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Economical effect on doubling of COVID-19 cases: examples of rich versus poor countries

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Abstract

Purpose – The paper aims to examine some economical, political and health system indicators on the transmission of the COVID-19 transmission within the national system. The main objective is to investigate what are the most effective indicators which have led to the declared numbers by countries.

Design/methodology/approach – This study combined multiple sets of data to describe best the economical status of the health system including the government spending on the health system to draw some conclusion regarding the behavior of the pandemic.

Findings – Complex emergencies and internal conflicts negatively affected the quality of the reported cases and the size of the pandemic. The health work force was the most determinant factor of the health system. It can sometimes be impossible to understand the epidemic only with epidemiological data or health system one; economical aspects of health system and political situation have to be added to the equation.

Originality/value – The research according to the authors' knowledge is the most comprehensive comparison so far that investigate the non-covid aspects from a political side in particular in complex emergencies and war situation added health system indicators.

Keywords Disaster management, Health system, Pandemic, Complex emergencies, Health policies, Epidemiology, Public health, Social welfare, Health expenditure

Paper type Research paper

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1. Introduction

In the context of the ever-increasing globalization over the past decades, epidemiologists have repeatedly added global pandemic such as influenza to the list of top risks of global biological hazards (Webster, 1997; Taubenberger *et al.*, 2007; Kasowski *et al.*, 2011). Even interspecies transmission and pandemic as the current COVID-19 have been thought to be an actual threat (Webster, 1997). However, this issue was rarely or never high on the agenda of political systems. To be able to respond effectively to a new pandemic disease at the national level, two key factors are needed. The first is the presence of political will and determination to preserve and protect the population from the disease. To do this, it is necessary for government to take very unpopular, but necessary measures in a dangerous epidemiological situation such as pandemics. The second factor, but no less important, it is necessary for governments to have a permanent reserve of significant financial and material resources. In the occurrence of the risk event, these resources will be immediately directed to strengthening of the health system. The considerable reserved financial resources must be spent for support on diverse sectors (transport, tourism, retail, services, culture, sports, creative activities), which will inevitably suffer after the introduction of restrictive measures. This scenario might be possible for countries with adequate resources or simply rich countries. Governments that do not consider the above factors will be unable to fully respond to the pandemic. Some politicians will decide not to introduce harsh restrictive measures for their citizens, while others, who are more problematic, will follow the line of protection of business interests (of course, we are not talking about the functioning of vital sectors of the economy) and allow them not to restrict entrepreneurial activity.

One of the main risks of the "human factor" in the management of any business is the choice of short-term benefits without assessing the long-term consequences. Therefore, both businessmen and politicians should better think today about not only the short-term financial and political benefits but also the long-term negative consequences that they receive by risking in perspective with the health of their country's population.

2. Methodology

There is no one single indicator or even a set of indicators can describe the evolution and the size of an outbreak in a country. In case of pandemics regardless of the definition, selecting suitable indicators becomes a difficult task since the evolution of the pandemics expands beyond the capacities of single country and stretches to the ability of the regional and even global health system to respond (Ali Maher and Bellizzi, 2020). Since the devastating Spanish flu pandemics, there were mild pandemics caused by several influenza viruses, for instance, H1N1 in 1946, A/H2N2 in 1957, seventh cholera pandemic 1961–present, Acute Immunity Deficiency Syndrome 1981–present and two Ebola pandemics 2014–2020 (LePan, 2020). Currently, the global picture is so complicated in terms of countries ability to protect themselves from globally transmitted diseases. Epidemiology, which is broadly defined as the science concerned with understanding the causes of health and disease states to improve the health of populations (Galea and Keyes, 2019) and the associated indicators such as the number of cases affected by a disease.

Using standard indicators proposed by international organization, we aimed to explore the evolution of the pandemic in selected high-income countries (HICs) versus a sample of low-income countries (LICs) to give a qualitative overview on the difference in attitude towards the disaster management aspect of managing the pandemic.

2.1 Country groups and economy

To understand the evolution of the current COVID-19 pandemics, we had the economic classification of countries provided by World Bank (WB) for national Gross Domestic Products (GDP) [1] as an indicator for the overall economic status. The Purchasing Power Parity (PPP) as an economic indicator for the purchasing capability of the population to purchase services including health services. We chose in total seven countries, four in the LICs category and three in the HICs trying to balance various aspects of investigation for the health system, economy and geographic representation. Four sets of the epidemiological, economical, health system and social indicators were chosen to have a thorough analysis and evidence of the hypothesis presented here.

The categorization of the countries here was based on examining some countries belonging to the two extremes of this classification, LICs and HICs. For the LIC countries we presented the cases of Afghanistan, Ethiopia, Syria and Yemen, while for the HIC, we examined Italy, UAE and the USA.

2.2 Health system indicators

The most relevant indicators to measure the strength of health system in times of crises are those directly related to economy. The share of what government spends from the total nominal Gross Domestic Products (GDP) on health system can be expressed in terms of what the state is spending as capital and current expenditure. The government spending on capital assets includes the fixed assets of the public health system infrastructure that is owned by the government (for instance, the public healthcare facilities and national laboratories). This includes, health care facilities structures, laboratories, equipment and other fixed assets. The Current Health Expenditures (CHE), represents the running cost to keep the health system delivering services. The public health system usually cannot cover all the needs of the population and the public would need to spend from their own economy to cover this gap, this is referred to as the Out of Pocket (OoP) expenditures. We examine the direct ones related to the capacity of the health system to respond to an exceptional event without assistance from abroad. As a result of the capital government investment in the health expenditures and the CHE, the number of Hospital Beds (HB) and Medical Doctors (MD) per 1,000 population were used outcome indicators. Finally, when data were available, we had the Universal Health Coverage (UHC) as the outcome of the health system.

2.3 Epidemiological indicators

Reporting of cases of communicable diseases during outbreaks or pandemics must follow a specific case definition. This can vary from examination of the symptoms which can make a person suspected or probably carry the disease to using laboratory or rapid tests for confirmation that the person carries the virus. During the COVID-19 pandemic most of reported numbers were done for the confirmed cases using polymerase chain reaction or Swab To describe the evolution of the pandemic we used the reported daily confirmed cases and we had this divided by one million population for comparison purposes. To compare the situation between countries we normalized the total confirmed cases (TCC) by one million of population. We used the Case Fatality Rate (CFR) to examine the severity of the pandemic. The date of the onset of the first case of COVID-19 in the country is to give a clearer picture of the pandemic evolution. When data were available, information regarding tests conducted in the country was mentioned, which is directly related to the testing capacity of the country and that to a large degree related as well to the economic situation.

2.4 Policy and socio-economic indicators

After the onset of the pandemic, difficult decisions were to be made by the governments regarding their best interventions to response and contain the pandemic. The first countries to face the pandemic were confronted by fact that they need to work on many directions and in absence of enough information on the virus, a set of measures seemed to be necessary to be taken such as restriction on movement, closure of economic activities, and ultimately curfews for days or weeks.

We used the Oxford Calculated Government Tracker (OxCGRT) which compiles more than ten indicators from government policies for health containment (Hale *et al.*, 2020). In some cases, we used the Corruption Perception Index (CPI) and Social Progress Index to describe the social trust between the population in and the government. All indicators used are described in detail in Table 1.

Indicators	Abbreviation	Description	Source and remarks
Date of pandemic onset	N/A	The date of reporting the first confirmed case in the country	https://ourworldindata.org/covid-cases
Study period end	N/A	This end of the analysis of reported cases 13 September 2020	17 September 2020 https://ourworldindata.org/covid-cases
Gross Domestic Products	GDP	The monetary value of all finished goods and services made within a country during a specific period	www.imf.org
Purchasing Power Parity	PPP	Value of all final goods and services produced within a country each year, divided by the average (or mid-year) population for the same year	www.imf.org
Hospital Beds	HB	Available beds at hospitals at all levels of care per one thousand population	http://data.worldbank.org/data-catalog/world-development-indicators
Medical Doctors	MD	Physicians include generalist and specialist medical practitioners per one thousand population	http://data.worldbank.org/data-catalog/world-development-indicators
Universal Health Service Coverage Index	UHSC	A composite of essential health services	Stenberg *et al.* (2017): hereafter, 'SDG Price Tag'
Daily Confirmed COVID-19 Cases	TCC	Daily confirmed cases of COVID-19 per million population	https://ourworldindata.org/covid-cases
Total Confirmed Cases	TCC	Accumulative daily number of confirmed COVID-19 cases till per million population till the end of the study period	https://ourworldindata.org/covid-cases
Case Fatality Ratio	CFR	Number of fatalities caused by COVID-19 cases divided by the total number of confirmed cases	https://ourworldindata.org/covid-deaths
Oxford Covid-19 Government Response Tracker	OxCGRT	An index collates indicators related to policies such as school closures, travel bans, etc.	https://ourworldindata.org/policy-responses-covid
Current Health Expenditure	CHE	Is a percentage of GDP. Estimates of CHE include health-care goods and services consumed during each year	https://datacatalog.worldbank.org/current-health-expenditure-gdp

Table 1.
Composite of all indicators used and their sources given links checked on 20 September 2020

Finally, the study of the development of the epidemic started as mentioned earlier by reporting he first confirmed case in the country and the end of the study period was the 6 September 2020.

3. Findings

Examining the group with the least economy, it was quite challenging to collect data regarding all the indicators, so we compiled the most recent indicators available. For these countries undergoing emergency or internal conflict situation namely Yemen and Syria. However, due to war situation it is acceptable to assume that the situation regarding the infrastructure can be worse if not compensated by relief efforts and humanitarian assistance. Looking at the different investment from government, Afghanistan (PPP US $2,182) would be the highest country in the group with the CHE as part of the GDP with almost 12%. Out of this high percentage of the CHE, around 75% is OoP, which indicates that the major part of the spending on health system is done by the population's private economy. The country has as low as 0.33 for both HB (2017) and MD (2012) per thousand population. According to the OxCGRT, the country started to have some containment measures prior to the first case of COVID-19 was reported in the country. These measures strength was elevated to around 40% after the first case and reached almost 80% in April and maintained the same level. Despite this high level of interventions, the heights daily reported cases with almost one thousand confirmed case was registered on 6 June. By 6 September, the country seemed to pass a peak of reported cases and the recorded TCC was the highest in the group as well as 984.48 and a CFR of 3.7%.

Ethiopia (PPP US$2,702) spends 3.6% of its GDP as CHE, of which the OoP expenditure represents 34% of the CHE. Even though the first COVID-19 case was reported on the 14 March, the country continued to report less than 100 cases per day until the 1 June. This lowest GDP associated with a modest CHE and relatively high OoP led to an extremely low HB of 0.2 per thousand population and a record low MD of 0.02 per thousand population (2010). The country kept its health containment measures high and reached 53% of OxCGRT directly after the cases reported more than 100 cases per day. However, the OxCGRT did not pass 75% throughout the reported period even during the peak of the reporting period. By 22the country reported its highest number of cases since the onset of the pandemic with almost 2,000 cases, TCC 499.86 and a CFR of 1.6%.

Syria and Yemen are countries with ongoing armoured conflict since 2011 and 2015 respectively. Syria (PPP US$2,900) and spends 3.6% of its GDP as CHE of which and as high as 53.7% is OoP expenditures. The HB in Syria is reported to be 1.5 per thousand population and MD 1.6 per thousand population. The country reported its first COVID-19 case on the 23 March and kept reporting less than 100 cases until the beginning of August. The reported health containment measures index OxCGRT, seemed to respond to the reporting of the first cases with around 30% from the middle of March and reached its maximum by April (74%). However, the highest number of daily cases reported was 163 confirmed cases on the 20 August. By the end of the study period the country registered a TCC of 177.37 and a CFR of 4.2%. Figure 1 summarizes all indicators for the countries examined in theis category (G I).

Yemen (PPP US$2,312) GDP is US$29,855m with 4.2% as CHE of which the OoP is the highest in LIC group (81%). The HB in Yemen is reported to be 0.7 per thousand population and MD 0.31 per thousand population. The country reported its first COVID-19 case as late as 30 April. The highest number of daily cases of 116 was reported on 16 June. The country reported a OxCGRT of 30% by end of March and the highest registered value so far was 33%. The country reported a TCC of 66.62 and a CFR of 28.8% by the end of the study period.

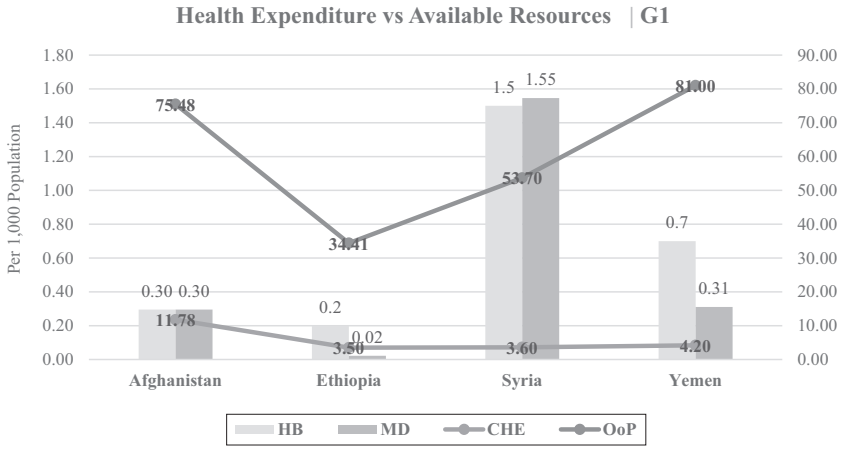

Figure 1.
Current health expenditure by countries in LIC group against the HB and MD

The spread of the COVID-19 pandemic out of China have taken most of the health systems in the globe by surprise. The first country to draw the attention of the world media to the severity of the COVID-19 was Italy. The country has a PPP of US$41,582 and its expenditure on health as represented by the CHE is 8.84% of the total GDP (US$1,988,636) of which 23.49% represents OoP expenditures. The HB in Italy is about 3.4 and MD is 4.02 per thousand population. Italy started to impose some health containment measures by 23 January and had an OxCGRT of 2.7%. The country reported its first case on the 28 February and started to impose more strict measures until the OxCGRT reached 90% by March 20. By the 6 September the country recorded TCC of 4,591.89 and a CFR of 12.8%.

The UAE is one of the highest PPP globally of US$70,441 as per the IMF in 2019. The country spends 3.33% of the GDP as CHE of which OoP represents 18.87% of that. HB per 10,000 population (HB) is 1.1, and there are 1.56 MD per 10,000 population (MD) as well. Since 24 January, the country started to have some form of health containment. The country registered its first case by the 12 February and started to increase its health containment measures until it reached almost 90% of the OxCGRT by 15 April. The total of the TCC was 7480.39 and the CFR was 0.5% by the end of the study period.

The PPP of the USA is US$67,426 and the Government CHE is the highest in the group with 17.06% of the GDP and OoP represents 10.99%. The HB in the USA is reported to be 2.9 per thousand population and MD 2.57 per thousand population. The first case reported in the state was on the 21 March, but the country had started some of the health containment measures prior to this date. On the 28 February, the OxCGRT was above 10% and never exceeds the 73% during the whole period until the 9 September. The TCC of the USA is 18,961 and the CFR is 3% by the 6 September (Figure 2).

4. Discussions

For the two countries in emergencies, Syria and Yemen (LIC group), it is almost impossible to draw any conclusion regarding the spread or the volume of the pandemic. The political scheme surpassed the epidemiology of the disease. Two governments and an active conflict made the disease stigmatized by any party to report on "sickness" which might give a weakness signal to the other side of the conflict. Yemen marked 15 on the CPI (Transparency International, 2019), on a scale from 1 to 100, the lower the number is the less transparent the government system is. One of the most remarkable observations on

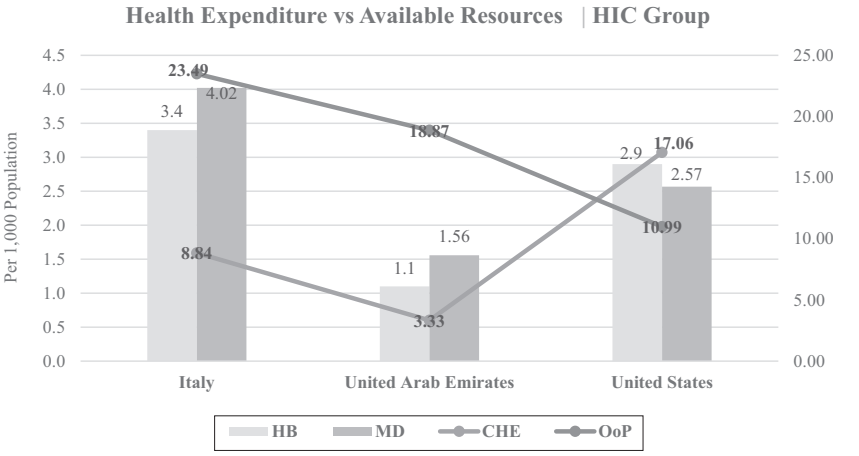

Figure 2.
Current health expenditure by countries in HIC group against the HB and MD

COVID-19 in Yemen is that the country reports less than 2,000 cases, about 67 of TCC. However, the country is asking for US$304.6m for the response of the pandemic. The discrepancy between what is reported and what amount of money asked in terms of assistance to meet the official reports can be explained by this lack of transparency within the political system in general. Almost the same conclusion can be drawn over the situation in Syria. The reported cases are the second highest in the group with around 204 TCC. However, the total COVID-19 response plan (Relief web Syria, 2019) estimates the need for health interventions with about US$188.6m. What is remarkable about Syria is that the reported confirmed cases did not exceed 10 confirmed cases except by late June. The peak of reported cases was registered by late August and since then until the end of the study period, the reported cases have been on the decline and the country ended up with 177.33 TCC and 4.2% CFR. It is worth mentioning that the HB and MD are higher in Syria compared to Yemen. However, it is not clear if these values are based on national capacity or a result of humanitarian assistance.

For Afghanistan, the country reporting of almost 12% of the CHE is more than most of the group of the HICs, and only USA has more spending than this reported value. Afghanistan also reports the highest percentage of OoP spending (almost 76%). Regarding the value and reliability of the reported CHE, the reported OoP reflects a weak network of government health insurance policies and weak capacity of the public health system. The country ended up with a high 1,000 TCC which is the highest in the group and a relatively low CFR of 3.7%. The appeal for the COVID-19 response by the health sector is around US $22m, which is the lowest in the LIC group.

Ethiopia has the lowest score on both HB and MD among countries in this group with 0.2 and 0.02, respectively. The country reported more than 100 cases daily relatively late by early June. However, this can be explained by the fact that cases started to be reported late in sub-Saharan Africa compared with the northern part of the continent. The country started to report a sharp decline in cases by late August and by the end of the outbreak reported almost 500 TCC and 1.6% CFR, which is the lowest in the group. The country health sector appealed to around US$130m. The country reported the highest number of absolute confirmed cases among all countries in the group.

In general, data was available across all countries in the HIC group for the indicators used in this study. More indicators, such as these related to testing, UHC and accurate data

regarding health containment measures, were available for analysis as well. Testing policies can as well reflect the economic capabilities of the country.

The country which had the biggest media attention at the beginning of the pandemic, *after China where the pandemic started*, was Italy, which reported its first case in February. Remarkably, Italy reported the highest number of cases globally with almost 6,000 cases in one day on 26 March and over 100 daily confirmed cases per million population. Italy has a CHE of almost 9% of its total GDP, which is only higher than the UAE in High Income group countries. What is unique about Italy in this group is that it has the highest percentage of OoP contribution to this CHE in the group with about 23%. This high OoP share of the health care system needed a substantial spending from the government to strengthen the public health system capacities. On the other hand, what seemed to be exceptional in the case of Italy compared with the rest of the countries is that the high HB and MD. Italy has 3.4 MD and 4.02 HB per thousand population. This might have been the determining factor for Italy to combat this pandemic with the lowest TCC of 4,591.89 by the end of the study period. The CFR is the highest among the group, which can be explained with the scarce information regarding the virus symptoms, case definitions, stigma and other uncertainties regarding case management and risk communication at this early stage of the pandemic. The status of Italy with a peak of reported cases, *which was not reported outside China at this time*, gave sometime to other countries to have more preparedness measures. One can claim that if not for the health workers high density and the high capacity of the public health system in Italy, the global pandemic would have seen a different course. The UAE is a typical example of the Gulf Cooperation Council and due to its status as a global logistics and transportation hub, was among the first countries to report cases in the HIC group. The country has the lowest number of MD and HB in the group. However, one of the major characteristics of the UAE response was the health containment measures. Enough resources in the country enabled the government to impose health containment measures passed 90% and above 80% for most of the time of the pandemic. The containment policies including decentralization of patients with mild cases in home isolation or quarantine seemed to have paid off and the country reported the lowest case fatality in the group 0.5%.

The USA represents a challenge when trying to understand the evolution of the ongoing pandemic. The USA has 10% of very rich population that controls more than 76% of all personal wellbeing; the country is home to 40% of all dollar millionaires in the world (Credit Suisse global report, 2019). Therefore, the CHE are distributed very unevenly: more benefits will go to those who pay large health insurance; and statistics simply average these amounts among all citizens of a given territory. The country CHE is one of the highest in the world which is more than 17%, at the same time the OoP is high as well with around 11%. USA has lower HB and MD than Italy, but better than the UAE. The United States kept its health containment measure since the beginning of the pandemic until now, however the maximum level of utilization of these measures never passed 75%. Why the USA is one of the countries with highest reporting cases so far then? Many factors could have contributed to that. In fact, there are other contributing factors that did not exist in the countries examined in this group, which is the administration of the health system between federal and state levels. The issue of the USA is a typical example of when data availability does not really reflect the actual situation within a political boundary of a state. The disparity between the states is deceiving when trying to sum up policy interventions at a national level, since all states are almost sovereign within their boundaries. The state where most of the cases in the USA were reported is California with more than 750,000 cases, while the lowest reported cases

was in Wyoming state with 1,700 cases. In California, one third cases are reported in Los Angeles county and only two cases reported in the county of Alpine.

For countries with low economy and ongoing conflict or in a recovery mode, it is almost impossible to use the epidemiological available data as an indicator to characterize the pandemic spread in the country. The CFR in Yemen for instance is the highest globally with around 28% of confirmed cases which indicates that most of the cases seen by the healthcare system are only very severe cases. The term "Political epidemiology", *according to us*, reflects the concept of politicizing the epidemiology and surveillance systems and using it to convey messages to the other side of the conflict or to the outer world. This can be noticed in the extremely low reported cases in Yemen and the unrealistic claim for the global community for assistance. With the available data, it is obvious that the HB and MD are the most reliable indicators. The amount of money requested by countries in emergencies did not at all reflects the reported situation in terms of number of cases nor the fatalities.

No doubt that the pandemic showed clearly that the overall preparedness of the health systems across the globe is not as optimal as even countries with high economic resources thought. However, looking at HIC group of countries it is obvious that the investment in the health work force is the think most paid back among health indicators, as it was showed in Italy. The UAE proved that with economic resources they could impose health containment measure for longer period and the economic loss can be mitigated later. The case of the USA showed that, due to the political scheme, national reporting did not actually reflect what was carried out as health response policies at the state level. It might be useful in similar case studies that each state to be dealt with as a separate epidemiological entity. Finally, whether we will call what we witness now a resurge of cases in many countries or second wave, it is imminent that the COVID-19 epidemic can never be analysed or understood by looking only to epidemiological indicators or economical ones. Political context and social factors, corruption and whatever concerns the society as whole, are in fact as equal. Moreover, the global problem of the growing social inequality, creates uneven access to health services not only for citizens living in poor countries but also for those who live in rich countries but belong to the lower social category. According to a study by Credit Suisse 2019, the 90% of the least affluent population now accounts for 18% of the world's wealth, up from 11% in 2,000.

The growing gap between rich and poor is also confirmed by data from another study published by the world Inequality Lab in December 2018. The WIR, 2018 shows that "The gap between rich and poor has increased in nearly every region in the world over the past few decades". Since 1980, income inequality has increased rapidly in North America and Asia, increased more moderately in Europe, and stabilized at very high levels in the Middle East, Africa and Brazil (Nelson, 2017).

5. Conclusions

A billionaire boom is not a sign of a thriving economy, it is a sign of a failed economic system", said Winnie Byanyima, chief executive of Oxfam International in 2018 (Oxfam, 2018). For example, in a very rich country – the USA – which has one of the highest levels of wealth concentration among developed countries, and statistically high health care costs, millions of people do not have insurance or even money to buy a disposable medical mask. According to a 2020 assessment by the U.S. Census Bureau (Horsley, 2020), the percentage of Americans living in poverty for 2019 (before the pandemic) had fallen to some of lowest levels ever recorded due to the record-long economic growth period and stood at 11.1% (adjusted for smaller response during the pandemic). However, in nominal terms, this is

more than 38 million people. Therefore, it is pointless to issue penalties for them for non-compliance with quarantine measures.

Our results call for the world to direct more attention and investment in the medical cadre and health-care work force. Having the economical means without enough personnel to deal with such unforeseen events. It is possible to repurpose the medical cadre to contribute to the response on all levels of care. The public health insurance which is included in the CHE was a major factor to increase the access of all population to health care as well. One major aspect which requires more research is the management of pandemics as a global threat. This will require drawing lessons learned from the current pandemic and how to strengthen the regional and global response in a multi stakeholders and complex economic national capacities.

Note

1. GDP: https://data.worldbank.org/indicator/NY.GDP.PCAP.CD

References

Ali Maher, O. and Bellizzi, S. (2020), "Pandemic declaration, definition versus process", *Public Health*, Vol. 185.

Galea, S. and Keyes, K.M. (2019), "Epidemiology at the heart of population health science", *American Journal of Epidemiology*, Vol. 188 No. 5, pp. 883-885.

Hale, T., Noam, A., Emily, C.-B., Laura, H., Beatriz, K., Saptarshi, M., Petherick, A., Phillips, T., Tatlow, H. and Webster, S. (2020), "Oxford COVID-19 government response tracker", Blavatnik School of Government.

Horsley, S. (2020), "American incomes were rising, until the pandemic hit", available at: www.npr.org/sections/coronavirus-live-updates/2020/09/15/913131697/american-incomes-were-rising-until-the-pandemic-hit (accessed 16 September 2020).

Kasowski, E.J., Garten, R.J. and Bridges, C.B. (2011), "Influenza pandemic epidemiologic and virologic diversity: reminding ourselves of the possibilities", *Clinical Infectious Diseases*, Vol. 52 No. Supplement 1, pp. S44-S49.

LePan, N. (2020), "Visualizing the history of pandemics".

Nelson, E. (2017), "Thomas Piketty says the US is setting a bad example on inequality for the world", Quartz, Retrieved December 16, 2017.

Oxfam (2018), available at: www.oxfam.org/en/press-releases/richest-1-percent-bagged-82-percent-wealth-created-last-year-poorest-half-humanity

Relief web Syria (2019), available at: https://reliefweb.int/sites/reliefweb.int/files/resources/Syria_COVID-19_Humanitarian%20Update_No%2017_1Sept2020_FINAL.pdf

Stenberg, K., Hanssen, O., Edejer, T.T.T., Bertram, M., Brindley, C., Meshreky, A., Rosen, J.E., Stover, J., Verboom, P., Sanders, R. and Soucat, A. (2017), "Financing transformative health systems towards achievement of the sustainable development goals: a model for projected resource needs in 67 low- and middle-income countries", *The Lancet*, Vol. 5 No. 9, pp. 875-887.

Taubenberger, J.K., Morens, D.M. and Fauci, A.S. (2007), "The next influenza pandemic: can it be predicted?", *JAMA*, Vol. 297 No. 18, pp. 2025-2027.

Transparency International (2019), "Corruption perception index", ISBN: 978-3-96076-134-1, available at: https://images.transparencycdn.org/images/2019_CPI_Report_EN_200331_141425.pdf

Webster, R.G. (1997), "Predictions for future human influenza pandemics", *The Journal of Infectious Diseases*, Vol. 176 No. s1, pp. S14-S19.

Webster, R.G., Shortridge, K.F. and Kawaoka, Y. (1997), "Influenza: interspecies transmission and emergence of new pandemics", *FEMS Immunology and Medical Microbiology*, Vol. 18 No. 4, pp. 275-279.

World Inequality Report (2018), available at: https://wir2018.wid.world

Further reading

IMF "Statistical data, including but not limited to, international financial statistics (IFS), balance of payments (BOP), direction of trade (DOT), and government finance statistics (GFS) microeconomic and financial data", available at: http://data.imf.org/

Korean Broadcasting System (KBS) August 31, 2020, available at: https://regnum.ru/news/3049998.html

The Global wealth report (2019), "Credit Suisse", viewed 15 August 2020, available at: www.credit-suisse.com/about-us/en/reports-research/global-wealth-report.html

World Health Organization (2007), "Everybody's business-strengthening health systems to improve health outcomes: WHO's framework for action".

World Health Organization (2008), "International health regulations (2005)", World Health Organization.

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