

Is the press properly presenting the epidemiological data on COVID-19? An analysis of newspapers from 25 countries.

Luciano Serpa Hammes (✉ luciano.hammes@hmv.org.br)

Hospital Moinhos de Vento

Arthur Proença Rossi

Universidade Luterana do Brasil

Luana Giongo Pedrotti

Hospital Moinhos de Vento

Paulo Márcio Pitrez

Hospital Moinhos de Vento

Mohamed Parrini Mutlaq

Hospital Moinhos de Vento

Regis Goulart Rosa

Hospital Moinhos de Vento

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Abstract

We conducted a cross-sectional study to assess how newspapers from 25 countries are comparing and presenting COVID-19 epidemiological data to their readers.

Of 75 newspapers evaluated, 51 (68%) presented at their websites at least one comparison of cases and/or deaths between regions of their country and/or between countries. Quality assessment of the comparisons showed that only a minority of newspapers adjusted the data for population size in case comparisons between regions (37,2%) and between countries (25,6%), and the same was true for death comparisons between regions (27,3%) and between countries (27%). Of those making comparisons, only 13,7% explained the difference in the interpretation of cases and deaths. Of 17 that presented a logarithmic curve, only 29,4% explained its meaning.

Although the press plays a key role in conveying correct medical information to the general public, researchers and journalists need to work more closely together to provide more accurate information.

Introduction

On February 15, 2020, the World Health Organization (WHO) Director-General Dr Tedros Adhanom Ghebreyesus said, "We're not just fighting an epidemic; we're fighting an infodemic," in reference to the fact that, amid the COVID-19 pandemic, we have witnessed the spread of a lot of incorrect information daily on social media, reaching millions of people [1,2]. There is an international campaign to use the traditional media as a source of trust-based secure information, such as newspapers. The WHO, since before the COVID-19 pandemic, has reinforced the important role of the press in combating the spread of misinformation [3,4]. Newspapers carry a great deal of responsibility as there is evidence that their reports influence the decisions not only of the general public but also of health professionals, stakeholders, and scientists [5,6].

In this context, the number of cases and deaths due to the pandemic are invariably compared between regions of the same country and between countries. But is the press, which reaches millions of people every day, managing to decipher and refine epidemiological information and present it in an appropriate way to readers?

The purpose of this study was to evaluate whether major newspapers around the world are adequately comparing the epidemiological data on COVID-19 from different regions/countries and whether they are guiding readers to properly interpret the pandemic numbers.

Materials And Methods

Study Design and Participants

We conducted a cross-sectional study in which the top 3 newspapers from 25 countries were evaluated for the quality of presentation of comparisons of COVID-19 epidemiological data. The 15 countries with the largest number of deaths adjusted for population size and the 10 most populous countries that were not on this initial list were selected, according to the European Center for Disease Prevention and Control, accessed on 23/May/2020.

We selected the newspapers with the highest circulation in each country, without an eminently sporting character, according to the best ranking index available. For each newspaper, 2 independent raters identified the website that each newspaper created to report COVID-19 data. Firstly, the raters explored the newspaper's website for news, and then used the Google search engine in the local language. Where newspapers had more than one website, all of them were included in the analysis. Disagreements between the 2 raters were resolved by consensus. There were no language restrictions. Texts written in languages other than English, Spanish, and Portuguese were translated using Google Translator (CA, United States).

Data Collection

Newspapers were included if they presented at least one table, graph, or map comparing cases and/or deaths between regions of a country or between countries on a website dedicated to COVID-19. The quality of data presentations was determined based on the answers to the following questions: 1) Have the numbers been adjusted for population size?; 2) Have the start dates for comparisons been adjusted for a common milestone across regions/countries (e.g., from a % of cases in the population)?; 3) Has a logarithmic curve been presented?; 4) If so, has its meaning been explained?; and 5) Has an explanation about the assertiveness of cases and deaths been provided? We considered each question as positive if one table, graph, or map fulfilled the above criteria at least once in a comparison.

Additionally, the same process was used to evaluate the data reported by the governments of each country (e.g., Ministry of Health and health authorities).

Finally, the number of website hits was assessed using web analytics from SimilarWeb (Tel-Aviv, Israel).

Statistical Analysis

We followed the Reporting of Observational Studies in Epidemiology (STROBE) guidelines. The data were expressed as absolute and relative frequencies of compliance with the requirements. Pearson's chi-square test was used to compare proportions, and the significance level was set at 5%. [7]

Role of the funding source

This study was funded by the authors and they declare no conflicts of interest.

Results

A total of 75 newspapers and 25 official bodies were evaluated between 23/May/2020 and 7/Jun/2020. The list of evaluated newspapers and the ranking index used to select them in each country are shown in **Table 1**. Together, the websites of these newspapers received 4 473 396 452 visits in May 2020, for a total of 1 306 866 593 unique visitors.

Of a total of 75 newspapers analyzed, 51 (68%) presented at least one graph, table, or map comparing cases and/or deaths between regions of their country and/or between countries on a website dedicated to COVID-19, as shown in **Figure 1**.

A detailed description of the comparisons is shown in **Table 2**. On average, half of the newspapers presented a comparison of cases or deaths between regions of the same country or between countries. We also stratified these results according to the Human Development Index (HDI) of each country to check for important differences between newspapers, which were not of great magnitude among countries with very high, high, and medium HDI.

Quality assessment of the comparisons showed that only a minority of newspapers adjusted the data for population size in case comparisons between regions (16 adjusted [37,2%] of 43 comparisons) and between countries (10 [25,6%] of 39), and the same was true for death comparisons between regions (10 [27,3%] of 36) and between countries (10 [27%] of 37), as shown in **Table 3**.

Table 3 also shows that time adjustment, which allows the analysis of curves with different start dates, was even less used than population size adjustment. Likewise, a logarithmic curve was rarely presented, and only 5 (29,4%) of the 17 newspapers that presented a logarithmic curve for cases or deaths explained its meaning and its purpose.

We also analyzed the quality of data presentations on the official websites of health authorities in each country and identified many inconsistencies in the reporting of comparisons – for example, only 4 of 17 (23,5%) official websites provided the number of deaths relative to population size when comparing their regions.

It should be noted that cases and deaths differ conceptually in their registration, mainly because of the testing models adopted in each country/region. Countries with broader testing policies may have more cases due to measurement bias. However, only 7 (13,7%) of the 51 newspapers that presented at least one graph, table, or map of cases explained the difference between cases and deaths.

We showed at **Table 4** that the quality of data varied according to the country HDI. 27 (61,4%) of 44 newspapers from very-high/high HDI countries presented at least one graph, map or table with population-adjustment or time-adjustment or logarithmic curve. All newspapers (7) from middle/low HDI countries have not presented any type of adjustment.

We also assessed data sources used by newspapers for their comparisons. Johns Hopkins University (<https://coronavirus.jhu.edu/map.html>) was used by most (72,5%) of the newspapers that compared cases or deaths between countries (**Table 5**).

Discussion

The novel COVID-19 pandemic has permeated communities around the world at unparalleled rates. Simultaneously we are experiencing an infodemic of unseen proportions before, spreading misinformation faster and further, creating an environment of uncertainty and anxiety [8,9]. In this respect, the press is viewed as an important source of more in-depth, detailed, and instructive information for the population, translating technical and scientific information into plain language [10].

We evaluated newspapers from 25 countries and found that about 70% of them compared numbers of COVID-19 cases and/or deaths, demonstrating that these newspapers are interested in presenting epidemiological

information. We also observed that interest varied little across different countries, regardless of their level of development, suggesting that it is a general interest.

In the comparisons analyzed here, only 1 in every 4 newspapers adjusted the number of cases and/or deaths for population size, which would seem to be a minimum requirement for assessing populations of different sizes from different regions/countries. The newspapers also failed to explain the difference between cases (subject to availability of testing, types of tests, and testing policies) and deaths (more assertive). Only 13,7% of newspapers provided this information.

Failure to adjust the number of cases and/or deaths for population size has an important impact on the interpretation of the data. As a simple hypothetical example, consider the comparison of COVID-19 case graphs between Germany and Italy on 14/Jun/2020. It is concerning that Germany is very close to Italy, which is known to have been greatly impacted by COVID-19. Has Germany also been heavily affected by COVID-19? The answer is no. We must consider that Germany has a larger population than does Italy, and that its policy of mass testing has been much more aggressive. Therefore, the most appropriate way to analyze data is to compare the number of deaths (and not just cases) according to population size—the result would be as follows: Germany with 10,6 deaths/100 000 population vs Italy with 56,8 deaths/100 000 population. Unfortunately, this simple error was present in most of the analyzed newspapers. A small study of 5 newspapers from India identified the same situation, where numbers of COVID-19 deaths and cases were presented without a denominator and without context, showing the emotional appeal of the headlines [11].

Similarly, time adjustment, which would allow superimposing curves mainly in comparisons between countries, was absent in most of the comparisons analyzed. Even the websites of health authorities, referenced by many newspapers, failed to meet this requirement for high-quality comparisons. Making adjustments to allow time comparisons between countries is a very important part of the analysis, since the pandemic did not start at the same time in different territories.

One important fact to consider is that none of the newspapers from middle/low IDH countries presented population-adjustment or time-adjustment or logarithmic curve for comparisons of cases or deaths between regions or countries.

Our study has some limitations that need to be addressed. Our sample is limited to 3 newspapers per country, and, given the difficulty in determining the total circulation of newspapers in the world, we did not perform a sample size calculation. Some well-known newspapers were left out of the analysis because they were not among the top 3 with the highest circulation in the country. In addition, because there was no universal ranking index from where to select newspapers in each country, we used different sources. Our results may have overestimated the quality of comparisons – if a newspaper had several comparative graphs and only one of them had been corrected for population size, we considered that the newspaper had met this requirement.

We understand that newspapers need to present factual information in their issues, highlighting specific points to draw public attention, and that journalists have limited time to prepare the data for publication [12]. For this reason, we decided to evaluate graphs presented on websites developed by newspapers, which would be less prone to the daily pressure of producing the next issue on time.

There is sufficient evidence that poor health literacy in general affects how patients respond and manage their health problems and related fear, and it is independently associated with several undesirable health outcomes, including hospitalization, mortality, and health care cost [13]. This situation has worsened during the COVID-19 pandemic, with misinformation about the origin of the disease, risk factors, use of chloroquine and ibuprofen, in addition to an unclear perception of the pandemic data [14–16]. Also to be considered is the increase in depression and anxiety generated by the COVID-19 pandemic, exacerbated by continued overexposure to information about the disease, which has also been evidenced in other epidemics such as Ebola virus [17–20].

Newspapers are important not only to the public but also to scientists and stakeholders, whose decisions are also influenced by the media [5]. Two Cochrane reviews, for example, provided evidence that press coverage plays an important role in influencing the use of health services and the decision to adopt healthy behaviors [21,22]. Conversely, the press has been criticized for presenting specific information, often shallow, exaggerated and without context, highlighting only the benefits of interventions and not consistent with the medical literature. An important limitation has been evidenced in the present study: the lack of a sense of proportion [5,6,12].

We must consider the reach of the newspapers analyzed in this study, which together added up to more than 4 billion hits in a month. The only newspaper that met all requirements during the study period was El País from Spain, whose website deserves recognition for adjusting COVID-19 cases and deaths for population size and time evolution, in addition to presenting and explaining the meaning of logarithmic curves and highlighting the difference between cases and deaths.

To our knowledge, this is the first article to broadly analyze the approach of the media to the epidemiological data on COVID-19. For decades there has been a gap between researchers and the press [23–25]. As researchers, we have to support the press so that they can adequately report the data, providing accurate and correct information to the population. On the other hand, the press has to be more careful with the source of the publishing data in science and medical issues, promoting a closer relationship between scientists and journalists. Newspapers undoubtedly play a very important role in reporting technical information to their readers, and this article is an attempt to help newspapers improve the scientific quality of their publications.

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Tables

Table 1. List of selected countries and the respective newspapers analyzed

Country	Selected newspapers		
15 countries with the largest number of deaths adjusted for population size *			
Brazil ¹	Estadão	Folha de São Paulo	O Globo
Canada ²	Le Journal de Montreal	The Globe and Mail	Toronto Star
Ecuador ³	El Comercio	El Diario	El Universo
France ¹	Le Figaro	Le Monde	Le Parisien
Germany ¹	Bild	Frankfurter Allgemeine Zeitung	Süddeutsche Zeitung
Ireland ⁴	Sunday Independent	Sunday World	The Sunday Times
Italy ¹	Corriere Della Sera	La Repubblica	La Stampa
Netherlands ¹	Ad Dagblad	De Telegraaf	Meter
Peru ⁵	El Comercio	La Republica	Perú 21
Portugal ⁶	Correio da Manhã	Jornal de Notícias	O Expresso
Spain ¹	El Mundo	El País	La Vanguardia
Sweden ⁷	Göteborgs-Posten	Svenska Dagbladet	Sydsvenskan
Switzerland ⁸	20 Minuten National GES	Blick	Tages-Anzeiger
United Kingdom ¹	Daily Mail	The Sun	The Sunday Times
United States ¹	New York Times	The Wall Street Journal	USA Today
10 most populous countries, not included in the list with the largest number of deaths *			
Bangladesh ⁹	Bhorer Kagoj	Daily Ittefaq	Prothom Alo
China ¹⁰	Cankao Xiaoxi	People's Daily	The Global Times
Ethiopia ⁵	Addisfortune	State capital	The Reporter
India ¹⁰	Dainik Bhaskar	Dainik Jagran	The Times of India
Indonesia ¹¹	Detikcom	Kompas	Liputan6
Japan ¹⁰	Asahi Shimbun	The Mainichi Shimbun	Yomiuri Shimbun
Mexico ¹	El Gráfico	La Prensa	Rumbo de México
Nigeria ¹²	Leadership	The Guardian	The Punch
Pakistan ⁵	Daily Jang	Dawn	The News
Russian Federation ¹	Argumenty i Fakty	Komsomolskaia Pravda	Rossiyskaya Gazeta

For each country, the 3 newspapers with the highest circulation are presented in alphabetical order.

Ranking index: 1 - Statista; 2 - Alliance for Audited Media; 3 - Asociación Técnica de Diarios Latinoamericano; 4 - Audit Bureau of Circulations; 5 - manual se using Google search engine in the local language, "newspaper + relevance + country of interest", where the first results were selected; 6 - Associação Port para o Controlo de Tiragem e Circulação; 7 - Swedish Institute for Opinion Surveys; 8 - Werbemedienforschung; 9 - National Media Survey; 10 - World Assoc of Newspapers and News Publishers; 11 - Roy Morgan Research; 12 - The Report: Nigeria.

* Deaths and population size according to the European Center for Disease Prevention and Control, accessed on 23/May/2020.

Table 2. Presence of comparisons of deaths or cases in the newspapers analyzed according to their country's human development index (HDI).

	Country's HDI*				Total (N=75)
	Very high (N=42)	High (N=18)	Medium (N=9)	Low (N=6)	
Comparison of cases between regions of the same country†	29 (69,1%)	8 (44,4%)	5 (55,6%)	1 (16,7%)	43 (57,3%)
Comparison of deaths between regions of the same country	22 (52,4%)	7 (38,9%)	6 (66,7%)	1 (16,7%)	36 (48%)
Comparison of cases between countries	25 (59,5%)	8 (44,4%)	6 (66,7%)	0	39 (52%)
Comparison of deaths between countries	22 (52,4%)	9 (50%)	6 (66,7%)	0	37 (49,3%)

*2019 human development index (HDI) according to the United Nations. Cut-off points are: HDI of less than 0,550 for low, 0,550-0,699 for medium, 0,700-0, high, and 0,800 or greater for very high human development.

† Comparison was defined as the presentation of at least one graph, table, or map comparing cases and/or deaths between regions of a country and/or between countries.

Table 3. Quality of comparisons presented by newspapers and health authorities

Rated item	Newspapers* (N=51)	Health authorities* (N=23)
Comparison of cases between regions of the same country	(N=43)	(N=23)
Population-adjusted cases	16 (37,2%)	10 (43,5%)
Time-adjusted cases	5 (11,6%)	0
Logarithmic curve option	4 (9,3%)	0
Comparison of deaths between regions of the same country	(N=36)	(N=17)
Population-adjusted deaths	10 (27,3%)	4 (23,5%)
Time-adjusted deaths	4 (11,1%)	0
Logarithmic curve option	3 (8,3%)	0
Comparison of cases between countries	(N=39)	(N=6)
Population-adjusted cases	10 (25,6%)	1 (16,7%)
Time-adjusted cases	9 (23%)	1 (16,7%)
Logarithmic curve option	15 (38,5%)	1 (16,7%)
Comparison of deaths between countries	(N=37)	(N=6)
Population-adjusted deaths	10 (27%)	1 (16,7%)
Time-adjusted deaths	8 (21,6%)	1 (16,7%)
Logarithmic curve option	9 (24,3%)	1 (16,7%)

* A total of 75 newspapers and 25 health authorities were analyzed, but only those that made comparisons for specific items are presented here.

Table 4. Quality of comparisons presented by newspapers and health authorities according to their country's human development index (HDI)

Population-adjustment or time-adjustment or logarithmic curve for comparisons of cases or deaths between regions or countries	Newspapers			Health authorities		
	IDH Very High or High (N=44)	IDH Medium or Low (N=7)	p value*	IDH Very High or High (N=19)	IDH Medium or Low (N=4)	p value*
At least one adjustment at any comparison	27 (61,4%)	0	0,003	10 (52,6%)	0	0,053
No adjustment	17 (38,6%)	7 (100%)		9 (47,4%)	4 (100%)	

* Pearson's chi-square test

Table 5. Data sources used by newspapers for comparisons of cases and/or deaths between countries

Source	Newspapers comparing cases and/or deaths between countries (N=40)*
Johns Hopkins University	29 (725%)
European Center for Disease Prevention and Control	4 (10%)
World Health Organization	2 (5%)
Other	2 (5%)
Not available	6 (15%)

* A total of 75 newspapers were analyzed, but only those that made comparisons are presented here.

Figures

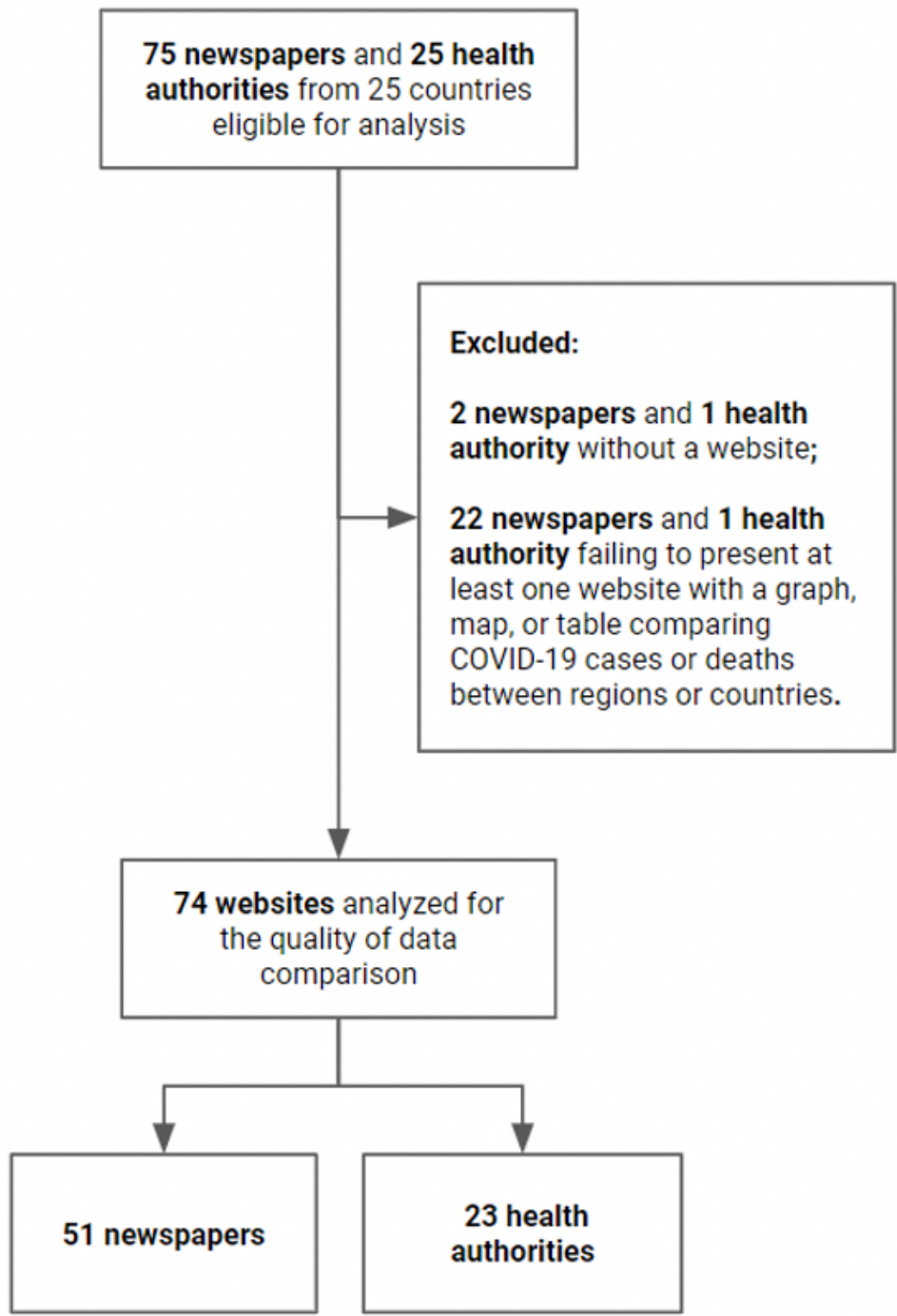


Figure 1

Flow diagram of study analysis