

PUBLIC SEARCH INTEREST ANALYSIS ON INDONESIAN COVID-19 CONTAINMENT POLICY

ANALISIS MINAT PENELUSURAN PUBLIK TENTANG KEBIJAKAN PENANGANAN COVID-19

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ABSTRACT

To assess public search interest patterns on Indonesian containment policy and to determine the use of Google Trends as an early warning system and a tool for making a suitable form of risk communication and interventions during COVID-19 Pandemic. The data related via GT using time series data ranging from 1 March 2020 to 2 May 2020. The data then compared to the number of COVID-19 daily new cases. Qualitative analysis used in every spike/peaking of search interest. The time-lag correlation with Pearson correlation was performed to measure the correlation between the rise of GT data and the increase of COVID-19 cases. From the keyword searched 'lockdown', 'PSBB', and 'jaga jarak' has 5,3,1 peaks, respectively. 'PSBB' has a highly significant positive correlation ($R = 0,8137$) compared with 'lockdown' ($R = -0,2494$) and 'jaga jarak' ($R = 0,3177$) with Pearson correlation. Lag-period wise, 'PSBB' also has a highly significant positive correlation in all sets ($P \leq 0,05$). 'PSBB' reached its peak consistently based on the policy issued by the Government. Validation using time-lag correlation shows the significant correlation between RSV keywords related to Government of Indonesia personal protection and the number of COVID-19 cases. GT can be used as a public search interest in accordance with government policy and also can confirm the reaction among the population which is the original policy of the Indonesian government.

Keywords: COVID-19, Google Trends, PSBB, Indonesia

BACKGROUND

On 11 March 2020, the World Health Organization (WHO) officially declared the Corona Virus Disease 2019 (COVID-19) as a global pandemic. As of 6 May 2020, COVID-19 pandemic has become an ongoing problem in more than 200 countries with over three million confirmed cases worldwide (1). In Indonesia, COVID-19 has caused 12,438 people to be infected and 895 deaths related to the disease. Indonesia case fatality rate (CFR) is also higher (7,2%) than worldwide (6,9%) and South-East Asia Region (3,7%) (2).

Reacting to the high number of COVID-19 cases and deaths, several countries have taken precautionary measures such as issuing containment orders because COVID19 spreads mainly through person-to-person contact (3). Since COVID-19 cases have been confirmed in Indonesia in March 2020, mass screening was chosen to be implemented. At the end of March 2020, Indonesia's president finally decided to implement large-scale social restriction (Pembatasan Sosial Berskala Besar) in cities and provinces. The government also emphasized the need to stay at home for all Indonesian citizens (4).

At present, the increase of internet usage and its availability worldwide playing an important role for people in getting important information about COVID-19. The behavior of searching for information in an electronic medium such as the internet can be analyzed with the ultimate goal of improving public health (5).

Google as the most popular search engine provides Google Trends (GT) which analyzes the popularity of specific search terms (6). GT has been implemented to examine several time-ranking patterns of some health-related issues to investigate public awareness of diseases (9,10). GT data can be utilized as a form of risk communication that is used to observe the dissemination of information related to health risks and events, such as pandemic and discussions about how to change behavior to reduce the risk (7).

This study was designed to observe whether the strategy taken by the government of Indonesia to limit the spread of COVID-19 can affect public search interest about the containment as a preventive measure on the internet using data from GT. Also, we aimed to assess whether GT data can be used as an early warning system and an instrument to help authorities making the suitable form of risk communication and interventions during COVID-19 Pandemic.

METHODS

The data related search terms in the Indonesian Language was searched via GT (<https://trends.google.com/trends>) using time series data ranging from 1 March 2020 to 2 May 2020. We used official COVID-19 new cases daily reports from (<https://bnpb-inacovid19.hub.arcgis.com/>) as the official website of the task force for the acceleration of handling COVID-19 in Indonesia by the National Disaster Mitigation Agency (Badan Nasional

Penanggulangan Bencana/BNPB). Keywords related to Indonesian government COVID-19 containment policy such as 'lockdown', 'PSBB' (Pembatasan Sosial Berskala Besar/large-scale social restriction) as a preventive measure against COVID-19 that taken by the government of Indonesia, and 'jaga jarak' (social distancing). Google Trend provides the relative search volume (RSV) and the data that is adjusted to the time and location, so the comparisons between queries can be easier. The results can be downloaded in the format of Comma Separated Values (CSV), which displayed on a scale from 100 for the highest attention to 0 for the lowest attention to the keywords.

The data from GT then compared to the number of COVID-19 daily new cases. Qualitative analysis used in every spike/peaking of search interest with Pearson correlation, with significance ≤ 0.05 . For

quantitative analysis, the time-lag correlation was performed to measure the correlation between the rise of GT data and the increase of COVID-19 cases, as previously applied in other studies (8).

RESULTS AND DISCUSSION

In Figure 1, The results of data analysis show the time series of the number of COVID-19 new cases in Indonesia visualized with GT data regarding search interest of keywords related to government of Indonesia's containment policy from 1 March 2020 – 2 May 2020. Since Indonesian president announced the first confirmed case on 02 March 2020, containment policy-related searches in Indonesia remained low (9). As plotted in the graph below, every keyword had a peak that resembled an increasing search interest. There were five peaks for 'lockdown', four peaks for 'PSBB', and one peak for 'jaga jarak' (Figure 1).

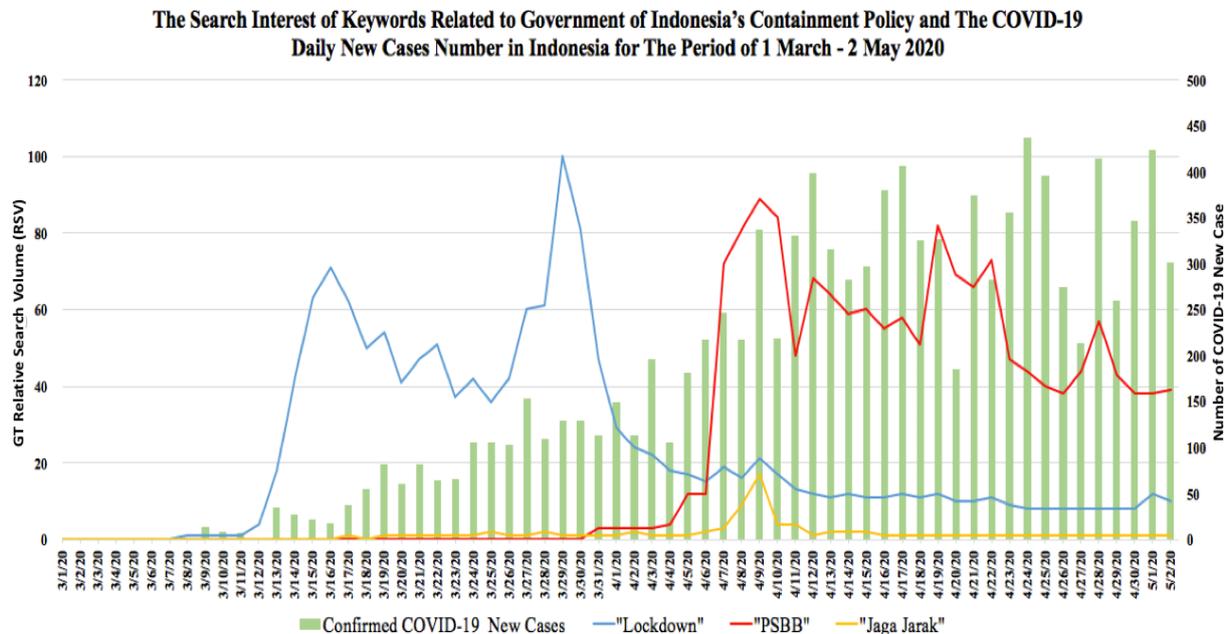


Figure 1. The comparison between search interest of keywords related to the government of Indonesia's containment policy and the COVID-19 daily new cases in Indonesia for the period of 1 March - 2 May 2020

Table 1 shows the distribution of Provinces with the highest interest keywords related to the Government of Indonesia's containment policy. It was found by DKI Jakarta, Banten, and Special Region of Yogyakarta as the most popular provinces in the search activity for the Government of Indonesia's containment policy.

Queries related to the keywords of 'lockdown', 'PSBB', and 'jaga jarak' can be seen in Table 2. Based on GT data, as for 'lockdown' and 'PSBB', the search was generally about the definition of the term. Since both of those terms were unusual to

be used before COVID-19 Pandemic. Meanwhile queries related to keywords 'jaga jarak' mainly about 'poster' and 'picture'. This implying that the public might be influenced to seek preventive behavior to protect themselves. Searching for information regarding health promotion posters also gives a positive impact on motivating people to do preventive measures amid COVID-19. Findings from the previous study suggest that after seeing an informational poster regarding COVID-19, people are motivated to practice social distancing (10).

Table 1. Provinces with the Highest Interest Keywords Related to Government of Indonesia's Containment Policy

Lockdown	PSBB	'Jaga Jarak'
Special Capital Region of Jakarta	Banten	Special Region of Yogyakarta
Special Region of Yogyakarta	Special Capital Region of Jakarta	Central Kalimantan
Banten	West Java	West Sulawesi
West Java	East Java	Bangka Belitung Islands
Riau Islands	Riau	Riau Islands
Aceh	Gorontalo	North Kalimantan
South Sulawesi	West Sumatra	Bali
Gorontalo	South Kalimantan	South East Sulawesi
East Java	South Sulawesi	Special Capital Region of Jakarta
Bali	South Sumatra	Bengkulu

Table 2. Queries of search interests with keywords related to the government of Indonesia's containment policy

Lockdown	PSBB	'Jaga Jarak'
'Lockdown adalah'	'Psbب adalah'	'Gambar jaga jarak'
'lockdown Indonesia'	'Jakarta psbb'	'Poster jaga jarak'
'Lockdown corona'	'Psbب apa'	'Jaga jarak corona'
'Lockdown apa'	'Singkatan psbb'	'Jaga jarak dan hindari kerumunan'
'Arti lockdown'	'Surabaya psbb'	'Jaga jarak hindari kerumunan'
'Lockdown arti'	'Psbب arti'	'Gambar jaga jarak hindari kerumunan'
'Lockdown artinya'	'Psbب singkatan dari'	'Poster jaga jarak dan hindari kerumunan'
'Jakarta lockdown'	'Psbب itu apa'	'Jaga jarak covid 19'
'Apa itu lockdown'	'Psbب corona'	'Gambar jaga jarak dan hindari kerumunan'
'Lockdown translate'	'Apa psbb itu'	'Gambar jaga jarak dan kerumunan'

The results of Pearson correlation between GT RSV data of keyword search interest and COVID-19 new cases are shown in Table 3. 'PSBB' has a highly significant positive correlation (R = 0,8137) compared with 'lockdown' (R = -0,2494) and 'jaga jarak' (R = 0,3177). Lag-period wise, 'PSBB' also

has a highly significant positive correlation in all sets. These results indicate that the increase in search activity through Google regarding 'PSBB' occurred on three days before, through the onset of newly confirmed COVID-19 cases in Indonesia, and stayed high until three days.

Table 3 Result of Time-lag Pearson correlations between keywords related to the government of Indonesia's containment policy in GT RSV and COVID-19 daily cases in Indonesia

Search term	Days						
	Lag - 3	Lag - 2	Lag - 1	Lag 0	Lag + 1	Lag + 2	Lag + 3
'Lockdown'	-0,1541	-0,1928	-0,2341	-2494*	-0,2621*	-0,2619*	-0,2721*
'PSBB'	0,8137*	0,8106*	0,7815*	0,8137*	0,8091*	0,7948*	0,8058*
'Jaga Jarak'	0,4210*	0,3520*	0,3025*	0,3177*	0,2459*	0,2627*	0,2147*

*Significant with P≤0,05

0 - 0,2	0,21 - 0,40	0,40 - 0,60	0,61 - 0,80	0,80 - 1
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Pearson correlation coefficient (R)

Results of time-lag Pearson correlation between 'lockdown' and COVID-19 daily cases in top ten provinces with the highest search interest is shown in Figure 2. In Banten, 'lockdown' significantly has a moderate positive correlation in all data sets. This finding reflected the increase of googling activities in 1-3 days before, after, and on the day COVID-19 cases increased. Meanwhile, in DKI Jakarta (except lag 0) and Bali (except lag 0&-1) almost all data sets significantly have

a low negative correlation. This means there will be an increasing search interest of 'lockdown' in 1-3 days before, after, and on the day COVID-19 cases decreased. A distinct phenomenon found in Aceh is that the increase of Google searches still found in 1-3 days after the increase of COVID-19 cases.

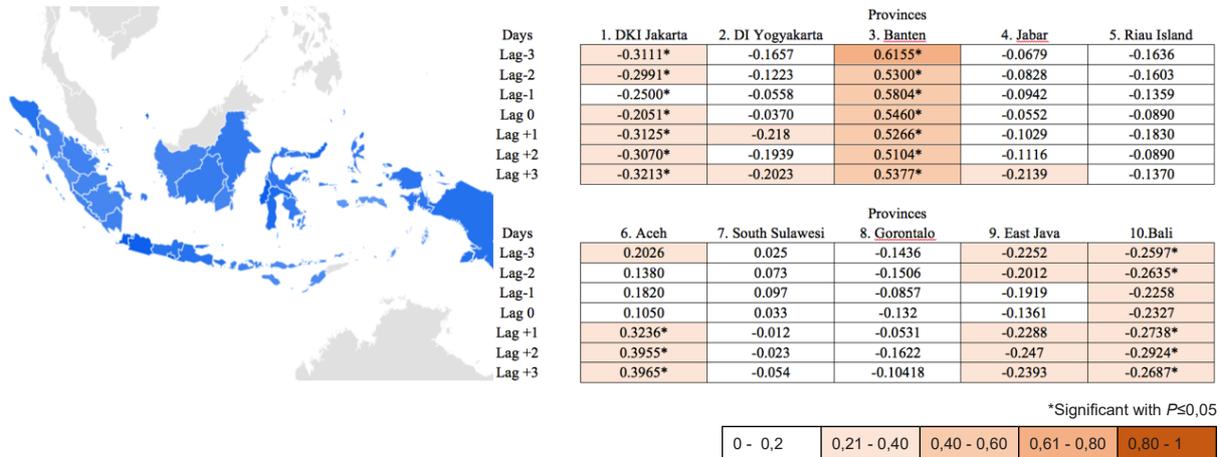


Figure. 2 Result of Time-lag Pearson correlations between keyword 'Lockdown' and COVID-19 daily cases in top ten provinces with the highest search interest. The color gradation on the map shows the level of interest, darker gradation indicates a higher level of interest

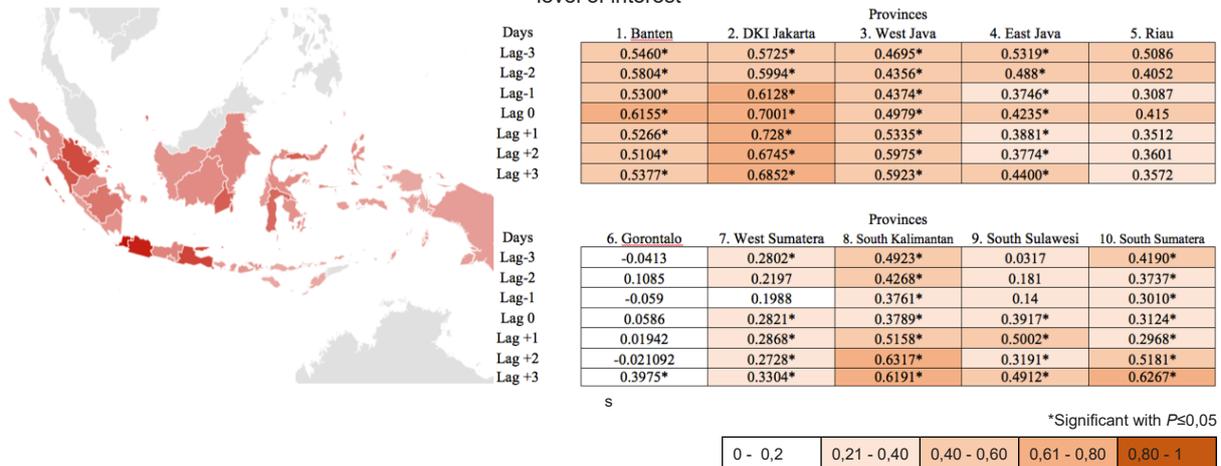


Figure. 3 Result of Time-lag Pearson correlations between keyword 'PSBB' and COVID-19 daily cases in top ten provinces with the highest search interest. The color gradation on the map shows the level of interest, darker gradation indicates a higher level of interest

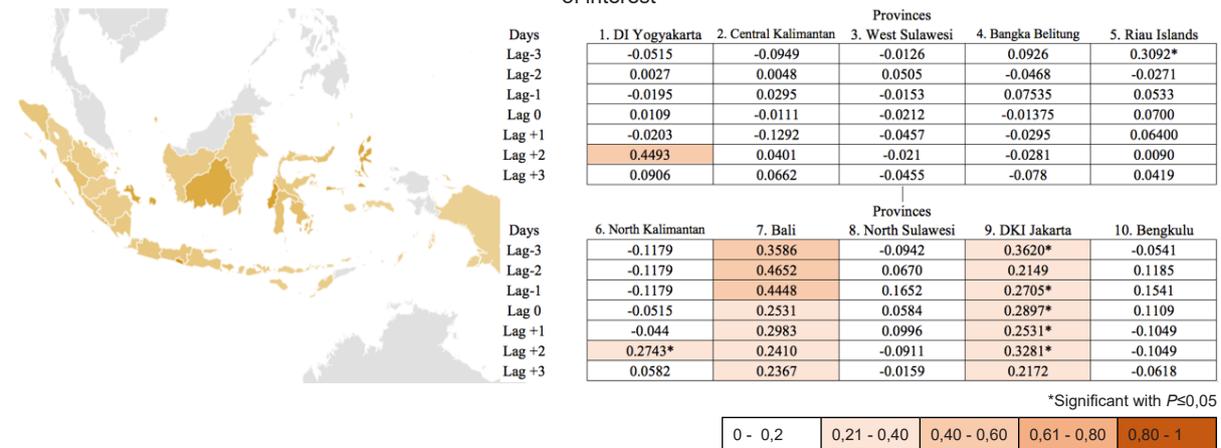


Figure. 4 Result of Time-lag Pearson correlations between keyword 'Jaga Jarak' and COVID-19 daily cases in top ten provinces with the highest search interest. The color gradation on the map shows the level of interest, darker gradation indicates a higher level of interest

Figure 3 shows the result of time-lag Pearson correlation between 'PSBB' and COVID-19 daily cases in top ten provinces with the highest search interest. In Banten, DKI Jakarta, West Java, East Java, Riau, South Kalimantan, South Sumatera, and West Sumatera all data sets have significantly low to moderate correlation. This finding reflected the increase of googling activities in 1-3 days before, after, and on the day COVID-19 cases increased. Meanwhile, a distinct phenomenon found in Gorontalo and South Sulawesi which indicated the increase of Google searches still found in three days after the increase of COVID-19 cases.

From the analysis above, GT data regarding keywords related to the Government of Indonesia's containment policy such as 'lockdown', 'PSBB', and 'jaga jarak' can be beneficial and used to monitor Indonesian population reaction towards COVID-19 pandemic. The Pearson correlation between keywords related to Indonesia containment policy and COVID-19 new cases in Indonesia is congruent with several studies that prove a relation between public search interest regarding COVID-19 and the number of newly reported COVID-19 cases in Taiwan (8), Wuhan (11) and Worldwide (12).

The search interest for 'Lockdown' reached the first peak on 16 March 2020. It happened after the Indonesian central government and DKI Jakarta regional authorities squabbled over the lockdown policy. On the same day, the ministry of state-owned enterprise (BUMN) instructed its employees' ages 50 and above to work from home (13). Meanwhile, the Ministry of Education ordered schools to close in some regions and announced that Ministry of Education readiness to assist schools in online learning by providing free teaching platforms. BNPB also extended the COVID-19 disaster emergency status for 91 days to 29 May 2020 (14).

The second peak happened on 19 March 2020 as COVID-19 CFR in Indonesia reached 8,2%, higher than Italia (7,2%), Iran (4,5%), and China (3,9%). Causing #IndonesiaLockDownPlease as a worldwide trending topic on twitter. Addressing this issue, the Indonesian Ministry of Economy said that imposing a lockdown would be difficult to implement in Indonesia, which consists of 34 provinces, despite calls from experts and scientists to do so. Because the problem was laid in the availability of the human resources to deliver basic commodities.

The third peak occurred on 22 March 2020 as BNPB stated that lockdown would not be implemented in Indonesia, despite Indonesia Doctor Association (Ikatan Dokter Indonesia/

IDI) having urged the Indonesian Government to implement lockdown in Indonesia to limit further spread of COVID-19 (15).

The fourth peak occurred on 24 March 2020, as Indonesian president has reiterated that he would not impose a nationwide lockdown, despite the growing number of confirmed COVID-19 cases in the country and the president also cautioned regional heads who sought to impose stricter movement restrictions in their respective regions. He said Indonesian people's cultural characteristics and discipline were the two main reasons why the government had ruled out a lockdown, adding that the decision was also made after evaluating policies enacted by other countries during the pandemic (15).

The fifth and the highest peak of search interest was seen on 29 March 2020, concurrently with the announcement made by the Health Ministry's disease control and prevention director-general that stated there were 1,155 cases of COVID-19 across 29 provinces, with 102 deaths and 59 patients have recovered. Meanwhile, search interest regarding keyword 'PSBB' remained low from the start of the first confirmed case in Indonesia (2 March 2020). The search interest was starting to raise in early April 2020, as 31 March 2020, Indonesia's president finally decided to implement large-scale social restriction (Pembatasan Sosial Berskala Besar) in cities and provinces (4). The search interest started to rise high on 7 April 2020 as the Governor of DKI Jakarta announced that PSBB would be implemented in Indonesia Capital Region for 14 days starting on Monday, 10 April 2020 (16).

The search interest regarding 'PSBB' reached the highest peak on 9 April 2020, one day before PSBB was officially applied in DKI Jakarta. Search interest in "Lockdown" and "Jaga Jarak" also raised on 9 April 2020. The increase in search interest of all keywords was reasonable, besides DKI Jakarta's residents, many people from other provinces such as Banten also worked on the capital region. DKI Jakarta and Banten have a humongous population with 80,4% and 65% internet penetration among its citizens, respectively. With internet accessibility, search interest of information regarding containment policy (in this case PSBB in DKI Jakarta) with a keyword such as 'lockdown', 'PSBB', and 'jaga jarak' would increase and affect national search interest. This is also reflected by the top ten provinces with the highest interest of 'PSBB' keyword (Table 1), which was Banten in the first place and DKI Jakarta in the second place.

The second peak of search interest regarding PSBB occurred on 19 April 2020, as the implementation of PSBB in some cities and regions

was announced by the regional government of East Java, West Java, and South Sumatera. All the provinces were also included in the top ten provinces with the highest interest of 'PSBB' keyword. The third peak occurred on 22 April 2020, when the DKI Jakarta Government announced to extend the PSBB until 22 May, as the COVID-19 outbreak has yet to subside. PSBB was also implemented in West Sumatera at the same time (17). The fourth peak of search interest regarding PSBB happened on 28 April 2020, congruent with extended PSBB announcement in several cities in West Java (18) and Riau (19). The fourth peak also congruent with approval of PSBB in Gorontalo and implementation of PSBB in South Kalimantan and South Sulawesi several days ago.

Increasing search interest of keywords related to prevention of COVID-19 spread, in this case, the keywords were 'Lockdown', 'PSBB', and 'jaga jarak' as preventive measures, can be considered as an effort to protect the population amid the pandemic. According to the previous study, the searching about prevention can document a predominantly rationally based need for information and of the population to prepare for the pandemic and to protect themselves. This includes terms such as 'lockdown', 'social distancing', and 'handwashing' (20,21).

The most prominent keyword that has a highly significant correlation to forecast COVID-19 cases is 'PSBB' (Pembatasan Sosial Berskala Besar). As Indonesia president announced the implementation of PSBB at the end of March 2020 (4). The Ministry of Health started to issue the Regulation of Ministry of Health (Peraturan Menteri Kesehatan/Permenkes) no. 9, 2020 about PSBB guidelines. Health regulation has grown in importance as a key lever for governments to affect the quantity, quality, safety and the distribution of services in health systems (22). A good health system, in turn, will affect health care service, which plays a role as determinants of health that contribute to public health (23).

During this pandemic, the public is vulnerable to feel restless and start to search for information from the internet. A Google trend data which is very accessible can be used by the Government to improve their effort in analyzing public restlessness in the major outbreak, which eventually will help themselves to maximize risk communication to transform the behavior of the community (11).

Searching for information during the pandemic, the public also being affected by information-seeking behavior which is influenced by media trends and outbreak news briefs, as seen in Figure 1, The search interest of keywords usually reach a peak during or after news related to the keyword.

Information-seeking behavior also affected by disease occurrence, where search term 'corona' and 'COVID 19' appear in queries of search interests with keywords related to Indonesia containment policy (Table 2) (22). Other individual factors such as gender, social class, education, culture, and language also affect this information-seeking behavior (25).

Internet penetration rate is also being considered as a confounding variable for GT data to increase the quality of data. As an island country, Indonesia also encounters the disparity of level of literacy and infrastructure which may vary nationally. These factors can affect information-seeking behavior and Internet utilization in all regions in Indonesia (22). The volume of internet searches might be related by this. Thus, provinces in Java Island which has a higher proportion of Internet users commonly have higher correlation, compared to provinces in other islands.

CONCLUSIONS

Data from google trends regarding keywords related to the government of Indonesia's containment policy such as 'lockdown', 'PSBB' and 'jaga jarak' forming a unique pattern. Every search interest usually reaches its peak depending on the period when the Government makes the announcement with a related keyword. A shifting of search interest between keyword 'lockdown' and 'PSBB' was observable after Indonesian president several times denied to impose lockdown and implemented PSBB at the end of March 2020. In conclusion, Google trend can be used as a public search interest in accordance with government policy and also can confirm the reaction among the population which is the original policy of the Indonesian government, thus will help authorities making suitable intervention. We suggest some actions that can be taken by the Government are providing information about the importance of self-protection, facilitating the community with good health care, and introducing them to how to notice alarming symptoms, especially high-risk populations. This effort is expected to diminish the debilitating impact caused by the pandemic

REFERENCES

1. World Health Organization. Coronavirus disease (COVID-19) situation report – 51 [Internet]. Geneva, CH: World Health Organization; 2020 [updated 2020 Mar 11; cited 2020 May 6]. Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200311-sitrep-51-covid-19.pdf?sfvrsn=1ba62e57_10

2. Kementerian Kesehatan Republik Indonesia. Info Infeksi Emerging Kementerian Kesehatan RI [Internet]. Jakarta, ID: Kementerian Kesehatan Republik Indonesia; 2020 [cited 2020 May 7]. Available from: <https://covid19.kemkes.go.id/>.
3. Wilder-Smith A, Chiew CJ, Lee VJ. Can we contain the COVID-19 outbreak with the same measures as for SARS?. *The Lancet Infectious Diseases*. 2020 Mar 5. doi: [https://doi.org/10.1016/S1473-3099\(20\)30129-8](https://doi.org/10.1016/S1473-3099(20)30129-8).
4. Eysenbach G. Infodemiology: The epidemiology of (mis)information. *Am J Med*. 2002;113(9):763-765. doi:10.1016/s0002-9343(02)01473-0
5. Cervellini G, Comelli I, Lippi G. Is Google Trends a reliable tool for digital epidemiology? Insights from different clinical settings. *J Epidemiol Glob Health*. 2017;7(3):185-189. doi:10.1016/j.jegh.2017.06.001
6. Ayers JW, Althouse BM, Allem JP, Rosenquist JN, Ford DE. Seasonality in seeking mental health information on Google. *Am J Prev Med*. 2013;44(5):520-525. doi:10.1016/j.amepre.2013.01.012
7. Husnayain A, Fuad A, Su EC. Applications of Google Search Trends for risk communication in infectious disease management: A case study of the COVID-19 outbreak in Taiwan. *Int J Infect Dis*. 2020;95:221-223. doi:10.1016/j.ijid.2020.03.021
8. Shin SY, Seo DW, An J, et al. High correlation of Middle East respiratory syndrome spread with Google search and Twitter trends in Korea. *Sci Rep*. 2016;6:32920. Published 2016 Sep 6. doi:10.1038/srep32920
9. Lunn PD, Timmons S, Barjaková M, Belton CA, Julianne H, Lavin C. Motivating social distancing during the Covid-19 pandemic: An online experiment. Doi:10.31234/osf.io/x4agb.
10. Strzelecki A. Infodemiological study using google trends on coronavirus epidemic in Wuhan, China. arXiv preprint arXiv:2001.11021. 2020 Jan 29.
11. Effenberger M, Kronbichler A, Shin JI, Mayer G, Tilg H, Perco P. Association of the COVID-19 pandemic with Internet Search Volumes: A Google Trends™ Analysis. *Int J Infect Dis*. 2020;95:192-197. doi:10.1016/j.ijid.2020.04.033
12. Cahya GK and Atika S. Pressures on for Jokowi to close cities [Internet]. 17 March 2020 [cited 10 may 2020]. Available from <https://www.thejakartapost.com/news/2020/03/17/pressures-on-for-jokowi-to-close-cities.html>
13. Koesmawardhani NW. Pemerintah Tetapkan Masa Darurat Bencana Corona hingga 29 Mei 2020 [Internet]. 16 Maret 2020 [Cited 10 May 2020].
14. Sulaiman MR, Varwati L. Angka Kematian Covid-19 Tertinggi di Dunia, Tagar Indonesia Lockdown Viral [internet]. 19 Maret 2020 [cited 10 may 2020]. Available from <https://www.suara.com/health/2020/03/19/104353/angka-kematian-covid-19-tertinggi-di-dunia-tagar-indonesia-lockdown-viral>
15. TheJakartaPost Editorial Team. No lockdown for Indonesia, Jokowi insists as COVID-19 cases continue to rise [Internet]. 24 march 2020. [cited 11 May 2020]<https://www.thejakartapost.com/news/2020/03/24/no-lockdown-for-indonesia-jokowi-insists-as-COVID-19-cases-continue-to-rise.html>
16. APJII IP. Perilaku Pengguna Internet Indonesia Survey [Internet]. 2018. Available from <https://www.apjii.or.id/pada>
17. Humas Jabar.PSBB Bodebek Diperpanjang 14 Hari Mulai 29 April [Internet]. 28 April 2020 [cited 11 May 2020]. available from: <http://humas.jabarprov.go.id/psbb-bodebek-diperpanjang-14-hari-mulai-29-april/3236s>
18. Nurman MA & Sofiah. PSBB Riau Diperpanjang dan Diperketat [Internet]. 28 april 2020 [cited 11 may 2020]. Available from <https://riaupos.jawapos.com/pekanbaru/28/04/2020/230324/psbb-diperpanjang-dan-diperketat.html>
19. Khalid A. SBB Disetujui Menkes, Gubernur Gorontalo Segera Siapkan Regulasi[Internet]. 28 April 2020 [cited 11 may 2020]. Available from: <https://news.detik.com/berita/d-4995135/psbb-disetujui-menkes-gubernur-gorontalo-segera-siapkan-regulasi>
20. Springer S. Google Trends provides a tool to monitor population concerns and information needs during COVID-19 pandemic. *Brain, Behavior, and Immunity*. 2020 Apr 29
21. Lin YH, Liu CH, Chiu YC. Google searches for the keywords of “wash hands” predict the speed of national spread of COVID-19 outbreak among 21 countries. *Brain Behav Immun*. 2020;87:30-32. doi:10.1016/j.bbi.2020.04.020
22. Clarke D. Law, regulation and strategizing for health. Strategizing national health in the 21st century: a handbook. Geneva: World Health Organization. 2016.
23. Durch JS, Bailey LA, Stoto MA. Understanding health and its determinants. In *Improving Health in the Community: A Role for Performance Monitoring* 1997. National Academies Press (US).
24. Nölke L, Mensing M, Krämer A, Hornberg C. Sociodemographic and health-(care)-related characteristics of online health information seekers: a cross-sectional German study. *BMC Public Health*. 2015;15:31. Published 2015 Jan 29. doi:10.1186/s12889-015-1423-0