ORIGINAL ARTICLE

Research

Where to survive the pandemic in Europe? A challenge for health care professionals

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Abstract

Introduction: Resilience assesses to which extent communities or countries have resources available for citizens in case of adverse events, i.e. disaster, poverty, lack of services. High resilience means resources are available for citizens at risk in case of adverse events. Historically, pandemics have been unequally divided between more or less (dis)advantaged communities. Disadvantaged countries have high mortality and are characterized by low social protection policy. Will this also be the case with the COVID-19 pandemic? This study investigates the resilience of 25 European countries and its relationship with excess death, caused by COVID-19. *Method:* To answer this question, the most reliable method of tracking changes in total mortality is "excess deaths", while European statistics ('Eurostat') collects reliable data on investments in social protection, health care, quality of life etc. Five indicators are used to assess resilience of each country. The number of estimated *excess death* per 100.000 inhabitants is calculated for the period January 2020-September 2021, compared with average death during the last 5 years. The percentage fully vaccinated is based on data by October 2021, calculated per 100.000 inhabitants. *Results:* Countries with a high resilience score have statistically significant less excess deaths and more fully vaccinated citizens. These countries are: Iceland, Norway, Denmark, Finland, Ireland, Germany, and the Netherlands. The countries with a low score on the resilience indicators, which citizens have high excess deaths are: Bulgaria, Slovakia, Hungary, Czech Republic, Romania, Poland, Italy, Spain, Portugal, and Slovenia. *Discussion:* This study evidently show, that some European states are more effective to deal with the pandemic, i.e. prevent excess death of citizens, than others. These countries are able to react rather effectively on the pandemic. Poor expenditures in public health, health care, and social protection reduce the adaptation capacity of health care systems to react effectively on a pandemic. However, it is not only health care what matters. Lack of resilience has major, other consequences. It will also affect feelings of vulnerability and create uncertainly among citizens.

Keywords: *pandemic, resilience, excess death, COVID 19*

ARTICOLE ORIGINALE

Cercetare

Unde să supraviețuiești pandemiei în Europa? O provocare pentru profesioniștii din domeniul sănătății

Rezumat

Introducere: Reziliența evaluează în ce măsură comunitățile sau țările au resurse disponibile pentru cetățeni în cazul unor evenimente adverse, adică dezastre, sărăcie, lipsă de servicii. Reziliența ridicată înseamnă că sunt disponibile resurse pentru cetățenii expuși riscului în cazul unor evenimente adverse. Din punct de vedere istoric, pandemiile au fost împărțite inegal între comunități mai mult sau mai puțin (de)favorizate. Țările dezavantajate au o mortalitate ridicată și se caracterizează printr-o politică scăzută de protecție socială. Va fi acesta și cazul în cazul pandemiei de COVID-19? Acest studiu investighează reziliența a 25 de țări europene și relația acesteia cu decesul în exces, cauzat de COVID-19. *Metodă:* Pentru a răspunde la această întrebare, cea mai fiabilă metodă de urmărire a modificărilor mortalității totale este „decesele în exces", în timp ce statisticile europene („Eurostat") colectează date fiabile despre investițiile în protecție socială, îngrijire medicală, calitatea vieții

etc. Cinci indicatori sunt utilizați pentru a evalua reziliența fiecărei țări. Numărul deceselor în exces estimat la 100.000 de locuitori este calculat pentru perioada ianuarie 2020-septembrie 2021, comparativ cu decesul mediu în ultimii 5 ani. Procentul de vaccinare integrală se bazează pe datele până în octombrie 2021, calculate la 100.000 de locuitori. *Rezultate:* Țările cu un scor ridicat de reziliență au mai puține decese în exces semnificative din punct de vedere statistic și mai mulți cetățeni vaccinați complet. Aceste țări sunt: Islanda, Norvegia, Danemarca, Finlanda, Irlanda, Germania și Țările de Jos. Țările cu un scor scăzut la indicatorii de reziliență, cu scor ridicat de decese în exces (moartea excesivă a cetățenilor) sunt: Bulgaria, Slovacia, Ungaria, Republica Cehă, România, Polonia, Italia, Spania, Portugalia și Slovenia. *Discuție:* Acest studiu arată în mod evident că unele state europene sunt mai eficiente pentru a face față pandemiei, adică previn moartea excesivă a cetățenilor, decât altele. Aceste țări sunt capabile să reacționeze destul de eficient la pandemie. Alocare de fonduri insuficiente în sănătatea publică, îngrijirea sănătății și protecția socială reduc capacitatea de adaptare a sistemelor de îngrijire a sănătății de a reacționa eficient la o pandemie. Cu toate acestea, nu numai îngrijirea sănătății contează. Lipsa rezilienței are și alte consecințe majore. De asemenea, va afecta sentimentele de vulnerabilitate și va crea incertitudine în rândul cetățenilor.

Cuvinte cheie: *pandemie, reziliență, mortalitate în exces, COVID 19*

Introduction

Publishers seem to like the pandemic. Frequently, well defined overviews are presented about the number of infected people and the number of death, (probably) related to COVID-19. Bloomberg published recently an interesting article 'The best and the worst places to be as we learn to live with Delta' (1). The article notices the change caused by Delta, which affects places that stayed resilient till now, which is determined by the 'Bloomberg's' Covid Resilience Ranking'. Historically, pandemics have been unequally divided between more or less (dis)advantaged communities, i.e. high rates of infection and mortality for the disadvantaged ones (2). These disadvantaged countries are characterized by a low social protection policy. Will this also be the case with the COVID-19 pandemic?

The Economist analyses regularly the popular question "How many people have died because of the covid-19 pandemic?" As has been extensively argued, to answer this question reliable and comparative data have to be available. Many presented data do not fulfill the needed quality. The standard method of tracking changes in total mortality is "excess deaths" (3,4). Excess death data do show, that the pandemic has become gradually endemic, i.e. the corona virus will remain threatening vulnerable citizens and countries. Which raises the next question is: which countries are most successful in beating the pandemic. I.e. which policies and measures may explain this success? And when may a country become qualified as 'resilient for the pandemic'. What has a country to do to become resilient?

The strategies so far to control of the pandemic are testing, tracing, isolation; i.e. measures to slow the spread and mitigate its effects on the healthcare system and society. Such protective measures do successfully contribute to reduce the number of Covid-19 deaths. Although these strategies are (more or less) effective, their need is disputed. But research shows a significant role of large-scale testing policy to effectively contain the epidemic (5). Based on such research, it is recommended to set up all necessary measures to enable the quick scale-up of testing capacity whenever required. Besides 'test-trace-isolate' vaccination will help, but it took time

to develop vaccines and even more time to convince people to use it. Systematic reviews and meta-analyses show, that full vaccination (two shots) with COVID-19 vaccines is (highly) effective against the virus (including its variants). Therefore, to vaccinate as many people as possible, as quickly as possible, is imperative as stated by Evens and Jewell in their Editorial (6). They state, that as of June 19, 2021, Covid-19 vaccines are estimated to have prevented 7.2 million infections and 27,000 deaths in England alone. Vaccination makes a big difference and the possibility to vaccinate strengthening the resilience of a community. Is it enough? The virus may not become eliminated, but vaccines and controlled behavior of citizens may limit the damage, caused by the virus. Some research outcomes indicate, that (financial) investments in health and social care do not (directly) contribute to less victims of the pandemic (4). However, human behavior and social inequity are huge confounding factors (7).

Could we learn from the great pandemic of 1918–19, from the polio pandemic of the fifties or from what is happening now, as is tried in 'the best global responses to the COVID-19 pandemic (8)? Scientific research has provided a lot of new knowledge about to manage the pandemic. But without test-trace-isolate-vaccinate the pandemic could be long, meaning restrictions on travelling and economic activities. It will take time to control the pandemic. Researchers, who have looked for the 'best global responses to the COVID-19 pandemic' (8), conclude that it's not money or political orientation alone that leads to successful country responses. Leadership and the ability to create a shared sense of commitment are seen as essential. Is the solution 'Its continued vigilance, extensive testing and contact tracing, isolation, and treatment of confirmed cases remains a model that most other countries can only aspire to…'(8)? Or is it the national strategy announced in January 2021 in the USA? (9). It includes 7 goals, among these first 'Restore trust with the American people', followed by 'Mount a safe, effective, comprehensive vaccination campaign' and 'Mitigate spread through expanding masking, testing, treatment, data, workforce, and clear public health standards.' Is this the way to realize 'corona-free' societies? All suggested measures are helpful in case of emergency, but it will not last for long. Therefore, an

international debate on a pandemic control policy is needed, i.e. a clear vision about what really works on the long run.

Could the Covid Resilience Ranking, which is described as 'a monthly snapshot of where the virus is being handled the most effectively with the least social and economic upheaval' (1), be helpful? The ranking uses twelve data indicators, including the virus containment, the quality of healthcare, vaccination coverage, overall mortality and progress toward restarting travel and easing border curbs. It seems that this Covid Resilience Ranking describes what the virus does and how a government reacts on what the virus does. But this is not a measure for resilience, i.e. how to overcome the pandemic. The changes in the ranking each months indicate that the predictive power is low. A high score on the ranking does not keep the virus away. Will lessons be learned from the covid pandemic? (10). An international debate on a pandemic control policy is still needed. And it could start to look at measures (on the short and long run), which kill the virus, i.e. the pandemic. And indeed, here the concept of resilience could be useful.

This study investigates which general policies make societies resilient to deal with the pandemic. Resilience of policies in EU countries has been studied on 'healthy ageing' and 'happy old' (11,12). Resilience assesses the proportion of citizens at risk for poverty and lack of access to services (health care, housing, social protection). Resilience indicates to which extent national resources are available for citizens in case of adverse events. Cosco et al. (13) suggest, that resilience should be used as a public health concept and interventions, directed at greater resilience, which might increase resources available to people at risk.

The concept of resilience has been developed in biological and psychological research to explain why some living systems (plants, animals, humans) could overcome adverse events and others could not, followed by studies on societal reactions to ecological changes and economic developments. Besides to individuals, resilience is useful to apply to communities and nations to understand how institutions, politics and social context may deal with major social changes to maintain quality of life of citizens. Resilience assesses how well a system (community, organization, or nation) is able to recover ('bouncing back') in case of adverse events or even to anticipate ('bouncing forward') in case of expected adverse events by investing in security, public welfare, skills, and culture (11). Building resilient societies should be seen as an international challenge as stated by the United Nations in 2015 with the mission: 'Build the resilience of the poor and those in vulnerable situations, and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters by 2030' (14). One of the 'side-effects' of resilient society is that it enlarges the trust in proposed measures, contributing to public safety, and supports social norms (15).

This research looks for COVID-19 resilient policies in Europe. In Europe, many states are **working together to contain the spread of the virus, i.e. screening, isolation, tracing etc.** Also, it is evident that a high % of vaccinated citizens is an important factor to control the pandemic. But in which countries with what kind of policies is this the case?

Is this enough or are national policies and welfare arrangements more important to understand the number of *excess death*, i.e. the death due to the pandemic? And if the latter is the case, which national policies make the difference for a more permanent way out of the pandemic. Based on these outcomes, countries may be classified as more or less successful in controlling the pandemic, i.e. limit the 'excess death'. The study focuses on the Europe because significant differences exist between the countries concerning welfare, health care and social policies on the one hand, but at the same time reliable, comparable datasets on health care, quality of life and social policies in each country are available on the other hand (16).

Methods

Excess deaths, to determine the death-toll of the pandemic in each country, are based on the study, published by The Economist (3). The number of estimated *excess death* per 100.000 inhabitants is calculated for the period January 2020-September 2021, compared with average death during the last 5 years. The percentage fully vaccinated is based on data by October 2021, calculated per 100.000 inhabitants.

To define resilient societies indicators are needed, but also the coherence of these indicators has to be analyzed. As mentioned, Eurostat data offer a reliable, comparative indicators for assessment of resilience in each country. The resilience indicators selected are based on indicators used in various studies.
The following indicators are used to asses resilience of the involved countries:
- level of life satisfaction (1=good; 4=poor);
- level of education (% low to high);
- overcrowded in housing (number low to high);
- total expenditure on social protection as % of GDP;
- total expenditure on health care as % of GDP.

The most recent data of 2020 or 2021 are used to asses resilience, excess death and percentage of fully vaccinated. A complete set of data is available of 25 European states.

Pearson correlation are calculated to analyse the effect of each indicator on the number of excess death, due to the Covid-19 pandemic in the 25 European countries. Statistically significant correlation are described. As former research did show and as is expected based on the conceptual description, resilience indicators are (partly) related to each other. Therefore, factor analysis is executed to determine the coherence of the resilience indicators. The outcome of the factor analysis is used to assess the extent of resilience of each country.

Results

All resilience indicators correlate statistically significant with excess deaths in 2021 (see Table 1).

In countries, whose citizens report to be satisfied with life and do not live in overcrowded houses, the number of excess deaths is relatively low. Also in countries, where citizens have a high education level and where a relatively high % of the Gross Domestic Product (GDP) is spent on social protection and health care, the number of excess deaths is relatively low.

In countries, which have a high number of vaccinated citizens, the number of excess deaths is low.

Table 1. Pearson correlation of 6 resilience indicators and excess death in 25 European countries

	LS	LE	OH	ESP	EHC	% FV
Life satisfaction (LS)						
Level of education (LE)	-.665**					
Overcrowd housing (OH)	.790**	-.750**				
Expenditure on social protection % GDP (SP)	-.816**	.616**	-.646**			
Expenditure on health care % GDP (HC)	-.746**	.459**	-.644**	.807**		
% fully vaccinated (%FV)	-.565**	.485*	-.761**	.526**	.526**	
Excess death per 100.000	**.796****	**-.689****	**.762****	**-.804****	**-.604****	**-.754****

*   p = < .05   ** p = <.01

As mentioned, a factor analysis is executed to explore the dimensionality of the resilience indicators. The analysis shows one factor, i.e. all indicators are strongly related. The explained variance is 71,5%.

Table 2. Factor analysis of 5 resilience indicators

	Resilience loading
Life satisfaction	-.928**
Level of education	.796**
Overcrowded housing	-.881**
Expenditure social protect % GDP	.897**
Expenditure health care % GDP	.843**

*   p = < .05   ** p = <.01

A high score on the resilience factor means citizens in that country have a high life satisfaction, a high level of education, do not life in overcrowded houses, and a relative high percentage of the GDP in that country is spent on social protection and health care.

Countries with a high resilience score have statistically significant less excess deaths and more fully vaccinated citizens: i.e. a high resilience score goes with low excess deaths (Pearson correlation r=-.842) as well as with a high percentage of fully vaccinated citizens (Pearson correlation r=.659).

These countries with *low excess deaths* and *a high percentage of fully vaccinated citizens* are (in order of low excess death and high vaccination): Iceland, Norway, Denmark, Finland, Ireland, Germany, and the Netherlands.

The countries, in which citizens have *a relatively high risk not to survive the pandemic*, are (in order of *high excess death* and *low number of fully vaccinated citizens*): Bulgaria, Slovakia, Hungary, Czech Republic, Romania, Poland, Italy, Spain, Portugal, and Slovenia. These countries have a low score on the resilience indicators and the resilient factor.

Discussion

This study evidently show, that some European states are more effective to deal with the pandemic, i.e. prevent excess death of citizens, than others. Such successful countries are characterized by their 'resilience'. These countries are able to react rather effectively on an adverse event, in case a pandemic.

The outcomes of our analysis underline, that health systems are an important aspect of resilience and a critical issue in the management of the COVID-19 emergency and the death rate (17). To create health care systems that are able to deal with a pandemic is clearly a priority. Poor expenditures in public health and health care reduce the adaptation capacity of health care systems to react effectively on a pandemic in some countries. However, it is not only health care what matters. Lack of resilience of the health care system has major, other consequences. It will also affect feelings of vulnerability of citizens and raise questions about other institutions. Or the other way around, greater resilience can be possible fostered by interventions at a population and may have beneficial effects (13).

In whatever way, during a crisis the lack of resilience may weak the adhesion to social norms or the willingness to 'follow the rules' (12). Citizens lose their trust in their institutions. The consequences in the case of COVID-19 are refusal to test, isolate, vaccinate, and followed by a shortage intensive care beds and increasing excess mortality rates.

So, social trust in institutions, in this case health care institutions - health care professionals - policy makers, is an important aspect to beat a pandemic (17,18). Therefore, resilience is also important to execute test-trace-isolate policy. However, lack of trust is stimulated, when institutions are not able to react effectively. We did not focus on specific health care aspects like number of beds, number of medical doctors etc. However, is there a lack of trust in health care institutions, the number of hospital beds will not make the difference. On the contrary, our research shows, that a high number of hospital beds is related to less fully vaccinated. Do people believe that the number of hospital beds is sufficient to survive the pandemic or to stay healthy? Probably not, because a high number of hospital beds is related to more citizens, who report a bad health and a low quality of life.

Policy measures to realize resilient societies require reliable public sector institutions, which enables resilient components like welfare, security, social cohesion and justice. And realizing these components needs an integrated approach. But the current imperative in many countries is to vaccinate as many people as possible, as quickly as possible (6). But what to do if citizens don't trust the vaccination? This is one of the questions several European countries try to answer.

To build resilient communities and states a long term strategy is needed. Constructive, societal interactions need shared values, following rules, accepting regulations and control, if needed. The United Nations formulated in 2015 the mission *'Build the resilience of the poor and those in vulnerable situations, and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters by 2030* (19). It is time to realize this mission. There are 6 years gone and a pandemic came. Where to go, when another pandemic is on its way?

Conflict of interst: none**/Conflict de interese:** nu există

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