

## MODELING OF COVID-19 TOPICS ON PUBLIC HEALTH MESSAGE COMMUNICATION PATTERNS ON RADAR BANYUMAS SOCIAL MEDIA

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### ABSTRACT

*The global outbreak of Covid-19 has emerged as one of the most devastating and challenging threats to all peoples of the world. The purpose of this study is to identify the theme and topic of Covid-19 on the pattern of public health message communication on social media Radar Banyumas. The spread of Covid-19 disease was found to correlate with social media activity as a tool to promote Covid-19 News. Topic modeling revealed from time to time in the Radar Banyumas mass media can help understand the impact of the outbreak on the emotions, beliefs, and thoughts of the affected communities. This can open up great opportunities for proper education and dissemination of information on public health recommendations. This study shows that data from Banyumas Radar mass media is useful for infodemiology studies. This topic modeling consistently categorizes public health messages, risk factors, pandemic situations, the impact of Covid-19, measures to slow the spread of Covid-19, preventive measures, health authorities and government policies, negative psychological reactions, social stigma related to Covid-19, Covid-19 cases, Covid-19 in Banyumas, and Covid-19 cases in Indonesia.*

**Keywords:** *topic modeling, discourse analysis, Covid - 19, Banyumas Radar*

## INTRODUCTION

The SARS-CoV-2 virus epidemic that began in 2019 resulted in coronavirus disease (Covid-19) which was further declared by WHO as a global pandemic (Ameli, Esfandabadi, Sadeghi, Ranjbari, & Zanetti, 2022) ; (Buigut & Kapar, 2021). Covid-19 has a rapid intensity of transmission and Indonesia began to be exposed to this deadly virus in early March 2020. Since then, various information has appeared in print and online mass media (Marcoux & Agarwal, 2021). The level of knowledge, experience, and emotions of the Indonesian public towards the various information resulted in various new news discourses that were disseminated through various social media platforms (Yanti, 2020). Various physical efforts such as mask use campaigns, coughing, sneezing ethics, clean and healthy living habits, and activity restrictions through social distancing and physical distancing are applied to all sectors, both private and government (Nur, 2020). However, the media's attitude is also no less important in providing color for the audience so that the role of the mass media in presenting Covid-19 News will contribute to shaping public opinion and dynamics in responding to this Covid-19 pandemic (Mughtar, Bahrudin, & Khoyin, 2020). During the pandemic period and the existence of social restriction policies, mass communication is an option in delivering information to the public and is used as the best choice in the process of social interaction that must continue during a pandemic (Sha, Hasan, Mohler, & Brantingham, 2020). Instagram Facebook the existence of various social media, print, and online mass media as well as various social media platforms such as Twitter, Instagram, websites, blogs, and Facebook that present various information, ideas, and public views related to the spread of the Covid-19 virus are used as a tool to convey messages to the wider community (Bonefasius, 2020), (Majumder & Mandl, 2020), (Gustomy, 2020). The existence of this news discourse very much helps provide explanations, knowledge, and solutions that can provide peace to the audience.

In addition, social media also plays an important role for individuals, governments, and organizations in providing information and expressing opinions. It

is a challenge to identify the topic and to find out how to react and the level of public sentiment and concerns about public health interventions in Covid-19 discourse (Kwok, Vadde, & Wang, 2021). Concerning the news discourse regarding Covid-19 in Banyumas, which is in the Radar Banyumas online media, it indirectly shows the community's involvement in the discourse. Government agencies in this regard who are heavily tasked with promoting various Covid-19 health protocols, also benefit from social media, especially when mentioning hashtags (Chen, Lerman, & Ferrara, 2020). To be able to increase community interaction and involvement in the post discourse regarding Covid-19, the community can respond to citizens' questions again by writing in the comments column or mentioning hashtags again. It can be said that texts (discourses), images, photographs, and videos are sources of media wealth that can affect the emotional valence of readers (Hosseini, Hosseini, & Broniatowski, 2020). News discourses regarding Covid-19 in Banyumas can indirectly illustrate that there is community involvement related to the type of discourse such as whether it can affect the discourse of new news raised by the community itself. Therefore, it is important to uncover the various reactions that appear on social media. Social Media has media-oriented features that are important for mediating the dissemination of information. The public can easily receive information about the latest facts related to the development of Covid-19 cases in the Banyumas region. Meanwhile, the government can use the information available in the mass media to better understand public attitudes, concerns, and demands. Sentiment analysis was conducted to see the opinion or tendency of opinion toward Covid-19 News discourse whether it tends to have a negative or positive opinion (Chandrasekaran, Mehta, Valkunde, & Moustakas, 2020) ; (Lwin et al., 2020).

This study aims to review and analyze articles about the occurrence of various types of infectious diseases, in this case, Covid-19. Social media Radar Banyumas provides a variety of communication mechanisms for citizen interaction, thus allowing the people of Banyumas to share information and exchange opinions. This study compared the timeline of topics discussed with the implementation time of interventions related to public health messages. It aims to describe the distribution of

topics based on a certain time and identify the representative words on each topic. The research can also track the community's response to the pandemic and how it evolves over time. This content and sentiment analysis can help understand the impact of the Covid-19 pandemic on emotions, beliefs and the general public. Metadata is taken from posts regarding Covid-19 News on Radar Banyumas social media including the number of likes, number of comments, number of retweets, time of publication, and location of publication. Data analysis in this study applied topic modeling critical discourse analysis by determining the topics that appear in posts on social media Radar Banyumas. This methodological framework is used to track public responses to the development of Covid-19 and serves to measure public reactions to actions or an ongoing policy.

## **THEORY AND METHOD**

Discourse is the most complete linguistic unit expressed in the form of a whole essay that carries a complete mandate. In this case, the discourse contains sentences, paragraphs and fragments of discourse (Scannell, 2021). As a means to channel information, discourse contains various ideologies and certain understandings (Abrams, 2020). In the digital era in this pandemic situation, the media as information providers must make various innovations so that news can be delivered quickly (Xue et al., 2020). The Media is present in the community as a connector of information as well as a communication bridge between the community and the government and vice versa (Chen et al., 2020). Globalization with the condition of the Covid-19 pandemic has made online news media or print media required to present news about developments related to what steps will be taken next. In line with what was conveyed (Prajarto, 2021) that the media has a central role in delivering information about Covid-19. In the delivery of information is expected to use descriptive propositional mode, persuasive and interrogative so that the information in the form of units of the language contains *kelugasan* (Majumder & Mandl, 2020). The construction of a discourse in online mass media has a very crucial

and essential role, especially on the theme of the news stories raised and how to present the discourse.

Social Media can also be used as a research and tracking tool in public health related to COVID-19. For example, researchers have used social media to track and forecast the spread of the COVID-19 outbreak. With so much publicly available information about various diseases and other public health issues, there is great potential to use social media as a source of data mining for pandemic response development. Social Media can be a complementary information channel to the official means for health data collection during this COVID-19 pandemic, which has previously been considered as successful as epidemiological surveillance and control activities carried out by health authorities. For this reason, more and more organizations, professionals and scientific institutions see the need to take advantage of Health Information Resources based on social media platforms.

Radar Banyumas is one of the largest mass media in the Barlingmascakeb area that contains various information that is trending. Researchers collected News discourses both in print and online media related to Covid-19 during the period from December 1, 2019, to December 1, 2021. Metadata textual information regarding Covid-19 is also taken from the number of likes, comments, retweets, publishing time and publishing location. After grouping the words from the collected texts, the researchers used topic modeling to identify topics that appeared in the news about Covid-19 on Banyumas Radar. Through the inventory, it can be analyzed about the emotional tendency of topics, calculate the proportional distribution of topics, social stigmatization, and changes in user concerns regarding Covid-19 News discourse. Topic modeling is a technique used to extract and summarize trending issues from a document (Garcia & Berton, 2020) ; (Mutanga & Abayomi, 2020). Among the existing techniques, one of the most common is topic modeling. This model aims to identify speculation about topic distribution based on Covid-19 News discourse so that it can map discourse to a collection of Covid-19 news topics.

## FINDING AND DISCUSSION

### Detection of Covid-19 discourse topics on Radar Banyumas' social Media

Topic modeling is the grouping of reading information sourced on a particular topic. Topic modeling works a kind of clustering by grouping documents based on their similarity (Yin, Yang, & Li, 2020). In this study, topic modeling was used to recognize topic trends in mass media related to health messages in order to create a health topic that can be identified during the Covid-19 pandemic (Chandrasekaran et al., 2020). The topics covered in Radar Banyumas' mass media posts are as follows.

Theme	Topics	Emerging Terms
About Covid-19	Clinical symptoms	Batuk, bersin, demam, sesak napas, droplet
	Ways of transmission	Transmit, transmisi lokal, hand sanitizer
	Ways of prevention at the individual level	Process, new case
Treatment	Medical resources	Nurse, doctor, volunteer, Ward
	Covid-19 Treatment	PCR test, ODP, PDP
	Medical treatment	Diagnosis, confirm
	Self-isolation room	ICU, ventilator, respirator
	No need to worry about burial of confirmed covid-19 bodies	Victims, funerals, dead people
	Patient reception	Recovery, survivors
	Who is included in the high-risk group	Elderly, pregnant and lactating women, comorbid
Covid-19 pandemic situation	Local epidemics	Pagebluk, Banyumas
	Epidemic in Indonesia	New normal
	Worldwide epidemic	China, Wuhan, isu global, kesehatan dunia

Covid-19 prevention and control measures	Self-isolation	Hospital, home
	Early detection	Symptom screening, a quarantine period
	Vaccine	Clinical trials, vaccine development
	No homecoming hometown	Infectious, comorbid
	Information about dialable numbers	The covid-19 task force, Ministry of Health, covid-19 cluster
	Joint prevention and control	Virus spread, lockdown, tracing
	How to get rid of Covid-19	Disenfektan, social restrictions, prokes, clean and healthy lifestyle
	Influencers as ambassadors of public health messages regarding Covid-19	Religious leaders, community leaders, social media
	Social distancing and Physical distancing	Physical restrictions, territorial restrictions
	Canceled public events	Celebration, The Imposition Of Restrictions On Community Activities
Closed public transport	Airport closure	
International travel control	Swab test, rapid test, self-quarantine	
Impact Of Covid-19	Workplace closure	Work From Home (WFH)
	School closures	Scholl From Home (SFH)
	Psychological influence	the emotional attitude of the patients was confirmed, and the workers were laid off, Hope, worry, fear, mental health
	Social stigmatization	Mental health,
	Impact or economic shock	Layoffs laid off, influence, market, shocked
	Work and resumption of production	Factory reopen
	Learning in schools has begun to be implemented again	Start face-to-face, back to school, college entrance

	exam, high school
Pandemic statistics	confirmed cases, deceased cases, recovered patient cases
Donate materials	Masks, hand sanitizer, discuss donations

Topic modeling on public health messages regarding Covid-19 information conveyed to residents in Radar Banyumas mass media is about 1) What is Coronavirus Disease 2019 (Covid-19); 2) who is included in the High-Risk Group ; 3) self-isolation, 4) information about telephone numbers that can be contacted ; 5) not going home, not worrying if there is a funeral and how to eradicate Covid-19. Public health messages on what is covid-19 education are related to a) clinical symptoms such as fever, cough, runny nose, sore throat, fatigue, and respiratory problems ; b) the mode of transmission which includes droplets or droplets of fluid derived from coughing/sneezing; personal contact such as touching and shaking hands ; and touching objects or surfaces contaminated with the virus on it and then touching the mouth, nose; C) prevention methods at the individual level that include personal hygiene include washing hands more often using soap with running water (CTPS) or using hand sanitizer, avoid touching eyes, nose and mouth with unwashed hands, avoid close physical interaction with people who have symptoms of illness, apply sneezing etiquette, wear a mask, stay at home and maintain social/physical distance (social/physical distancing), do not shake hands, immediately change clothes / shower, and periodically clean and disinfect objects that are often touched. Furthermore, how to prevent at the individual level is to increase self-immunity which includes balanced consumption of gisi, doing a physical activity / light gymnastics, sunbathing in the morning for 15 minutes, adequate rest, not smoking, vitamin supplements (if needed), control diseases such as diabetes mellitus, hypertension and asthma, and remain calm responding to information and the next situation, other information submitted in the mass media, breastfeeding and productive age with concomitant diseases/risks. In this regard, the scope is what

should be done by the elderly, nursing pregnant women. The elderly should stay at home, keep doing routine activities sunbathing, istirahat enough and sleep 6-8 hours/day, eat a balanced nutritious diet, drink multi vitamins (if necessary), keep a distance of 1-2 m, avoid shaking hands/touching, often wash hands with soap with running water, stay away from sick people and keep the environment clean. For pregnant women that must be done is to learn and apply the guidelines for maintaining pregnancy in the KIA book. Furthermore, what is done by breastfeeding mothers, among others, is using a mask while breastfeeding, and washing the breast pump after each use.

The most prominent content analysis was the public health message regarding self-isolation. Residents with the status of people under monitoring (ODP) and patients under supervision (PDP) established by the hospital/puskesmas must isolate themselves by staying at home. In this case, the role of residents, RT/RW/village head in self-isolation /home quarantine, or residents with OTG/ODP/PDP status and travelers have their own procedures in each handling. Therefore, the information about this independent class is very intensively conveyed through social media platforms and others. In posters, banners or any public health messages are always followed by an important telephone number that can be contacted by residents such as the telephone number of the RT/RW/Village Head, Kemenkes (119 ext.9), The National Disaster Management Agency (BNPB): 117, and website addresses that can be accessed by all residents to find out the latest information about Covid-19 such as the BNPB website (<https://www.covid19.go.id/>) and three Kemenkes websites (<https://covid.kemkes.go.id;> <https://infeksiemerging.kemkes.go.id;> <http://promkes.kemkes.go.id>). Another appeal in public health messages is not going home. This is because it is prone to the risk of transmission, breaking the Covid-19 chain, giving more importance to family health in the hometown. If forced to go home, then what must be done is to use a private vehicle and always prokes at the time of travel. Travelers are also required to report at their place of residence and continue to do isoman for 14 days because travelers are included in the ODP.

Another public health message is that the public does not need to worry if there is a funeral for the bodies of citizens who are positive for Covid-19 because the bodies when sanctified, buried have gone through special procedures from the hospital and are carried out by trained officers so that they are safely sterilized and will not transmit. The trending topic in the Covid-19 pandemic at the end of 2021 is how to eradicate Covid-19 with disinfectants. Manufacturers are competing to offer a wide range of over-the-counter disinfectant products. However, the content of the message emphasized is about checking the active ingredients listed on the product label, disinfectant must contain one of the active ingredients including Accelerated hydrogen peroxide (0.5%), Chloroxylenol (0.12%), Ethyl alcohol /ethanol (62-71%), Iodine in iodophor (50 ppm), Sodium chlorite (0.23%), etc. In this case, what needs to be cleaned is the surface of objects that are often touched such as electronic devices, light switches, toilets, sinks, chairs backs, and tables. How to do it is by using gloves, using a mask.

Topic models in public health messages that can remove social stigma include information about stories and images of local people who have experienced Covid-19 and have recovered and support recovery efforts such as donating plasma and implementing a 'Hero' campaign to honor caregivers and health workers who may be stigmatized. In addition, journalistic reporting that focuses too much on individual behavior can increase the stigma of people who may have Covid-19. Some information is also centered on the news about efforts to find vaccines and anti-viral drugs that take a long time which resulted in giving fear and giving the impression that the current pandemic situation will not end. As a substitute, it promotes content around basic infection prevention practices, early recognition of Covid-19 symptoms, ways of recurrence, and so on. Stereotypes of Banyumas local people with a humanism side are needed to help remove the stigma against Covid-19 sufferers.

### **How to Engage in Communication with Affected Communities**

Social Media is a communication tool and a source of information that can be used as a means of learning about people's reactions to social problems (Kwok et al.,

2021). The Covid-19 pandemic has had a significant impact on all sectors of life. Platforms such as Radar Banyumas mass media have allowed Banyumas people to discuss with each other and show emotional support that can be seen from the presence of positive comments and negative comments (Ito & Chakraborty, 2020). In this regard, the involvement of citizens during the Covid-19 crisis in Banyumas is very important to understand how public priorities and concerns of people who feel panic, anxiety and fear regarding news discourses circulating in the media. Public opinion and dynamics in responding to the Covid-19 pandemic have an impact on communication engagement with affected communities. The key message conveyed to the general public regarding the Covid-19 pandemic is to know about Covid-19 (Causes, Symptoms, Signs, transmission, prevention, and treatment). In this case, prevention can be done, among others, Health Advice and Travel Advice. Perform hygiene on all limbs such as always maintaining routine hygiene, especially before holding the mouth, nose, and eye and after holding public installations, covering the mouth and nose when sneezing and when having airway symptoms using a mask and immediately seeking treatment are included in health advice. Furthermore, travel advice includes avoiding contact with animals (whether living or dead), avoiding close contact with patients with symptoms of respiratory infections, complying with food safety instructions and hygiene rules, avoid consuming raw or undercooked animal products. It can be said that communication engagement with affected communities among others i.e. establishing methods to understand the concerns, attitudes, and beliefs of key audiences, identifying about the target audience, and gathering information about knowledge e.g. whom they can trust, how they will receive the information, their concerns, etc. In addition, identifying influencers such as religious leaders, community leaders, health workers and community networks that can be used for community engagement can be used as key factors to convey the message to the right target. Prevention at the community level is also related to restrictions on physical interaction and social restrictions such as messages in avoiding the use of public transportation, working from home (Work

from Home), avoiding traveling out of town, avoid gathering friends and family. The implementation of cough and sneeze ethics is also a key message in public appeals.

The strategy of delivering media information on the prevention and recurrence of Covid-19 to the mass media in Banyumas can provide education to the community. In conveying information, especially amid pandemic conditions, tools in the form of educational media are needed that can help convey messages. Health education Media are all means in an effort to display the message or information that the communicator wants to convey so that the target can increase his knowledge which is finally expected to change his behavior in a positive direction towards health (Ortega & Bernabé-Moreno, 2021). Types of media delivery of messages with communication patterns in the form of Appeals can be in the form of print media such as booklets, leaflets, flyers (Flyers), and flipcharts (flip sheets, rubrics, posters, photos). The message contained in the mass media must be effective and creative. In this case, should focus attention on the message (command attention), the message should be delivered effectively, simply, and clearly. The message must be trustworthy (create a trust), consistent, and expected to provide benefits. In the public health message regarding the news of Covid-19 in the form of appeals related to prevention and countermeasures.

"Infodemic" hoaxes in the current pandemic situation can contribute to negative effects including stigmatization and discrimination of affected communities. The community needs information from clear sources, so that it can be acted upon to support the community. Various types of hoax infodemics circulating in the news include: a) the emergence of 'memes' and emotional narratives that mix emotional language, lies, and fragmentary information ; b) the existence of false websites and identities by providing false information that looks like the truth and will be included in the news; c) the existence of manipulative images or videos deliberately created by irresponsible people to cause confusion and eliminate public trust in state authorities ; d) organized disinformation campaigns aimed at politics and deliberately created to undermine the credibility of authority and the economy. Ineffective communication

leads to misunderstandings, misinformation can also contribute to stigma and discrimination. Therefore, the use of diction must be careful because it can affect the attitude of others. To anticipate hoax infodemics, the effort made is to provide information by accurate facts about Covid-19 News accompanied by clear links or narratives and sources. The existence of various varied news discourses also allows the public to seek various reliable information (Medford, Saleh, Sumarsono, Perl, & Lehmann, 2020). The emergence of these new discourses is also inseparable from the development of technology that can allow people to create their own, and use multimedia content easily. Discourse content posted on social media is usually presented in plain text, images or photos and videos. It is also not uncommon for certain social media because of the word limit, then only include complementary materials such as images or videos (Liu et al., 2020) . Related to this, there are positive content that is shared and then get a positive reaction which ultimately increases the rate of retweets and there is content that contains negative emotions which ultimately decreases the number of shares (Chew & Eysenbach, 2009), as in the following news information data.

Positive Information	Negative Information
Talk about the Covid-19 disease in a clear source by attaching a map of the distribution of Covid-19 disease throughout the world in general and Indonesia in particular	Talking about the Wuhan virus, or the Chinese virus or the Asian virus. Based on the fact that the official name for this type of disease was deliberately chosen to minimize the stigmatization of “Co” which stands for Corona, or “Vi” for the virus and “19” because the disease appeared in 2019.
People who have Covid-19, people who are being treated for Covid-19, people recovering from Covid-19, people who died after contracting Covid-19	Covid-19 cases or victims
Talk about people who have had or made contact with Covid-19	People who transmit Covid-19, infect others or spread the virus because it implies intentional transmission and blame”. Using criminalizing or dehumanizing terms can create an impression of its own.
Talking about people who may have Covid-	Talking about covid-19 suspects or suspected

*Gita Anggria Resticka, Erwita Nurdiyanto, Gigih Ariastuti Purwandari – Modeling of Covid-19 Topics on Public Health Message Communication Patterns on Radar Banyumas Social Media*

19 or people suspected of having Covid-19 cases

Talk about the impact of Covid-19 risk based on scientific and current data from the health page  
Share unconfirmed rumors and avoid using exaggerated (hyperbolic) language

When informing about Covid-19, the use of certain words or sentences such as ‘suspected case, isolation’ and some other words may have a negative meaning for people and trigger stigmatization. This public health message should use simple language and avoid clinical terms. The use of inappropriate diction, ambiguous and ineffective sentences can make negative assumptions, obscure information, double meaning and potentially lead to widespread fear. The reason for using proper diction and effective sentences on mass and social media will form a popular language and communication language on Covid-19. The use of ambiguous words and sentences and words that have negative connotations will affect the treatment of ODP patients or PDP patients. Therefore, it must be wise when communicating on social media and other communication platforms so that it supports efforts to remove the stigma around the Covid-19 disease. In this regard, hoax news discourse is present through social media and is influenced by social, cultural and political contexts. The existence of information in the form of negative sentences that appear when the media is not careful in explaining a hoax such as the use of inappropriate diction is one indication of the spread of hoaxes. Hoax news discourse does not use factual information, but through certain diction content manipulation and distortion of information is used to convey news that is not necessarily the truth. Detection of news discourse containing hoaxes can be identified from provocative news headlines accompanied by photos as illustrations to be able to convince readers. In this case the photo or image can be more convincing to the reader without having to read the full content of the news. The appearance of *pungtuasi* or punctuation point, exclamation mark *belebihan*, mixing capital and lowercase letters, shortening words, sentence structure ineffective, the use of interjection words (interjection) “*aneh, behoh, wow*”, and the use of auxiliary words *Command* “*tolong, silakan*” also indicate hoax news. The purpose of its use is to make the reader feel anxious and worried when the news does not really

happen. The use of sarcasm language with variations of expression using caustic words and crude ridicule and the use of modalities with certainty markers (definitely, of course, so) and possibility markers (presumably, maybe, presumably, likely) can also indicate hoax news discourse.

## CONCLUSION

The Covid-19 pandemic has proven to have a psychological impact and paralyze the economy of affected communities. The covid-19 discourse, which is widely spread on various mass media platforms, both in accordance with facts and simply hoaxes, has been able to identify public opinions on the Covid-19 topic. This topic modeling Identification shows a variety of cases and more information about what Covid-19 is, how the symptoms and ways of transmission, finding ways to adapt to the pandemic situation, tracking the transmission of Covid-19 to media attention / social atmosphere to the economy. Rdaar Banyumas can serve as an important cultural medium for the growth and dissemination of public perceptions of global infectious outbreaks such as Covid-19.

## REFERENCES

- Abrams, T. (2020). Disability, deadly discourse, and collectivity amid coronavirus (COVID-19). *Scandinavian Journal of Disability Research*, 22(1), 168-174. <https://doi.org/10.16993/SJDR.732>
- Ameli, M., Esfandabadi, Z. S., Sadeghi, S., Ranjbari, M., & Zanetti, M. (2022). COVID-19 and Sustainable Development Goals (SDGs): Scenario analysis through fuzzy cognitive map modeling. *Gondwana Research*, 14(1), 138-155. <https://doi.org/10.1016/j.gr.2021.12.014>
- Bonefasius, R. dkk. (2020). Elipsis pada wacana tentang covid-19 dalam kolom Opini surat kabar Kompas. *Jurnal Pendidikan dan kebudayaan Miissio*, 12(2), 152-163.
- Buigut, S., & Kapar, B. (2021). Covid-19 cases, media attention and social mood. *International Journal of Economics and Financial Issues*, 11(4), 66-72. <https://doi.org/10.32479/ijefi.11591>
- Chandrasekaran, R., Mehta, V., Valkunde, T., & Moustakas, E. (2020). Topics, trends, and sentiments of tweets about the COVID-19 pandemic: Temporal infoveillance study. *Journal of Medical Internet Research*, 22(10), 1-12, <https://doi.org/10.2196/22624>

- Chen, E., Lerman, K., & Ferrara, E. (2020). Tracking social media discourse about the covid-19 pandemic: Development of a public coronavirus twitter data set. *JMIR Public Health and Surveillance*, 6(2), 1-9. <https://doi.org/10.2196/19273>
- Chew, C., & Eysenbach, G. (2009). Pandemics in the age of Twitter: Content analysis of Tweets during the 2009 H1N1 outbreak. *PLoS ONE*, 5(11), 1-13. <https://doi.org/10.1371/journal.pone.0014118>
- Garcia, K., & Berton, L. (2020). Topic detection and sentiment analysis in Twitter content related to COVID-19 from Brazil and the USA. *Applied Soft Computing*, 101, 107057. <https://doi.org/10.1016/j.asoc.2020.107057>
- Gustomy, R. (2020). Pandemi ke Infodemi: Polarisasi Politik dalam Wacana Covid-19 Pengguna Twitter. *JiIP: Jurnal Ilmiah Ilmu Pemerintahan*, 5(2), 190-205. <https://doi.org/10.14710/jiip.v5i2.8781>
- Hosseini, P., Hosseini, P., & Broniatowski, D. A. (2020). Content analysis of Persian/Farsi Tweets during COVID-19 pandemic in Iran using NLP. In *Proceedings of the 1st Workshop on NLP for COVID-19 (Part 2) at EMNLP 2020*, Online. Association for Computational Linguistics. <https://doi.org/10.18653/v1/2020.nlpcovid19-2.26>
- Ito, H., & Chakraborty, B. (2020). Social Media Mining with Dynamic Clustering: A Case Study by COVID-19 Tweets. *2020 11th International Conference on Awareness Science and Technology (iCAST)*, 1-6. <https://doi.org/10.1109/iCAST51195.2020.9319496>
- Kwok, S. W., Vadde, S. K., & Wang, G. (2021). Tweet Topics and Sentiments Relating to COVID-19 Vaccination Among Australian Twitter Users: Machine Learning Analysis. *Journal of Medical Internet Research*, 23(5), 1-16. <https://doi.org/10.2196/26953>
- Liu, Q., Zheng, Z., Zheng, J., Chen, Q., Liu, G., Chen, S., & Ming, W. (2020). Health Communication Through News Media During the Early Stage of the COVID-19 Outbreak in China: Digital Topic Modeling Approach. *Journal of Medical Internet Research*, 22(4), 1-12. <https://doi.org/10.2196/19118>
- Lwin, M., Lu, J., Sheldenkar, A., Schulz, P., Shin, W., Gupta, R., & Yang, Y. (2020). Global Sentiments Surrounding the COVID-19 Pandemic on Twitter: Analysis of Twitter Trends. *JMIR Public Health and Surveillance*, 6(2), 1-10. <https://doi.org/10.2196/19447>
- Majumder, M. S., & Mandl, K. D. (2020). Early in the epidemic: impact of preprints on global discourse about COVID-19 transmissibility. *The Lancet Global Health*, 8(5), e627-e630. [https://doi.org/10.1016/S2214-109X\(20\)30113-3](https://doi.org/10.1016/S2214-109X(20)30113-3)
- Marcoux, T., & Agarwal, N. (2021). *Narrative Trends of COVID-19 Misinformation*. Diambil dari

<https://www.semanticscholar.org/paper/0709e03af0787bdd1cf6cad724283f9097e75a2a>

- Medford, R., Saleh, S., Sumarsono, A., Perl, T., & Lehmann, C. U. (2020). An “Infodemic”: Leveraging High-Volume Twitter Data to Understand Early Public Sentiment for the Coronavirus Disease 2019 Outbreak. *Open Forum Infectious Diseases*, 7. <https://doi.org/10.1093/ofid/ofaa258>
- Muchtar, K., Bahrudin, B., & Khoyin, M. (2020). Analisis Tajuk Rencana Mengenai Covid 19 pada Harian Umum Pikiran Rakyat. 1–14. Diambil dari <http://digilib.uinsgd.ac.id/id/eprint/31611>
- Mutanga, M. B., & Abayomi, A. (2020). Tweeting on COVID-19 pandemic in South Africa: LDA-based topic modelling approach. *African Journal of Science, Technology, Innovation and Development*, 14, 163–172. <https://doi.org/10.1080/20421338.2020.1817262>
- Nur, M. (2020). Konstruksi Reputasi dan Responsitivitas Intansi Pemerintah melalui Media Sosial pada Situasi Pandemi Covid-19 (Analisis Wacana pada Laman Facebook Direktorat Jenderal Perbendaharaan Kementerian Keuangan RI). 5, 217–234.
- Ortega, J., & Bernabé-Moreno, J. (2021). Modelling the Degree of Emotional Concern: COVID-19 Response in Social Media. *Applied Sciences*, 11(9),38-72. <https://doi.org/10.3390/app11093872>
- Prajarto, N. (2021). A Content Analysis on Health Communication of Covid-19 in Online Media From February To July 2021. *Jurnal Penelitian Komunikasi dan Opini Publik*, 25(2), 132–148.
- Scannell, D. (2021). COVID-19 Vaccine Discourse on Twitter: A Content Analysis of Persuasion Techniques, Sentiment and Mis/Disinformation. *Journal of Health Communication*, 26(7), 443–459. <https://doi.org/10.1080/10810730.2021.1955050>
- Sha, H., Hasan, M., Mohler, G., & Brantingham, P. (2020). Dynamic Topic Modeling of the COVID-19 Twitter Narrative Among U.S. Governors and Cabinet Executives. *ArXiv, abs/2004.1*. Diambil dari <https://www.semanticscholar.org/paper/e767d7dc7a215fc7e1eed093425089a179eba77a>
- Xue, J., Chen, J., Chen, C., Zheng, C., Li, S., & Zhu, T. (2020). Public discourse and sentiment during the COVID 19 pandemic: Using Latent Dirichlet Allocation for topic modeling on Twitter. *PLoS ONE*, 15(1), 1-12. <https://doi.org/10.1371/journal.pone.0239441>
- Yanti, A. D. dkk. (2020). Analisis Kesalahan Berbahasa dalam Wacana Media Sosial Lawan Covid-19. *Journal Humanities Piktorial*, 2(2), 1-8, <http://dx.doi.org/10.32493/piktorial.v2i2.7643>
- Yin, H., Yang, S., & Li, J. (2020). *Detecting Topic and Sentiment Dynamics Due to*

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