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COVID-19 misinformation: Accuracy of articles about coronavirus prevention mostly shared on social media

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ABSTRACT

Objective: To analyze accuracy of articles about COVID-19 prevention most frequently shared through social media platforms.

Methods: Identifying, using the Buzzsumo analytic tool, 30 most frequently shared articles in April 2020 about COVID-19 prevention and classifying them according to number of shares, accuracy, topic and sharing platform. Calculations were made using descriptive statistics tools and chi-square test.

Results: The top 30 articles about coronavirus prevention were shared 4904 160 times over a period of one month with 96.8% of all shares through Facebook. Most of the articles (80%) was found to be accurate, however they accounted for only 64% of shares. The inaccuracies referred mostly to handwashing. The most shared articles were about medications followed by masks and hand washing.

Conclusions: Articles about coronavirus prevention are usually accurate, yet relatively less likely to be shared than inaccurate ones. Facebook remains a dominant social media platform for sharing content. Buzzsumo could be considered a tool in certain situations such as pandemic for health authorities to quickly investigate different health topics popular on social media.

Lay Summary: Most of the articles about COVID-19 prevention, identified as most frequently shared through social media platform during the pandemic, was found to be accurate. However, inaccurate content was more likely to be shared than by Facebook users compared with accurate content. This suggests the need for health authorities to monitor content shared on social media in extraordinary situations such as pandemics.

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Introduction

The world came to a sudden and unprecedented halt in March 2020 when the global pandemic of coronavirus was declared by the World Health Organization [1] and the public realized COVID-19 is not a distant threat shown on the news but a real, deadly virus. Although Internet has been the first source of information for patients [2] and 63% of social media users have shared news and information between each other [3] for years, the coronavirus

managed to elevate the “infodemic” to another dimension. Only in February 2020, the Director-General of WHO said that “we are not just fighting an epidemic, we are fighting an infodemic” [4].

Despite many risks and challenges, the belief that social media could play a crucial role as a tool for dialog between authorities and citizens is becoming increasingly common [5]. They provide an opportunity for health professionals, medical doctors, experts and health organizations to encourage among communities and individuals more conscious decision-making related to health or treatment. On the other hand, spreading misleading or inaccurate information, especially about prevention during pandemic, may pose extraordinary risks for public health. Some studies already found that misleading health information are more likely to be shared on social media than accurate ones [6,7]. Ubiquity and power of social

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media make it an increasingly important part of public health and the coronavirus pandemic seems to only intensify processes that have been taking place before [8].

The aim of this study was to analyze the accuracy of articles about coronavirus prevention most frequently shared on social media.

Methods

We decided to identify 30 articles about prevention against coronavirus disease with the highest number of shares on social media (Facebook, Twitter, Pinterest, Reddit) using Buzzsumo, the online analytic tool. It is a data controller application that searches for articles based on keywords and provides data about number of shares on most popular social media platforms [9]. It has already been used for data collection in research papers, including ones in the field of medicine and public health [10,6].

The keywords were the three most commonly used terms for coronavirus [11]: „coronavirus“ or „COVID-19“ or „SARS-CoV-2“, each coupled with „prevention“ to select the most relevant articles. The application is able to combine results for all prevention related words (ex. prevent, preventing). We eventually excluded the „SARS-CoV-2 prevention“ keyword from further analysis as the number of results and shares were insignificant (<1% of other results). The criterion for including an article was that it contained some kind of a preventive advice. The excluded articles did not contain any preventive advice or recommendation and usually referred to news about various events such as government decisions about restrictions. Fig. 1 describes the selection process. The search was conducted on April 27, 2020 without any date restrictions.

Content evaluation for accuracy of each article was conducted independently by two researchers, public health experts. We classified each article as either “accurate”, “misleading” or “inaccurate” using the following criteria: “**accurate**” publications had to be consistent with either the latest WHO [1] or the Centers for Disease Prevention and Control (CDC) guidelines [12] or results of scientific research available at: PubMed, Scopus, Web of Science or Google Scholar. “**Misleading**” articles were those containing both accurate and inaccurate information while “**inaccurate**” had to contain information inconsistent with the guidelines or scientific knowledge sources. Any disagreements or doubts were resolved through discussion or consulted with an experienced epidemiologist. Additionally, all articles were classified according to their content: medication, masks, hand washing, surface cleaning, isolation, general and other. The content such as “lifestyle”, “alternative medicine”, “contact lenses” and “animals” was classified as “other”.

Data are presented as numbers and percentages. Number of shares of accurate and misleading articles were compared using chi-square test.

Results

Out of the 30 top shared articles identified 24 were found to be accurate (80%) and 6 to be misleading (20%). None of the analyzed articles about coronavirus prevention was inaccurate according to the criteria. Most of the shared content came from non-affiliated ($n = 29$; 97%) and non-peer reviewed journal websites ($n = 1$; 3%). Half of the articles were from TV/radio websites ($n = 15$, 50%), nine articles were from newspaper/magazines websites (30%) and 1 from research journal website (3%) and 1 from government website (3%). The other 4 articles (13%) were found on various other websites. The 30 top articles about coronavirus prevention were shared 4 904 160 times in total (Facebook, Twitter, Reddit, Pinterest) with Facebook as the leading platform - 4 748 800 (96,8%) of all shares.

The most shared articles were those about medications ($n = 2 004 182$) followed by masks and handwashing. The detailed data are presented in Table 1. Two thirds (64% - 3 138 271) of all shares referred to accurate content (Fig. 1.). Although there were fewer articles judged as misleading ($n = 6$), the percentage of their shares reached 36% ($n = 1 765 889$) of total number of shares ($n = 4 904 160$) on social media (Fig. 2.).

Data from Fig. 3 show that articles about medications were mostly accurate (5 out of 7; >2 m shares). However, the second most commonly shared articles (1,16 m shares) that covered subject of wearing masks, were all misleading (2 out of 2). Almost all articles about handwashing were found to be accurate (8 out of 9; 640 758 shares). The inaccuracy of articles about masks was largely about the very sense of wearing masks in general

Discussion

While 80% of articles on coronavirus prevention out of the top 30 most shared (24/30) were accurate, they accounted for relatively less shares (64%). It shows a certain pattern that corresponds with findings of another study [6] and a phenomenon of false information spreading online more easily than truth [13]. Incidents described occasionally by the media suggest that this may have real and tragic consequences. The widely covered case of a couple who ingested a form of chloroquine to prevent COVID-19 is one of the recent examples. The news about chloroquine were widespread despite warnings that it had not been proven to be of any help in coronavirus prevention [14]. Another examples comes from Iran where 44 people died after drinking ‘bootleg alcohol’ over belief that it would protect them against the virus [15]. The media reports and WHO itself suggested that the 2014 Ebola outbreak was made more difficult to contain by the spread of false information and public anxiety caused by it [16]. Rapid development of social media may most probably only intensify such processes in certain circumstances.

Table 1
Number of shares according to content and accuracy.

Subject of article	n	Number of shares	MISLEADING ARTICLES		ACCURATE ARTICLES		p-value
			n	Number of shares	n	Number of shares	
Medication	7	2 004 182	2	47 232	5	1 956 950	<0.001
Masks	2	1 166 832	2	1 166 832	0	0	<0.001
Hand washing	9	819 667	1	178 909	8	640 758	<0.001
Surfaces cleaning	3	796 049	0	0	3	796 049	<0.001
General	5	657 831	1	469 007	4	188 824	<0.001
Other	8	311 233	1	82 818	4	228 415	<0.001
Contact lenses	2	94 540	0	0	2	94 540	
Animals	2	86 173	0	0	2	86 173	
Lifestyle	1	82 818	1	82 818	0	0	
Alternative Medicine	3	47 702	0	0	3	47 702	
Isolation	4	35 400	1	35 400	3	239 430	<0.001

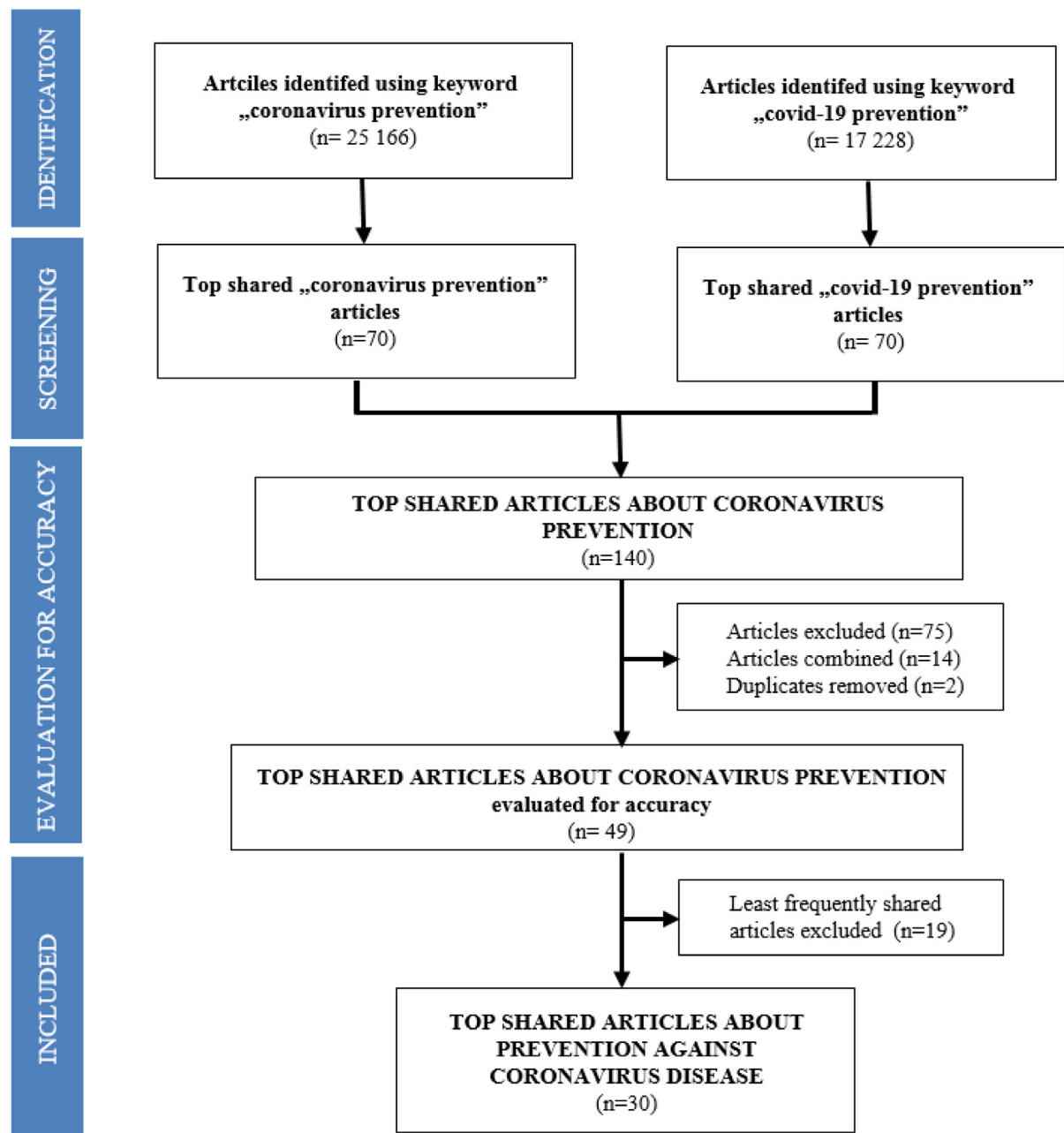


Fig. 1. Study identification and selection.

Various incidents indicate how important it is to quickly provide people with accurate and well communicated information, especially during such difficult and fearful times as a global pandemic. Social media may undoubtedly be quick in spreading information, however this refers to both, true and false.

Top shared articles assessed as “accurate” referred predominantly to medications and hand washing. Nonetheless, all articles on wearing masks were judged “misleading” because they all questioned to some extent the sense of wearing it. This is an important finding as the recommendations on COVID-19 management from CDC and WHO focus largely on face coverage for effective prevention. The Desai and Aronoff study suggested that although hand washing was the best way to prevent coronavirus transmission, wearing masks was also considered important, especially in situations in which social distancing proved difficult [17]. The 2020 systematic review and meta-analysis that investigated 172 obser-

vational studies concluded that use of face masks had a potential to seriously reduce risk of infection [18]. These conclusions are in line with CDC recommendation to wear masks in order to prevent a wearer from unconsciously spreading the virus to others [19]. As it was already confirmed that SARS-CoV-2 carriers are usually asymptomatic or presymptomatic, yet highly contagious, accurate information on masks may be considered a fundamental issue. The most recent research results suggest that airborne transmission may be the dominant route for virus transmission [20].

Most popular social media platforms employ measures in effort to mitigate harmful impact of misinformation. Facebook, Google and Twitter claim to remove it as quickly as possible and cooperate with WHO and other government organizations to make sure users receive accurate and evidence-based information [21]. For example, Facebook guides its users directly to websites of WHO and local health authorities that explains COVID-19 prevention and

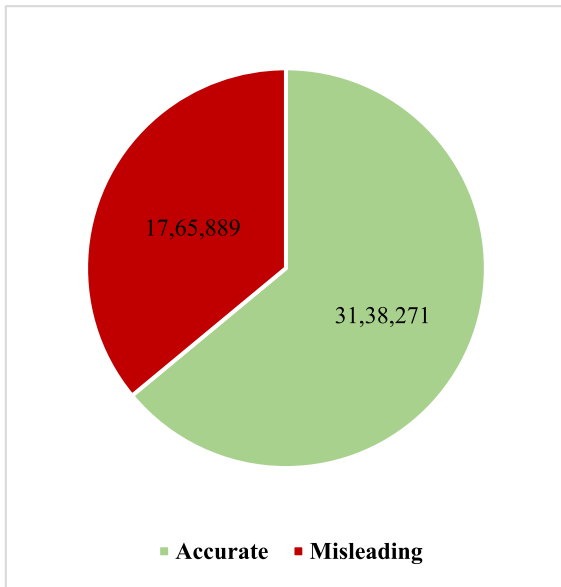


Fig. 2. Shares by accuracy.

control [22]. Nevertheless, the effectiveness of these efforts is difficult to judge especially considering a pace at which news and information on social media get spread and consumed. Our results show a rather high level of accuracy, nevertheless the example of masks suggest that there is still room for improvement even when it comes to fundamental issues.

Peer-reviewed journals' and official institutions websites all provided "accurate" information (as evaluated in this study) on coronavirus prevention, however accounted for only 6,7% of identified articles.

Strengths and limitations

The first and major limitation of this study is its short lifespan in a quickly evolving ecosystem of social media. Nevertheless, it shows how to effectively and quickly evaluate certain issues. It can also be replicated in other countries, languages and on differ-

ent topics and aspects. We limited phrases used to search articles only to prevention against coronavirus, so future research may focus on other aspects. As Facebook was the most common platform to share articles, we were not able to determine if a person sharing an article actually promoted it or warned against it. Although Buzzsumo has been previously used in research we cannot rule out that it brought some unrecognizable bias into our study.

Conclusions

The information on coronavirus prevention shared through social media in the analyzed period of time was usually accurate. Nevertheless, the inaccuracies found in articles on wearing masks – a crucial element of prevention - suggest that one cannot assume that all the important information is trustworthy. Buzzsumo offers a unique and easy opportunity to investigate in detail what sort of information is shared most often at any given time. As social media have already become an important part of people's life, such investigations may quickly provide vast amounts of specific and general data. They also seem a useful tool to be considered by health authorities in sudden and quickly evolving situation such as the coronavirus pandemic. Monitoring the most popular content and identifying most common inaccuracies, based on data not just subjective judgment, could effectively facilitate adequate actions. Example of France shows that cooperation between authorities and social media companies is possible and worth consideration [23].

Ethical approval

Not required.

Declaration of Competing Interest

None declared.

References

[1] WHO. Coronavirus disease (COVID-19) pandemic. 2020. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019> (accessed: 22 April 2020).
 [2] De Martino I, D'Apolito R, McLawhorn AS, Fehring KA, Sculco PK. Social media for patients: benefits and drawbacks. *Curr Rev Musculoskelet Med* 2017;10:141-5.

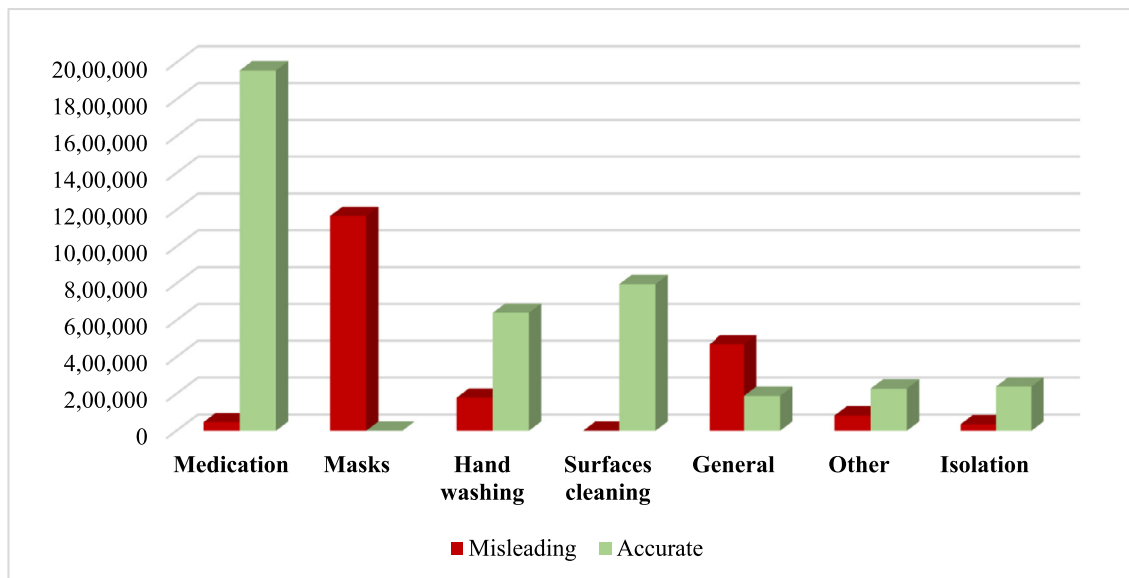


Fig. 3. Accuracy of articles about identified subjects by number of shares.

- [3] Schmidt AL, Zollo F, Vicario MD, Scala ABA, Caldarelli G, Stanley HE, Quattrocchio W. Anatomy of news consumption on Facebook. *Proc Natl Acad Sci* 2017;114(12):3035–9.
- [4] WHO. Munich security conference. 2020. <https://www.who.int/dg/speeches/detail/munich-security-conference> (accessed: 25 May 2020).
- [5] Liu Q, Zheng Z, Zheng J, Chen Q, Liu G, Chen S, et al. Health communication through news media during the early stage of the COVID-19 outbreak in china: digital topic modeling approach. *J Med Internet Res* 2020;22(4):e19118.
- [6] Alsyof M, Stokes P, Hur D, Amasyali A, Ruckle H, Hu B. Fake news in urology: evaluating the accuracy of articles shared on social media in genitourinary malignancies. *BJU International*; 2019.
- [7] Sommariva S, Vamos C, Alexios M, Uyên-Loan Đào L, Tyson DM. Spreading the (fake) news: exploring health messages on social media and the implications for health professionals using a case study. *Am J Health Educ* 2018;49(4):246–55.
- [8] Wang Y, McKee M, Torbica A, Stuckler D. Systematic literature review on the spread of health-related misinformation on social media. *Soc Sci Med* 2019. <https://buzzsumo.com/> (accessed: 14 May 2020).
- [9] Waszak PM, Kasprzycka-Waszak W, Kubanek A. The spread of medical fake news in social media – the pilot quantitative study. *Health Policy Technol* 2018;7(2):115–18.
- [10] Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet* 2020;395(10223):507–13.
- [11] CDC. Coronavirus (COVID-19). 2020. <https://www.cdc.gov/coronavirus/2019-ncov/index.html> (accessed: 22 April 2020).
- [12] Vosoughi S, Roy D, Aral S. The spread of true and false news online. *Science* 2018;359(6380):1146–51.
- [13] CDC. Information for clinicians on investigational therapeutics for patients with COVID-19. 2020. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/therapeutic-options.html> (accessed: 22 April 2020).
- [14] Bote J. At least 44 dead from drinking toxic alcohol in Iran after coronavirus cure rumor. *USA Today* 2020. <https://eu.usatoday.com/story/news/world/2020/03/10/44-dead-iran-drinking-toxic-alcohol-fake-coronavirus-cure/5009761002/> (accessed: 27 April 2020).
- [15] Jones B, Elbagir N. Are myths making the Ebola outbreak worse? 2014. <https://edition.cnn.com/2014/08/20/world/africa/ebola-myths/index.html> (accessed: 17 June 2020).
- [16] Desai AN, Aronoff DM. Masks and Coronavirus Disease 2019 (COVID-19). *JAMA* 2020.
- [17] Chu DK, Akl EA, Duda S, Solo K, Yaacoub S, Schünemann HJ. Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. *Lancet* 2020.
- [18] CDC. Use of cloth face coverings to help slow the spread of COVID-19. 2020. <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html> (accessed: 22 April 2020).
- [19] Klompas M, Morris CA, Shenoy ES. Universal masking in the COVID-19 era. *N Engl J Med* 2020.
- [20] Zarocostas J. How to fight an infodemic. *Lancet* 2020;395(10225):676.
- [21] Mian A, Khan S. Coronavirus: the spread of misinformation. *BMC Med* 2020;18(89).
- [22] Haddad MP. Coronavirus: comment le gouvernement et les réseaux sociaux luttent contre les "fake news". *RTL* 2020. <https://www.rtl.fr/actu/politique/coronavirus-comment-le-gouvernement-et-les-reseaux-sociaux-luttent-contre-les-fake-news-7800193222> (accessed: 27 April 2020).