

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/349820484>

The Covid-19 pandemic in low- and middle-income countries, who carries the burden? Review of mass media and publications from six countries

Article in *Pathogens and Global Health* · March 2021

DOI: 10.1080/20477724.2021.1878446

CITATIONS

38

READS

184

13 authors, including:



Dhia Joseph Chackalackal
University of Freiburg

3 PUBLICATIONS 57 CITATIONS

[SEE PROFILE](#)



Ahmed Asa'ad Al-Aghbari
Heidelberg University

8 PUBLICATIONS 63 CITATIONS

[SEE PROFILE](#)



Su Yeon Jang
Max Planck Institute for Demographic Research

10 PUBLICATIONS 151 CITATIONS

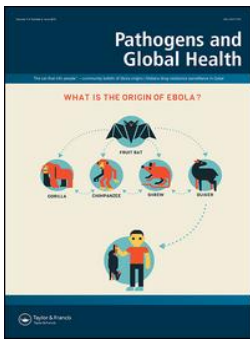
[SEE PROFILE](#)



Tatiana Rivera Ramirez
University of Freiburg

5 PUBLICATIONS 79 CITATIONS

[SEE PROFILE](#)






The Covid-19 pandemic in low- and middle-income countries, who carries the burden? Review of mass media and publications from six countries

Dhia Joseph Chackalackal, Ahmed Asa'Ad Al-Aghbari, Su Yeon Jang, Tatiana Rivera Ramirez, Jose Vincent, Anand Joshi, Megha Raj Banjara, Peter Asaga, Rocio Cardenas Sanchez, Maria Angelica Carrillo, Juan Manuel Villa, Sonia Diaz Monsalve & Axel Kroeger

To cite this article: Dhia Joseph Chackalackal, Ahmed Asa'Ad Al-Aghbari, Su Yeon Jang, Tatiana Rivera Ramirez, Jose Vincent, Anand Joshi, Megha Raj Banjara, Peter Asaga, Rocio Cardenas Sanchez, Maria Angelica Carrillo, Juan Manuel Villa, Sonia Diaz Monsalve & Axel Kroeger (2021): The Covid-19 pandemic in low- and middle-income countries, who carries the burden? Review of mass media and publications from six countries, *Pathogens and Global Health*, DOI: [10.1080/20477724.2021.1878446](https://doi.org/10.1080/20477724.2021.1878446)

To link to this article: <https://doi.org/10.1080/20477724.2021.1878446>

 View supplementary material 

 Published online: 04 Mar 2021.




 Submit your article to this journal 

 View related articles 

 View Crossmark data 



The Covid-19 pandemic in low- and middle-income countries, who carries the burden? Review of mass media and publications from six countries

Dhia Joseph Chackalackal ^a, Ahmed Asa'Ad Al-Aghbari^a, Su Yeon Jang^b, Tatiana Rivera Ramirez ^a, Jose Vincent^c, Anand Joshi^d, Megha Raj Banjara^e, Peter Asaga^f, Rocio Cardenas Sanchez^{g,h}, Maria Angelica Carrillo ^{a,h}, Juan Manuel Villa^a, Sonia Diaz Monsalve^a and Axel Kroeger^a

^aFaculty of Medicine, Albert-Ludwigs-University Freiburg, Centre for Medicine and Society, Freiburg, Germany; ^bDepartment of Preventive Medicine, Kyung Hee University School of Medicine, Seoul, Korea; ^cDepartment of Community Medicine, Amala Institute of Medical Sciences, Thrissur, India; ^dPublic Health and Infectious Disease Research Center (Phidrec), Kathmandu, Nepal; ^eCentral Department of Microbiology, Tribhuvan University, Kirtipur, Kathmandu, Nepal; ^fInstitute of Molecular Diagnostics and Infectious Diseases, Keffi, Nigeria; ^gInstituto Departamental De Salud-IDS, Norte De Santander, Colombia; ^hGrupo GIGA, Universidad Francisco De Paula Santander, San José De Cúcuta, Colombia

ABSTRACT

During the Covid-19 pandemic, rich countries employed lockdown and physical distancing policies for transmission control. However, the question still remains whether these measures are also suitable in countries with a fragile economy, which rests mainly on the informal sector. The impacts of lockdown measures in disadvantaged population strata in six low- and middle-income countries (LMICs) were reviewed using i) 93 media reports and ii) 17 published scientific papers. This review showed that those who suffered the most from the lockdown were migrants, workers in the large informal sector, small businesses, slum dwellers, women and elderly, revealing the social, cultural and economic inequalities of societies. Financial and food support for the poor was inadequate and sometimes mismanaged. In the better organized societies, the resilience was stronger (South Korea, Kerala/India) but here also the poor had to suffer the most. It is strongly recommended that outbreak response strategies should particularly focus on the poor and vulnerable population.

KEYWORDS

COVID-19; corona virus; low- and middle-income countries; socio-economic impact

Introduction

After the start of the Covid-19 (SARS-CoV-2) outbreak in early December 2019, a visit by a WHO-expert team to China documented the lockdown strategy of the government.¹ At the same time a mathematical model suggested that the expected high epidemic wave in an uncontrolled situation could be converted into a long-lasting, low epidemic curve through strict transmission control.² These were major contributions to the decision of governments to drastically restrict people's movements by closing businesses, schools, universities, public events and others (lockdown strategy) in order to enable the health services to cope with the large number of severe cases. This medical-epidemiological view did not consider the societal aspects of the strategy in spite of warnings by economists.³ When the epidemic reached the high-income countries (HICs) of Europe, the medical-epidemiological lockdown model was adopted quickly neglecting the impact of these measures on the economy and public society. But what does lockdown mean for low- and middle-income countries (LMICs), where societies and health services are less organized and the public sector is less able to economically support the

informal sector and the mass of impoverished people? The concern of massive collateral damage due to stringent mitigation strategies has already been voiced by authors in richer countries criticizing that 'this diffuse form of warfare, aimed at "flattening" the epidemic curve generally rather than protecting the especially vulnerable' cannot be the solution.⁴ What are the impacts of 'flattening of the curve' by employing the lockdown model and 'social distancing' for LMICs where the informal sector is predominant, and the poverty levels are high?


To document the social and economic consequences of the lockdown strategy of countries with varying socio-economic levels, this study was undertaken in South Korea, Mexico, Colombia, India, Nigeria, and Nepal.

Methods and study sites

Study design

The study used mainly a literature review approach analyzing newspaper articles and television messages collected by study participants in the target countries, complemented by a review of published scientific

CONTACT Dhia Joseph Chackalackal  dhia.joseph.chackalackal@pluto.uni-freiburg.de  Albert-Ludwigs-University Freiburg, Centre for Medicine and Society, Freiburg, Germany.

 Supplemental data for this article can be accessed [here](#).

evidence. The main reason for this approach is that only few studies based on the societal impact of Covid-19 were available at this stage – many of them based on mathematical modeling- and that newspaper articles and television reports reflect the social and cultural attitudes at the time.

Study sites and the ‘COVID-19 team’ in target countries

Countries with different levels of poverty or economic strength in Asia, Africa and Latin America were selected. Economic indicators are presented in Table 1 showing, according to the GDP, three middle-income countries (Colombia, Mexico and South Korea – whereby the latter may also be classified as high-income country when considering exclusively the GDP) and three lower middle to low-income countries (India, Nigeria, and Nepal). The informal economic sector was important in all study countries, but exceptionally large in the poorer countries. Also, the proportion of small businesses (self-employment) in the poorer countries was around 80% while only between 25.4% (South Korea) and 51% (Colombia) in the middle-income countries. These figures indicate the proportion of the population expected to be particularly hit by the Covid-19 related lockdown policy.

For the collection of and analysis of local data, the ‘COVID-19 team’ was organized. All team members, two per country, were academics working in local Universities or health services. They were continuously connected by internet allowing information exchange through a shared drive.

Search strategy and selection criteria

For the review of the literature, a systematic search of the literature was done to answer the question ‘What is known about the socioeconomic impact of the

measures undertaken by the governments of the target countries?’

The search strategy included a combination of keywords related to the categories ‘COVID-19’, ‘measures’, ‘interventions’, ‘impact’ and ‘consequences’ in the online databases PubMed, Cochrane library, WHO COVID-19 Global research database on COVID-19, Embase, and Google Scholar (searched on 25 April 2020). In order to generate a more comprehensive search, six individual searches combining the terms above and each target country were conducted in Google Scholar (the first 100 hits per country were screened), until no new relevant information was found (‘saturation’). Inclusion criteria were: scientific articles with information on the socioeconomic impact of the public health measures related to COVID-19 adopted in our target countries. Observational and intervention studies including qualitative, quantitative or mixed methodologies as well as literature reviews in English or Spanish available as full text were included.

Since COVID-19 was a newly discovered disease and was recently declared as a pandemic by the World Health Organization (11.03.2020), there was limited scientific information about it (especially in LMICs). However, considering the urgency of the matter, we also considered the second-line sources of the situation in the targeted countries in the literature review: This included pre-print scientific studies in peer review journals, MedRxiv, and non-peer review journals. The excluded articles were letters to the editor, opinions, guidelines, commentaries and editorials due to the limitation of information.

Selection of the studies was done by one reviewer (TR). The pre-selected studies were screen by a second reviewer (AK) and occasionally, in case of uncertainty, by a third researcher (MAC). From an initial total of 3606 hits; the selection of relevant papers was carried out in three stages. First, the titles were evaluated according to the inclusion and exclusion criteria.

Table 1. Selected economic indicators from WDI data, 2018.

	Korea, Rep.	Mexico	Colombia	India	Nigeria	Nepal
GDP per capita, PPP (constant 2011 international \$)	36 777	18 134	13 321	6888	5316	2741
Informal employment (% of total non-agricultural employment)			57.2%	80.3%		
Self-employed, total (% of total employment) (modeled ILO estimate)	25.1%	31.6%	51.4%	76.5%	81.5%	79.8%
Vulnerable employment, total (% of total employment) (modeled ILO estimate)	19.2%	26.8%	47.2%	74.5%	77.7%	78.7%
Poverty headcount ratio at \$3.20 a day (2011 PPP) (% of population)	0.1%	8.8%	10.9%	46.7%	69.1%	35.4%

Source: World Development Indicators (WDI), compiled by the World Bank from officially recognized international sources. <https://data.worldbank.org/indicator?tab=all>

‘Employment in the informal economy as a percentage of total non-agricultural employment. It basically includes all jobs in unregistered and/or small-scale private unincorporated enterprises that produce goods or services meant for sale or barter. Self-employed street vendors, taxi drivers and home-base workers, regardless of size, are all considered enterprises. However, agricultural and related activities, households producing goods exclusively for their own use (e.g. subsistence farming, domestic housework, care work, and employment of paid domestic workers), and volunteer services rendered to the community are excluded.’

‘Self-employed workers are those workers who, working on their own account or with one or a few partners or in cooperative, hold the type of jobs defined as a self-employment job. i.e., jobs where the remuneration is directly dependent upon the profits derived from the goods and services produced. Self-employed workers include four sub-categories of employers, own-account workers, members of producers’ cooperatives and contributing family workers.’

‘Vulnerable employment is contributing family workers and own-account workers as a percentage of total employment’

‘Poverty headcount ratio at \$3.20 a day is the percentage of the population living on less than \$3.20 a day at 2011 international prices.’

Second, the same criteria were applied to the abstracts of the articles retained in the first stage. Third, the full text articles and articles without abstract availability in the previous stages were evaluated. Thus, 17 publications were selected (see Prisma flow diagram by Moher et al., in Figure 1).⁵

Mass media analysis

For additional relevant information, 93 newspaper reports (until 1 May 2020) from the six countries were collected by our local collaborators ('Covid-19 team') using similar inclusion/exclusion criteria as the literature review. Languages included were English, Spanish, and Korean.

To assess the intensity of lockdown measures in the target countries, the 'Stringency Index' of the strictness in governmental policies was calculated from the following indicators: closure of schools, workplaces,

public events, and public transportation; restrictions on gatherings, internal movements, and international travel; and quarantine requirements. Computation of the index followed the methodology described by Hale et al.⁶ To estimate the 'Stringency Index', data of government responses in our target countries provided by the Oxford COVID-19 Government Response Tracker were used.⁷

Data management and analysis

Data extraction of the 17 studies selected in the literature review as well as of the 93 newspaper articles/TV reports was performed using a separate spreadsheet for each review which included the following items: authors, year of publication, country, study design or type of document (newspaper articles, TV reports), status of the publication, methodology (only for

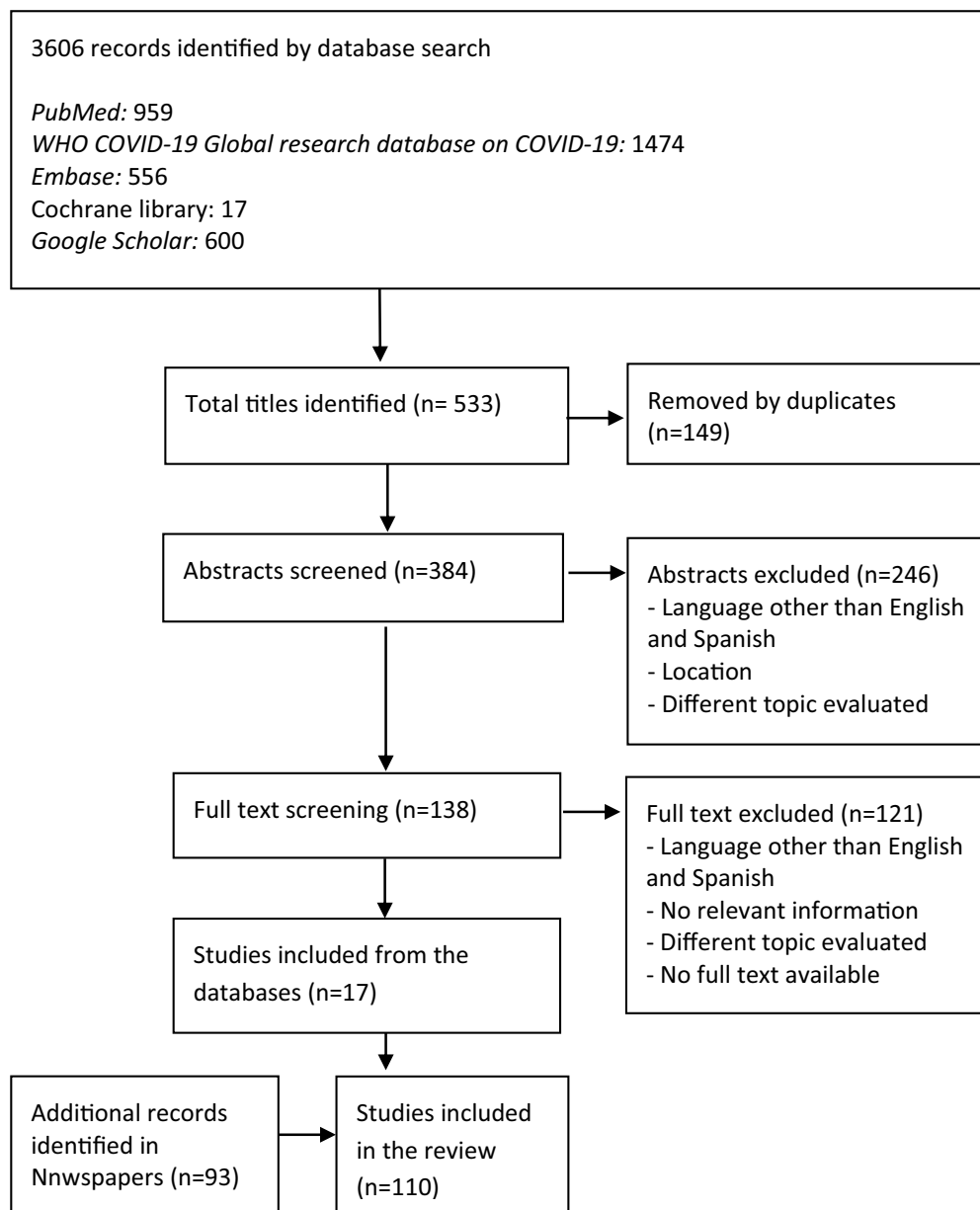


Figure 1. Selection of studies in the literature review.

scientific studies) and results (media reports, supplementary Table 1; literature review).

No attempt was made to assess the quality of included studies, due to the nature of the review, however the inclusion and exclusion criteria applied to the scientific literature in the search defined the quality of the included papers. A narrative description is presented in the results section together with the information from newspaper articles.

In the following text, the newspaper articles are referenced with their ID numbers in the data summary sheet in square brackets (see references from the supplementary material). The papers from the literature review and other references are cited in upper-case letters and referenced at the end.

Ethics approval

Only secondary data were analyzed with the exception of personal observations by our 'Covid-19 Team'. The study was approved by the ethics committee of Freiburg University.

Results

Areas of concern in the fight against the Covid-19 pandemic

'The lockdown was sudden and not accompanied by effective social security measures' [1] was often mentioned in our study countries. Nepalese people felt that the information received was accurate but that there was no experience with and therefore no clear strategy in dealing with the crisis.^{8,9} In India there were

contradictory perceptions; some were surprised about the sudden lockdown, while others thought it and other restrictions came late, particularly the travel restrictions from high-risk areas.^{10,11}

Another common concern was related to the poor: 'If the government does not ensure to feed the hungry, there will be more deaths due to starvation than due to Covid-19' (Nepal [61]). A study in Colombia showed that sustainable solutions for all are needed, not just short-term attempts to cope with the sick.^{12,13}

This leads to the question if the forced lockdown [2] was a feasible strategy in LMICs where the informal economic sector is predominant, and the poverty levels are high (Table 1). The lockdown in our study countries followed the European-Chinese model, with measures being particularly intense in India and Colombia (Figure 2) and less stringent in South Korea. The experiences and lessons learned are presented under the following headings: Vulnerable groups, impact of the lockdown on people, their business and way of life, and mitigation strategies by the government.

Vulnerable groups, an overview

Vulnerable population groups are those at a higher risk of suffering economic hardship or damage to their living conditions due to lockdown measures (societal view) or those who have a higher risk of dying due to the Covid-19 infection (medical view). The most vulnerable groups as identified by the literature review and mass-media analysis consist of:

- Migrant workers
- Refugees and asylum seekers
- Urban poor, homeless

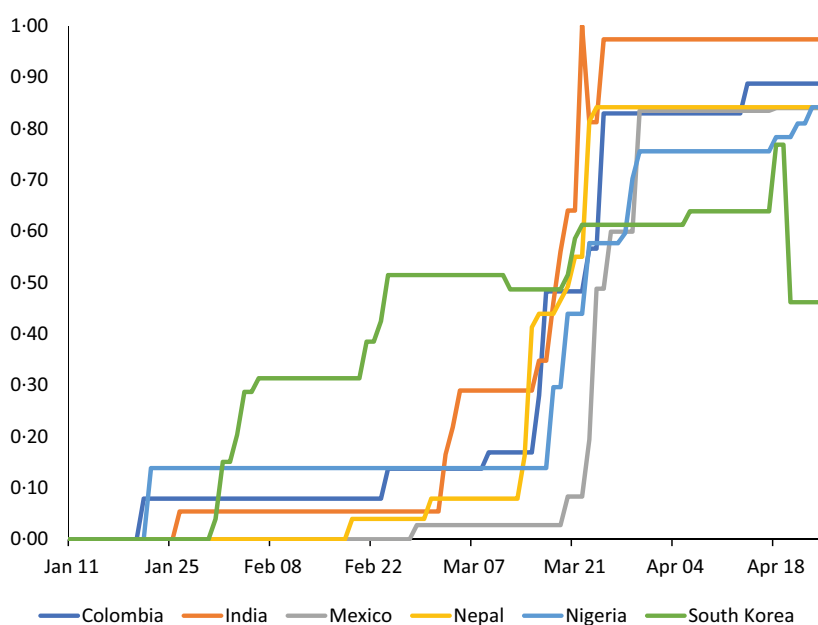


Figure 2. The stringency index showing the level of containment measures by country. * Index of stringency of government responses to COVID-19; elements include Closures in schools, workplaces, public events, and public transportation; Restrictions on gatherings, internal movements, and international travels; and the quarantine requirements.

- Workers in the informal economic sector
- Sex workers
- Women & children
- Religious groups and indigenous communities
- High-risk groups for severe disease (elderly, chronic diseases, immunocompromised and others)

Impact of the confinement policy in LMICs

i) Impact on people's environment (crowding, high temperatures, limited mobility)

The difficulties or impossibility of physical distancing in hot climates under crowded living conditions were frequently reported. People's knowledge about physical distancing was satisfactory in Nigeria, but due to their jobs which require physical contact it was impossible to implement.^{14,15} In Indian slums where six people live in one room and share a bathroom and toilet with many other families, or in Nigerian slums where eight people live in one room [46,44] physical distancing is not a viable option.^{16,17} In most of the LMICs, 'social distancing is a privilege of the middle class' [58]. In Colombia, more than 5 146 197 houses have space deficiencies.¹⁸

Heat and water shortage are other concerns. Hot rooms without air-conditioning are unbearable particularly for children [40]. Water shortages in deprived areas do not allow for frequent hand washing or excessive water consumption in middle class families during home quarantine, and is threatening the water supply in dry areas [3].^{16,19}

A drastic increase of domestic violence was observed during the lockdown period, mainly against women [4,5,6] and children [7,8]. In Mexico this type of violence increased by 27% within 3 months [6]. In Colombia the number of emergency calls by women increased by 76% [4] and domestic violence and crimes against women went up by 103% compared to the same month in the year before, pushing the government to provide shelter for victims [9].

Home office and home schooling were also an area of concern, as they were reported to only be feasible for richer families who have a computer and internet connection at home, and do not depend on school feeding programs [10, 71]. Also, teachers reported having difficulties using electronic equipment to teach their students in Colombia [10].

ii) Impact on the informal economic sector

A large proportion of the economy in LMICs is based on the informal sector: daily wage earners, street vendors, artisans, migrant workers, refugees, sex workers and others. They were the first to suffer: 'No work, no food' (Colombia [41]) or 'I prefer to die from Corona virus and not from hunger' (Nigeria [50]). Due to lockdowns, these workers not only saw no customers but also had no transport available to get to their work (Colombia [11]). This situation was also described in

the other countries (India^{10,20}, Colombia [11-15], Nigeria [47], and Mexico [16]). Also, an increased risk of child labor, sexual exploitation or forced child marriage in families who struggled to feed their members was mentioned [47, 48].

Violent acts of vandalism have been reported, where food trucks were looted (Nigeria [81] and Colombia²¹) or food vendors were attacked by the hungry crowd. Making management of confirmed cases of Covid-19 more complicated, many people in the informal sector have no medical insurance (India [17] and Nepal [58]) and cannot afford medical treatment.

iii) Impact on migrant workers and refugees

Migrant workers or refugees are particularly vulnerable in the lockdown strategy. They are often not officially registered and not entitled to receive governmental benefits (Nepal [17] and Colombia [42]). With the lockdown, most of them lost their jobs, were fired by their landlords and no longer had access to charity food provisions [65], prompting them to attempt to return to their states or countries of origin. The large number of Nepali migrant workers in India, and Venezuelan migrants in Colombia, 90% of which were working in the informal sector at the time [41] were brought by buses [38] or forced to walk [41] to the border without any physical distancing. In India, migrant workers were sprayed with disinfectants or not allowed to cross the border because of the fear of infection. On the other side of the border, Indians in Nepal, wanting to get back to their country were detained and not allowed to cross. Both governments provided food and shelter [62]. In Colombia, 14 000 Venezuelans arrived in the border cities; many more came from Ecuador, Peru or Brazil.²² Due to overcrowding, social distancing was impossible. Additionally, due to the closure of charity food provisions and small food traders, there was an intense food shortage at the borders [65]. Those who crossed the border had still a long way to get home.

Internal migrant workers, those who came from rural areas to get a job in the cities, were at risk as well. After the sudden lockdown large numbers of them tried to get home to their villages – reported in India, Nepal and Nigeria, but they were stuck either because of the travel ban in India [18] or overcrowded public transport in Nepal [38]. Many of them tried to walk home, but after some casualties, the government in Nepal was obliged to transport them [43].

iv) Impact on small businesses

Small businesses were among those who suffered the most from the lockdown strategy.²³ In Mexico many were unable to pay taxes or had to close their businesses [19-21] and/or had to reduce staff [19,22,23]. The same occurred in Colombia, India, and the other countries [22,53,59].¹⁹ Nepal suffered from the crash of the tourist industry and, just as the other

countries, from the reduction of import, export, employment and increased inflation including increase in food prices.^{19,23,24}

v) Impact on social cohesion

In some of our study countries, it was observed that the pandemic is unveiling social and economic inequalities. Examples are: Covid-19 'could set women back decades in gender equality' [107] or 'exposed inadequacies in Nigeria's social protection system' [48] or fueled religious conflicts in India [66].

vi) Impact on peoples' anxieties

In Nepal and India, people were 'upset, restless and sad with the unexpected lockdown'⁹⁹. The uncertainty of what will happen next made them feel nervous, stressed and worried, prompting many to ask for mental health care.^{10,26,27} Some reports showed a fear of getting infected from health staff, particularly in Mexico [24], Colombia [25] and India [26]. But fear also worked the other way around: hospitals refused to accept fever patients [39].⁸ These fears were particularly serious, as fear can lead to extreme actions such as attempted suicide [51] or resorting to traditional healers [52].

vii) Impact on peoples' creativity (Survival strategies)

A number of reports describe peoples' adaptive capacity to the new situation. In Mexico, small businesses avoided closing down by taking up new businesses, such as transporting medical equipment [20], selling face masks, or producing furniture [23]. Many also switched to online businesses: to sell medical and funeral equipment [27] or other goods. In Colombia, sex workers began selling fruits and vegetables to compensate for the lack of income [28]. In India, prisoners produced face masks [67] and in South Korea restaurants organized drive-through services for customers to avoid human contact [77].

viii) Impact on peoples' instinct: Corruption and exploitation

Misuse of public resources when responding to the negative impact of containment were reported from several places. To these belonged overpricing of food packages, cleaning kits, or medical equipment, mismanagement of funds; and excessive prices for medical care in private hospitals [29–33, 57]. In Colombia, socio-economic and emergency contracts were misused even by the Army.^{28, 29}

Governmental (and private) mitigation strategies

i) Cash, food, shelter

Mitigation strategies include supportive packages to businesses, hospitals and the poor as well as early payments of pensions and delay of tax payments.^{8, 9, 17} However, in the poorer countries, the government support has been described as being grossly insufficient^{30,40,41}. In Nigeria, the social protection system is under-financed, and excludes the poorest part of the population [47, 48]. Nigeria has provided cash

relief to 3.6 million poor households, but 95.9 million people are living in extreme poverty [62]. Even those who received the relief payment received it in a lump sum, which is only enough to cover the cost of living for less than a week. Often the promised help did not materialize leading to demonstrations [64]. In Nepal, the banks extended repayment deadlines, but no relief packages for the poor were considered [61]. In several countries, landlords were obliged to not evict their tenants, or to waive the rent for 3 months [54, 55] but this was often not adhered to [54].

Private sector donations became more common, for instance through online donor platforms in Nigeria [62].

ii) Health services interventions

Descriptions of weak health systems with limited capacity to cope with large numbers of severely sick patients illustrated a difference from the HICs. Complaints were particularly mentioned in Nigeria – where the upper class usually goes for medical treatment to HICs [49], but also in Colombia [11], Nepal^{9,10}, and even Mexico.³⁰

The shortage of ICU-beds and of protective clothing was reported in all countries [82, 46] but also the construction of provisional treatment units.^{8, 31}

Alternative approaches in South Korea and Kerala, India

i) South Korea

Although South Korea had opted for a slightly different prevention strategy – namely to find infection chains early through mass testing, and put these in isolation- a certain level of physical distancing and quarantine was introduced (see [Figure 2](#)) which led to similar damage on vulnerable groups as in the LMICs, but to a lesser extent. Vulnerable populations (e.g., elderly, low-income households, disabled, homeless, and refugees) suffered from lack of food, shelter and workplaces [71] due to closing of shelter homes and social welfare centers. Particularly the homeless, children belonging to low-income households, and disabled people did not get food [71] or cleaning support [75, 76]. The elderly often suffered from depression due to the shutdown of community welfare centers [70, 75].

At a later stage, restaurants and hotels [77,79] and small businesses were hit by the lockdown measures and subsequently suffered from layoffs, unpaid leave of absence, and sales decline, affecting particularly those that were self-employed [69,73,77–79].

There were major endeavors by public and private institutions to limit the impact of the lockdown measures as much as possible (see the moderate stringency index for South Korea in [Figure 2](#)). In particular, private and public organizations started distributing facial masks and hand sanitizers as well as emergency food kits to vulnerable populations [75, 78]. Free meals were replaced by lunch-box deliveries [76]. There were support activities for workers in the informal sector [87,

88]. To ease the debt burden of vulnerable groups, repayments were postponed [88]. The general public collaborated by using face masks and keeping physical distance [72, 77]. Social peace was maintained, and no major violent acts were reported.

ii) Kerala State in India

Kerala started mitigation activities very early, including preparing initial protocols, setting up technologies for contact tracing and quarantine [34]. Rapid testing was organized, following the example of South Korea. Kiosks were set up which collect samples within 2 minutes [35]. In addition to aggressive testing and contact tracing, the state also introduced, an extended quarantine period from 14 to 28 days and established treatment centers [36]. The 'Break the chain' campaign was declared urging people to follow physical distancing and personal hygiene recommendations [82]. Wash basins with liquid soap were installed at bus stops for handwashing [81]. Health workers are protected by masks, used sanitizers and followed other preventive measures [60].

The Kerala government announced an economic relief package of 2.6 billion USD and made a great effort to prevent food scarcity: 1200 community kitchens were set up where meals were provided for free [60]. The government of Kerala distributed 30 kg rice and 5 kg wheat per family to poor families along with providing them with free shelter [68]. Thousands of homes were built to accommodate stranded migrant workers. Inmates in jail stitched masks and prepared sanitizers [67]. To support working from home, the state government cooperated with internet providers to increase network capacity and declared relaxations in loan repayments and rents. Two months of advanced payment of pension was also introduced [67].

The measures were successful, with Kerala being the first state with a decline of new infections and a low case-fatality rate [83]. Social peace was maintained.

Discussion

The review has mainly focused on the negative socio-economic impact of the lockdown measures in the LMICs. From our analysis, we can see how particular groups suffered more from lockdowns and other restrictions than others in LMICs. Implementing a medical-epidemiological model to fight the spread of the disease led to often disastrous consequences in the LMICs, which eventually resulted in lifting the measures.

Containment strategies in LMICs and HICs: what makes the difference in the Covid-19 response?

Many hardships created by the containment strategy in LMICs are also occurring in the lower socio-economic classes of the rich countries. In the USA, a disproportionately high percentage of poor Afro-

Americans were infected or died of Covid-19 in several States.³² In New York, 'black and Latino people are dying at twice the rate of white non-Hispanics and low-income neighbourhoods have seen the largest case counts'.³³ Likewise, the impact of the lockdown policies on small businesses is also seen in HICs such as the US, where within 4 weeks, 22 Million people filed jobless claims which – as in LMICs – is 'exposing hidden weaknesses in the U.S. economy'.^{33,34} The mass exodus from urban to rural areas has happened to a smaller extent in big cities of the UK, not due to hunger as in the LMICs, but because people prefer the pleasant countryside during lockdown.³⁵

Thus, examples for the described impact of the lockdown in LMICs (on living conditions, the informal economic sector, migrant workers/refugees, small businesses, social cohesion, peoples' anxieties, their creativity and bad instincts) can also be found in HICs, but the magnitude of the impact makes the difference. The USA has a GDP of 54 471 USD per capita versus 2,741 in Nepal, or 5,316 in Nigeria. The US has a self-employment rate of 6.3% compared to around 80% in Nepal, Nigeria and India (Table 1). Countries with an important informal economic sector, a high proportion of migrant workers, and a weak social system are particularly vulnerable to social distancing measures. The desperate reactions by the poor in Nigeria and Colombia (looting, shop lifting) are an example [90].³⁶

The second difference between HICs and LMICs is given by the surge capacity or resilience to the pandemic threat which is related to the ability of governments to release a substantial amount of resources in support of the populations most affected by the containment and mitigation measures. While in LMICs the coronavirus economic relief packages are moderate to poor – as seen in our review, the HICs can afford much more generous alleviation policy, such as the 2.2 trillion US Dollar CARES Act that was passed in the US.³⁴

Differences in impact and resilience require different response policies: Excess Covid-19 mortality or excess malnutrition and human suffering?

LMICs are facing the dilemma of whether to opt for one or the other extreme: strict virus transmission control through physical distancing and quarantine ('flatten the epidemic curve'), while, waiting for a vaccine or a drug, versus relaxed transmission control with a focus on the vulnerable groups, investing in the improvement of the hospital infrastructure and waiting for the herd immunity to end the epidemic. The collateral damage of the first approach will likely be the long-term increase of malnutrition and human tragedies but potentially benefit from a lower mortality if the health services available are of a reasonable quality. The collateral damage of the second approach will be a higher short-term mortality but will potentially benefit from a better health infrastructure, if the

government invests in the health sector, and less societal and economic disruption.

The third option: learning from alternative strategies

South Korea, (following a similar route as Hong Kong, Singapore and Taiwan) and Kerala State in India (following the South Korean approach but with much stricter quarantine rules) may offer an alternative for middle-income countries. They both are economically stable (see Table 1 for South Korea) and have well-established governance systems which allow quick and efficient responses to unusual events. Table 1 indicates the high proportion of people with vulnerable employment in India, Nigeria, and Nepal (above 70%) compared to South Korea (less than 20%). In South Korea, the massive testing policy with contact tracing and isolation of suspected individuals has shown its benefits avoiding a strict lockdown. Kerala opted for a combination of massive testing, quarantine and support for the poor with positive short-term effects; however, the long-term economic and social effects are yet to be determined.

The tests are expensive (>100 USD per test) and therefore not affordable for mass testing in LICs [93]. Therefore, the only currently available strategy in LMICs (with a high proportion of the informal economic sector) seems to be to follow the Swedish model, where the lockdown is recommended but not compulsory [92]. Currently, the Indian government follows a similar strategy [91].

At the time of the study, there were not many alternative strategies employed by one country or the other (with the exception of South Korea and Kerala, where the model is not applicable in LICs). Even now, several months later, we are starting to learn in HICs, how much, a step-wise lockdown can contain the pandemic and what happens in the low-income countries if the original measures are lifted. Therefore, we conclude that there is a need for collaboration among countries with rapid exchanges of best practice examples of interventions and strategies. International and national policy-briefs and pandemic plans should be circulated among decision-makers and more widely communicated down to municipality levels in order to implement consistent strategies. Research should not exclusively focus on vaccine, drug or diagnostics development, but also identify the key strategies to be followed in the better-off and poorer countries.

Strengths and limitations of the study

As SARS-CoV-2 is a novel coronavirus and the Covid-19 pandemic was quite recent at the time of writing this study, we almost exclusively used electronic sources for information research and conducted secondary data analysis. The internet has the potential of being up-to-date and interdisciplinary. However, electronic sources also pose challenges for research, such as the lack of quality control and the high volume of data due to an immense number of sources. We met this issue by using data from official sources and verifying information on governmental websites. This ensured professional scientific quality of the study despite the use of general public media. The use of mass media also introduces reporting bias as the media tends to focus on the most salient events thereby neglecting others which are also important.

Conclusion

Our study has shown that vulnerable population groups, i.e., workers in the informal sector, small businesses, migrant workers, refugees, homeless, and others have to bear the largest burden of the pandemic, and that better organized societies are better prepared for mitigating the social impact. It is therefore strongly recommended that when deciding on outbreak response strategies, to take into account not only the impact on health but also on the society and its vulnerable population strata.

Declarations

Authors' contributions

DJC, AAA, SYJ, JV, AJ, MRB, PA, RCS, MAC, JMV and SDM collected the of Newspaper articles. TRR, AK and MAC conducted the systematic literature review. DJC, AAA and SYJ prepared the spread sheets. DJC, AAA and AK wrote the text with contributions from all authors. All authors contributed to the interpretation of mass media reports, and reviewed and approved the final manuscript.

Acknowledgments

We would like to extend our sincere gratitude to Eduardo Alfonso Sierra (Colombia), Hyemin Park (South Korea), Martin Anto (India), Professor In-Hwan Oh (South Korea), Ronald Skewes Ramm (Dominican Republic), and Dr. Arun Padmanandan (India) for contributing information and supporting the study.

Competing interests

The authors declare that they have no competing interests.

Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Dhia Joseph Chackalackal  <http://orcid.org/0000-0003-4600-9863>

Tatiana Rivera Ramirez  <http://orcid.org/0000-0002-4830-7795>

Maria Angelica Carrillo  <http://orcid.org/0000-0002-0876-289X>

Availability of data and materials

The datasets generated and/or analyzed during the current study are available as supplementary material in the Synapse repository, <https://www.synapse.org/#!/Synapse:syn22111631>.

References

- [1] González-Jaramillo V, González-Jaramillo N, Gómez-Restrepo C, et al. Impact of the COVID-19 pandemic on the Colombian population according to mitigation measures. preliminary data from epidemiological models for the period Mar 18to April 18, 2020. *Rev Salud Pública* 2020; published online Apr 7. <https://dx.doi.org/10.15446/rsap.v22.85789>.
- [2] Hale T, Webster S, Petherick A, et al. COVID-19 government response tracker. Blavatnik school of government. 2020 April 25 [cited 2020 May 04]. Available from: <https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker>. Data use policy: Creative Commons Attribution CC BY standard. Accessed 2020 May 04.
- [3] Ozili Peterson K COVID-19 pandemic and economic crisis: the Nigerian experience and structural causes. *Social Science Research Network* 2020; published online Apr 3. [10.2139/ssrn.3567419](https://doi.org/10.2139/ssrn.3567419). Accessed 2020 May 04.
- [4] Schwarz R Nächstenliebe im Souterrain. *Neues-deutschland*. 2020 April 21 [cited 2020 May 06]. Available from: <https://www.neues-deutschland.de/artikel/1135762.obdachlose-und-corona-naechstenliebe-im-souterrain.html>.
- [5] Moher D, Liberati A, Tetzlaff J, et al. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *BMJ*. 2009;339(jul21 1):b2535.
- [6] Krieg C Ausgegrenzte hochrisikogruppe. *Neues-deutschland*. 2020 April 25 [cited 2020 May 06]. Available from: <https://www.neues-deutschland.de/artikel/1135913.coronavirus-ausgegrenzte-hochrisikogruppe.html>.
- [7] Ferguson NM, Laydon D, Nedjati-Gilani G et al. Report 9: impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand. Imperial college COVID-19 response team. Imperial College London. 2020 March 16. <http://10.25561/77482>. Accessed 2020 May 04.
- [8] Auerbach A, Thachil T. How clients select brokers. Competition and choice in India's slums. *American political science review*. Cambridge University Press:2018. Vol. 112: 4. 775–791. doi:10.1017/S000305541800028X
- [9] McKibbin W, Fernando R The global macroeconomic impacts of Covid-19: seven scenarios. *CAMA Working Paper*. 2020 April 19. doi: [10.2139/ssrn.3547729](https://doi.org/10.2139/ssrn.3547729).
- [10] Koirala J, Acharya S, Neupane M, et al. Government preparedness and response for 2020 pandemic disaster in Nepal: A Case Study of COVID-19. *Social Science Research Network* 2020; published online Mar 31. <https://ssrn.com/abstract=3564214> DOI:10.2139/ssrn.3564214. Accessed 2020 April 29.
- [11] Koirala J, Acharya S Impact of novel corona virus (COVID-19 or 2019-nCoV) on Nepalese economy. *Social Science Research Network* 2020; published online Mar 25. <http://dx.doi.org/10.2139/ssrn.3560638>. Accessed 2020 April 29.
- [12] Barkur G, Vibha KGB Sentiment analysis of nationwide lockdown due to COVID 19 outbreak: evidence from India. *Asian J Psychiatr* 2020; published online ahead of print Apr 12. [10.1016/j.ajp.2020.102089](https://doi.org/10.1016/j.ajp.2020.102089). Accessed 2020 May 06.
- [13] Chaurasiya P, Pandey P, Rajak U, et al. Epidemic and challenges of coronavirus disease-2019 (COVID-19): India response. *Social Science Research Network* 2020; published online Apr 7. <http://dx.doi.org/10.2139/ssrn.3569665>. Accessed 2020 May 05.
- [14] Paternina-Cacedo AJ, Choisy M, Garcia-Calavaro C, et al. Social interventions can lower COVID-19 deaths in middle-income countries. *MedRxiv* 2020; published online ahead of print Apr 23. [10.1101/2020.04.16.20063727](https://doi.org/10.1101/2020.04.16.20063727). Accessed 2020 May 06.
- [15] Park SW, Sun K, Viboud C, et al. Potential roles of social distancing in mitigating the spread of coronavirus disease 2019 (COVID-19) in South Korea. *MedRxiv* 2020; published online ahead of print Mar 30. [10.1101/2020.03.27.20045815](https://doi.org/10.1101/2020.03.27.20045815). Accessed 2020 May 04.
- [16] Contraloría General de la Nación [Controller General of the Nations]. Por presuntos sobrecostos en contratación de emergencia por Covid-19: Contraloría abre proceso de responsabilidad fiscal por \$1.050 millones contra gobernador de arauca y ordena 27 indagaciones preliminares en otros casos [for alleged cost overruns in emergency contracting for Covid-19: CGR opens \$ 1.05 billion fiscal responsibility process against Governor of Arauca and orders 27 preliminary inquiries in other cases]. In: Boletín de prensa-2020 [Internet]. 2020 April 24 [cited 2020 May 04]. Available from: https://www.contraloria.gov.co/contraloria/sala-de-prensa/boletines-de-prensa/boletines-de-prensa-2020/-/asset_publisher/9IOzpebPkrRW/content/por-presuntos-sobre-costos-en-contratacion-de-emergencia-por-covid-19-contraloria-abre-proceso-de-responsabilidad-fiscal-por-1-050-millones-contra-gobe.
- [17] Dattilo W, Castro ESA, Guevara R, MacGregor-Fors I, Pontes RS. COVID-19 most vulnerable Mexican cities lack the public health infrastructure to face the pandemic: a new temporally-explicit model. *MedRxiv*. 2020; Apr 14. published online ahead of print. DOI:10.1101/2020.04.10.20061192
- [18] Eligon J, Burch ADS, Searcey D, et al. Black American face alarming rates of coronavirus infection in some states. *The New York Times*. 2020 April 07 [cited 2020 May 06]. Available from: <https://www.nytimes.com/2020/04/07/us/coronavirus-race.html>.

- [19] Olapegba PO, Ayandele O, Kolawole SO, et al. Preliminary assessment of novel coronavirus (COVID-19) knowledge and perceptions in Nigeria. *MedRxiv*. 2020; Apr 19 published online ahead of print. DOI:10.1101/2020.04.11.20061408.
- [20] Ministerio de Relaciones Exteriores, Colombia [Ministry of Foreign Affairs, Colombia]. Informe oficial 29 de Abril 2020 [Official report 2020 Apr 29]. [cited 2020 May 04]. Available from: <https://www.migracioncolombia.gov.co/noticias/265-abril-2020/no-podemos-permitir-que-la-salida-desordenada-de-venezolanos-ponga-en-riesgo-al-pais>.
- [21] Koshle H, Kaur R, Basista R Breakdown of business and workers in India: impact of Corona Virus. *Social Science Research Network* 2020; published online Mar 20. 10.2139/ssrn.3557544. Accessed 2020 May 05.
- [22] Hale T, Angrist N, Kira B, et al. Variation in government responses to COVID-19. Version 5.0. Blavatnik school of government working paper. 2020 April 29 [cited 2020 May 04]. Available from: <https://www.bsg.ox.ac.uk/research/publications/variation-government-responses-covid-19>.
- [23] Roy D, Tripathy S, Kar SK, et al. Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic. *Asian J Psychiatr*. 2020; Apr 8;51. published online ahead of print. DOI:10.1016/j.ajp.2020.102083.
- [24] Koirala J, Acharya S, Neupane M perceived stress in pandemic disaster: a case study from India and Nepal (April 4, 2020). *Social Science Research Network* 2020; published online Mar 25. <http://dx.doi.org/10.2139/ssrn.3568388>. Accessed 2020 April 29.
- [25] Nwafor JI, Aniuoku JK, Anozie BO, et al. Knowledge and practice of preventive measures against COVID-19 infection among pregnant women in a low-resource African setting. *MedRxiv*. 2020; Apr 20. published online ahead of print. DOI:10.1101/2020.04.15.20066894
- [26] Avila A Los saqueos y los problemas de seguridad con la cuarentena [looting and security problems with quarantine]. *Revista Semana*. 2020 April 02 [cited 2020 May 04]. Available from: <https://www.semana.com/opinion/articulo/los-saqueos-y-los-problemas-de-seguridad-con-la-cuarentena-columna-de-opinion-ariel-avila/660859> Accessed from: 2020 Apr 30
- [27] Saenz JC corrupción, la pandemia en el COVID-19 que se busca frenar a tiempo [corruption, the pandemic in COVID-19 that seeks to stop in time]. *Diario El Espectador*. 2020 April 19 [cited 2020 May 05]. Available from: <https://www.elespectador.com/coronavirus/corruptcion-la-pandemia-en-el-covid-19-que-se-busca-frenar-tiempo-articulo-915484>.
- [28] World Health Organization. Report of the WHO-China joint mission on Coronavirus disease 2019 (COVID-19). 2020 February 16–24 [cited 2020 May 04]. Available from: <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>.
- [29] Umoh JM, Nseobot IR, Hamid Y, et al. COVID-19 city locked down: implications on human welfare in developing countries. *Social Science Research Network* 2020; published online Apr 17. <https://ssrn.com/abstract=3578134>. Accessed 2020 May 05.
- [30] El Departamento Administrativo Nacional de Estadística (DANE), Colombia [The National Administrative Department of Statistics, Colombia]. Comunicado de prensa del 16 de abril, 2020: Deficit Habitacional [Press release of April 16, 2020: Housing Deficit] 2020 April 16. [cited 2020 May 04]. Available from: <https://www.dane.gov.co/index.php/en/estadisticas-por-tema/demografia-y-poblacion/deficit-habitacional>.
- [31] Koirala J, Acharya S Economic impact of COVID-19 in Nepal: a question of bad or worst. *Social Science Research Network* 2020; published online Apr 21. 10.2139/ssrn.3580840. Accessed 2020 April 30.
- [32] Adhikari A, Narayanan R, Dhorajiwala S, et al. 21 days and counting: COVID-19 lockdown, migrant workers, and the inadequacy of welfare measures in India. *Stranded Workers Action Network*. 2020 April 15 [cited 2020 May 04]. Available from: <https://ruralindiaonline.org/library/resource/21-days-and-counting-covid-19-lockdown-migrant-workers-and-the-inadequacy-of-welfare-measures-in-india/>.
- [33] Avila A Los saqueos y los problemas de seguridad con la cuarentena [looting and security problems with quarantine]. *Revista Semana*. 2020 April 02 [cited 2020 May 04]. Available from: <https://www.semana.com/opinion/articulo/los-saqueos-y-los-problemas-de-seguridad-con-la-cuarentena-columna-de-opinion-ariel-avila/660859>.
- [34] The New York Times. The pandemic's uneven economic toll [Internet]. 2020 April 23 [cited 2020 May 06]. Available from: https://uk.news.yahoo.com/coronavirus-lockdown-250000-left-london-141501319.html?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQ.
- [35] Gura D Another 5 million people filed jobless claims last week, bringing total to almost 22 million in one month. *NBC News*. 2020 April 16 [cited 2020 May 06]. Available from: <https://www.nbcnews.com/business/business-news/another-5-million-people-filed-jobless-claims-last-week-bringing-n1185056>.
- [36] Martin G UK Coronavirus: nearly 250,000 people left London for rural areas ahead of lockdown. *Yahoo News UK*. 2020 April 19 [cited 2020 May 06]. Available from: https://uk.news.yahoo.com/coronavirus-lockdown-250000-left-london-141501319.html?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAJZouAL5m2GVcdCKWwpce-l1ibz72eAQ1lzl7WYcdelbKr7nLxOo3ysR8e9gO4rOfdkONzhcDlidWxallM61QZitWg64VIAXb9T7Hu7NGWi-apQSxkMz2KyCCWX2DUFnxyl-1i5-4yfae-7DFX8ea8-0svnnDG3qfACrhIMsb3nd.