

Public precaution awareness: a case study from Google search trend during Covid-19 outbreak in Indonesia

Erna Rochmawati¹ and Achmad Nurmandi¹

¹Universitas Muhammadiyah Yogyakarta

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Abstract

Objective: The global outbreak of COVID-19 is emerged recently and this poses stress on health and well-being of the people in the worldwide including in Indonesia. Public interest in this new issue largely reflects people's attention to COVID-19 and their willingness to take precautionary actions. This study aimed to examine public awareness on the prevention of COVID-19 using Google Trend (GT) . **Methods:** Using GT, we retrieved public query data for the term of (coronavirus, handwashing, hand sanitizer, and facemask) between 12 December 2019 and 4 April 2020 in the specific locations of Indonesia nationwide and several provinces. The correlation between daily search volumes on the topic related to COVID-19 and the daily number of people infected with COVID-19 was analyzed. **Results:** Our studies observed the overall search trend of RSV regarding COVID-19 after the global outbreak and the announcement of first covid-19 case in Indonesia, the search related to COVID-19, and other defined terms in Indonesia increased rapidly. In addition, search related to face mask were gradually increased. Searches for face mask and hand sanitizer is more popular than handwashing. There is a positive correlation between daily RSV on COVID-19 and other defined terms and the daily number of people infected with COVID-19 nationwide ($p < 0.05$). There are various interest to RSV related to COVID-19, and public awareness of COVID-19 was almost similar in some provinces, particularly searches related to facemask and hand sanitizer. **Conclusion:** Our findings demonstrates that GT could potentially define the proper timing and location for practicing appropriate risk communication strategies to prevent the spread of emerging disease. The study demonstrates that government should strengthen the publicity of COVID- 19 nationally, reinforce the public's awareness on the prevention of COVID-19 and finally inform the importance of protecting individuals with appropriate and affordable precautionary measures.

Introduction

After the first cases of coronavirus disease occurred in 2019 (COVID-19) in Wuhan, the capital city of Hubei Province, China, the pandemic has marched relentlessly worldwide. There have been 575,444 confirmed cases worldwide in 202 countries, areas and territories according to the World Health Organization associated with 26,654 deaths; 1155 of these cases are and 102 of the deaths are in the Indonesia (as of March 29, 2020) (World Health Organization, 2020b).

According to the current evidence, COVID-19 viruses appear primarily transmitted between people through respiratory droplets and contact routes (Liu et al., 2020). In addition, the transmission of the COVID-19 virus can occur by direct contact with infected people and indirect contact with surfaces in the immediate environment or with objects used on the infected person. Health authorities such as the World Health Organization and public health expert worldwide recommend strategies to prevent the transmission mechanisms that are acceptable in a variety of community settings worldwide. The recommendations include: respiratory and hand hygiene measures. For respiratory measure, recommendations specifically for individuals with symptoms include covering the mouth while coughing or sneezing to prevent aerosol and droplet transmission, and using disposable tissues and washing hands after contact with respiratory secretions to prevent contact transmission. In addition, the World Health Organization also recommend to wear face mask in public

settings recently. In regarding to face masks, there has been misinformation about appropriate use of face masks. Some individuals have assumed that they are protected from COVID-19 by wearing a medical face mask. This practice is not supported by evidence from studies and cause a limiting the availability of face masks for response professionals who need them (Choi, Skrine Jeffers, & Logsdon, 2020).

Frequent hand hygiene is recommended to prevent viral transfer via contact with infected people and surfaces. Hand hygiene can be conducted either using an alcohol-based hand rub if hands are not visibly dirty or soap and water when hands are visibly dirty (World Health Organization, 2020a). While these hygiene practices are widely recommended by health authorities, evaluation of the awareness of such precaution measures in the general population is limited (Hayward, Beale, Johnson, Zambon, & Fragaszy, 2020).

Many information regarding to the precaution measures of COVID-19 are widely available and relatively easy to be accessed in the internet. In line with the internet availability and usage, many information mainly can be accessed easily via Google as the most popular search engine. Google, in particular, provides a web site called Google Trends, that can analyse the popularity of specific search terms. Since Google Trends became available to the public, it has been used to study health-related issues in a variety of topic domain including public awareness (Nuti et al., 2014; Schootman et al., 2015). Public interest in COVID-19 largely reflects people's awareness and their willingness to take precautionary actions like performing hand hygiene, wearing mask, and social and physical distancing. There are already many studies on COVID-19, however, few focus on the public awareness in this issue particularly in Indonesia. Our research aimed to fill that void. Therefore, we aimed to explore public awareness of COVID-19 and its prevention by the query data retrieved from Google Trends in this research.

Methods

This study investigated the correlation between the number of new cases of COVID-19 and the search index from Google. The aim of this study was to create an effective and affordable model to predict new cases, which would enable prompt and correct decision- making regarding public policies to limit the spread of COVID-19.

Google trend is known as a publicly available web-based tool which analyse relative search for a particular query. Google trend can provides the number of relative searches for a particular query within a particular time and a particular region or worldwide. Terms such as Coronavirus, handwashing, and face masks in Bahasa were collected from GT during the period of January 1st 2020 to march 31st , 2020. These search terms represented the information search for COVID-19 and practice of personal precautions to prevent disease transmission. Relative search volume (RSV) data were filtered by geographic regions in Indonesia. The data collected from Google Trends is adjusted to the time and location, so the comparisons between queries can be easier. These queries were searched from 2019/12/12 to 2020/04/04 within the seven provinces in Indonesia such DKI Jakarta, East Java, Yogyakarta Special Province, Central Java, West Java, Bali and South Sulawesi. These countries were selected because there were positive COVID-19 cases in these provinces in the beginning of the outbreak. Besides, since the RSV in the Indonesia and some provinces is less than "1" for several days, we treated it as RSV equal to "1" in these days for better reflecting the Indonesian and people in the selected provinces response to COVID-19 as conducted in the previous study (Hu et al., 2020). The results then being downloaded in the format of Common Separated Values, which displayed on a scale from 0 to 100. GT data then were compared with daily data on COVID-19 cases that were obtained from the website of COVID centre Ministry of Health Indonesia.

Results and Discussion

COVID-19 related searches in Indonesia remained low in period of the first case that was detected on December 12th 2019 (CNN, 2020) and relatively dynamic until the first announcement of the COVID-2 first case in Indonesia in 3rd March 2020 (Ministry of Health, 2020). The same trend also occur globally, China and Taiwan (Husnayain, Fuad, & Su, 2020; Strzelecki, 2020). In addition, COVID-19 related searches in Indonesia continued to extend and reached its peak on March 16th , 2020 as local cases were reported and local transmission was announced. The searches related to COVID-19 were relatively high for two weeks.

The searches for COVID-19 reached its peak and continuously high for two weeks from 16th March to 30th March 2020, as there was an increase of patients with positive infected COVID-19. The searches declined gradually afterward. Such declined searches is likely due to availability of information provided in television, online news reporting, and social media expert reporting (Keller et al., 2019).

An increase in face masks related searches in Bahasa in line with the increased of COVID-19 related searches (Figure 1). This reflects an awareness to use face masks for preventing the COVID-19 spread. However, such search also reflect a drive immense purchases of face masks that lead to face masks shortage in Indonesia. The search was relatively high when the first case of COVID-19 was announced and declined gradually in the following week. However, the face masks related search increased in the last week of March 2020. This could be due the increased number of positive case of COVID-19. In addition, this could be due to available information to wear cloth face coverings in public settings as alternative rather than wearing medical face masks (CDC, 2020).

Hand hygiene is one of precaution measures to prevent the spread of COVID-19 that include hand wash and the use of hand sanitizer. Hand sanitizer related search was started to increase in the first week of March 2020, while the searches for hand washing were fewer than hand sanitizer and were relatively stable. These searches were in line with COVID-19 and face masks related searches, expect in March 16th 2020 when hand sanitizer related search was higher than the face mask related search. This condition indicated that people were still gathering information about hand hygiene practices for precaution measures when the availability of face mask was limited. In addition, more information about to make homemade hand sanitizer were become more popular.

Figure 2 demonstrates overall search of COVID-19 were related term was dynamic. This is related to the public anxiety and curiosity following the announcement of international warning from WHO. The huge number of searches might be caused by public restlessness due to the increasing number COVID-19 positive cases. All of the search terms that we utilised in the study were in Bahasa. The use of keywords depict that people in Indonesia mostly prefer to search for information related to diseases and precaution measures in their native language. Therefore, GT data could also reflect the information needed by users based on keyword utilization.

We also found huge numbers of COVID-19 searches in seven provinces including Jakarta, East Java, West Java, Central Java, Bali, Special Province of Yogyakarta and South Sulawesi (Figure 2). Figure 2 demonstrates the search of COVID-19 increased dramatically for two days in the selected provinces that relates to the announcement of the first case of COVID-19 in Indonesia. Additionally, Fig.2 showed huge numbers of COVID-19 searches in Jakarta (91 points), while in other provinces the number was still quite low. This is due to the first case of COVID-19 was found in Jakarta. The search decreased gradually until the 2nd weeks, however, the number of searches was increased again in the selected province after in 3rd week after the first confirmed case in the seven selected provinces. This indicate that GT data could be utilised to plan public risk communication as well as precaution measures timely.

The study demonstrates that GT can be used as a tool to monitor public awareness and precaution measures toward COVID-19 epidemic infection in Indonesia couple days before and 3 weeks after the increased of confirmed cases. Appropriate information disease and precaution measures during outbreak is urgently needed. The provision of such information could help the spread of disease and more importantly, could reduce excessive amount of information circulating in affected populations which might induce public restlessness or panic (World Health Organization, 2020c). Thus, more effective measures to provide information should be taken by the Government and related parties to enhance public awareness and finally control the spread of COVID-19 in Indonesia particularly and in the worldwide.

Conclusion

The findings of this research will help decision makers and the public agency communicators better understand and establish effective coping techniques for the dynamic information and processing cycle triggered by infectious disease outbreaks. Communication of infectious diseases is a form of risk communication important

for public health and safety (Toppenberg-Pejcic et al., 2019). The problem of infectious disease communication mainly from the precise route to infection, treatment and recovery in the initial stage (Lin, McCloud, Bigman, & Viswanath, 2017).

Acknowledgment

N/A

Conflict of interest

The authors declare no conflict of interest

Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request

Ethical Statement

Ethical Statement is not applicable

References:

- CDC. (2020). Use of Cloth Face Coverings to Help Slow the Spread of COVID-19. Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html>
- Choi, K. R., Skrine Jeffers, K., & Logsdon, M. C. (2020). Nursing and the Novel Coronavirus: Risks and Responsibilities in a Global Outbreak. *Journal of Advanced Nursing*, *n/a* (n/a). doi:10.1111/jan.14369
- Hayward, A., Beale, S., Johnson, A. M., Zambon, M., & Fragaszy, E. B. (2020). Hand and Respiratory Hygiene Practices and the Risk and Transmission of Human Coronavirus Infections in a UK Community Cohort *The Lancet* . doi: <https://ssrn.com/abstract=3551360> or <http://dx.doi.org/10.2139/ssrn.3551360>
- Hu, D., Lou, X., Xu, Z., Meng, N., Xie, Q., Zhang, M., . . . Wang, F. (2020). More effective strategies are required to strengthen public awareness of COVID-19: evidence from Google Trends. *The Lancet* . doi: <http://dx.doi.org/10.2139/ssrn.3550008>
- Husnayain, A., Fuad, A., & Su, E.-Y. (2020). Applications of google search trends for risk communication in infectious disease management: A case study of COVID-19 outbreak in Taiwan. *International Journal of Infectious Disease* . doi: <https://doi.org/10.1016/j.ijid.2020.03.021>
- Keller, M., Blench, M., Tolentino, H., Freifeld, C. C., Mandl, K. D., & Mawudeku, A. (2019). Use of unstructured event-based reports for global infectious disease surveillance. *Emerging Infectious Diseases*, *15* (5), 689-695.
- Lin, L., McCloud, R. F., Bigman, C. A., & Viswanath, K. (2017). Tuning in and catching on? Examining the relationship between pandemic communication and awareness and knowledge of MERS in the USA. *J Public Health (Oxf)*, *39* (2), 282-289. doi:10.1093/pubmed/fdw028
- Liu, J., Liao, X., Qian, S., Yuan, J., Wang, F., Liu, Y., . . . Zhang, Z. (2020). Community transmission of severe acute respiratory syndrome coronavirus 2, Shenzhen, China, 2020. *Emerg Infect Dis* . doi:doi.org/10.3201/eid2606.200239
- Ministry of Health. (2020). Situasi terkini perkembangan novel Coronavirus (COVID-19) (Current update on Novel Coronavirus (COVID-19). Retrieved from https://infeksiemerging.kemkes.go.id/downloads/?dl.-cat=5&dl_page=2#.Xo1QRC-r0-U
- Nuti, S. V., Wayda, B., Ranasinghe, I., Wang, S., Dreyer, R. P., Chen, S. I., & Murugiah, K. (2014). The Use of Google Trends in Health Care Research: A Systematic Review. *PLOS ONE*, *9* (10), e109583. doi:10.1371/journal.pone.0109583

Schootman, M., Toor, A., Cavazos-Rehg, P., Jeffe, D. B., McQueen, A., Eberth, J., & Davidson, N. O. (2015). The utility of Google Trends data to examine interest in cancer screening. *BMJ Open*, 5 (6), e006678. doi:10.1136/bmjopen-2014-006678

Strzelecki, A. (2020). Infodemiological study using Google Trends on Coronavirus epidemic in Wuhan, China. *arXiv* .

Toppenberg-Pejcic, D., Noyes, J., Allen, T., Alexander, N., Vanderford, M., & Gamhewage, G. (2019). Emergency Risk Communication: Lessons Learned from a Rapid Review of Recent Gray Literature on Ebola, Zika, and Yellow Fever. *Health Communication*, 34 (4), 437-455. doi:10.1080/10410236.2017.1405488

World Health Organization. (2020a). Advice on the use of masks in the community, during home care, and in health care settings in the context of COVID-19. In World Health Organization (Ed.).

World Health Organization. (2020b). Coronavirus (Covid-19) disease outbreak. Retrieved from <https://www.who.int/emergencies/coronavirus-2019/situation-reports/>

World Health Organization. (2020c). Risk communication and community engagement (RCCE) readiness and response to the 2019 novel coronavirus (2019-nCoV). Retrieved from <https://www.who.int/publications-detail/risk-communication-and-community-engagement-readiness-and-initial-response-for-novel-coronaviruses>

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