deliberative	−1.60	0.02	−2.94 to −0.27

*All models adjusted for age ≥65 years, population female, GDP per capita and UHC Index.
GDP, gross domestic product; UHC, Universal Health Coverage; V-DEM, Varieties of Democracy.

Unlike previous ecological studies on governance and COVID-19,[6 40–42] we used excess mortality as our outcome measure rather than COVID-19 cases or deaths. This provides a more comprehensive and unbiased assessment of the impact of COVID-19 within countries, given significant international variations in testing capacity and differing practices on reporting causes of death.[1] Through linking routine datasets we were also able to control for a range of important confounders when assessing the relationship between excess mortality and democratic governance.

The first major limitation of our methodology is an inability to draw causal inference. Due to the observational nature of this study with limited available data, it is not possible to rule out all potential confounders. The goodness-of-fit for our multivariable models was moderate, indicating that there may be additional factors influencing excess mortality that we have failed to include. For instance, the stringency of government restrictions (although included at a single point in time in our univariable analysis) varied over time within countries. Although, we would expect restrictions, like many other factors not explicitly captured in our analysis, to be on the causal pathway between governance and deaths, and therefore, a mediator rather than a confounder. Second, unlike previous research following countries over time as they become more democratic,[23] we cannot conclude from our cross-sectional analysis that strengthening democratic institutions within countries will improve pandemic response. Our findings suggest that this could be the case, but further work is required to understand the real-world impact of any such change on emergency preparedness and response. Third, we measured democratic governance prior to the pandemic, but this may not necessarily reflect the way populations have been governed during the COVID-19 pandemic. Despite this, governance during the pandemic, operating within existing national political and economic systems, might be expected to be correlated with governance prior. Long-term factors potentially affecting excess deaths, such as health system resilience, public sector safety nets and national cultures, are unlikely to change radically over such a short space of time. Fourth, there was variation in governance at a subnational level, particularly in geographically large countries with Federal systems of governance. We have not been able to account for the impact of this on excess mortality, but national indices can be expected to reflect and account for at least some degree of local variation in governance. Finally, we were not able to obtain excess mortality data for all countries, limiting the generalisability of our findings. Of particular note, there were some countries which have had large COVID-19 epidemics but were not included due to a lack of data, including India and

China. It is possible that the autocratic countries are both more likely to provide incomplete and inaccurate all-cause mortality data (thereby disqualifying them from the World Morality Dataset) and to underperform with respect to preventing deaths. If this is correct, then the results of the current study may underestimate the negative association between democracy and COVID-19 mortality. In addition, we were unable to control for the impact of different variants across countries, which may have been partially responsible for differences in excess deaths. Although our death data extended past the point at which the Delta variant was becoming the dominant variant globally (mid-2021[43]) and ended before the dominance of the Omicron variant (early 2022[44]), partially mitigating this risk. Regardless, we were able to include 78 countries in the analysis (and a majority of 46 (59%) high-income countries), representing a significant step forward in the literature making use of such routine data to understand variation in the impact of COVID-19 across countries. Further research is needed to confirm our findings with additional country-level mortality data.

At the national level, recommendations on improving pandemic response focus on compliance with International Health Regulations through specific public health capacities such as surveillance, testing, communications and countermeasures.[45 46] We found that the way societies were governed prior to the pandemic, and how decisions were made, including those relating to government led policies, strategies and systems, altered the impact of COVID-19 epidemics, when considering both COVID-19 and non-COVID-19 deaths. Given the omission of socio-political considerations from outbreak risk assessment tools, this study strengthens the case to expand the scope of traditional pandemic risk assessment. For future epidemics and pandemics, countries must be able to better capture the complex vulnerabilities they face in a protracted and large-scale public health emergency.

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