Sentiment Analysis of Health Care Professionals on Twitter

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ABSTRACT. Positive and negative effects are associated with the information and communications produced by social media. Therefore, social media has a substantial impact on social life in society. In addition to serving as a platform for establishing relationships with other users, social networking sites are also used to facilitate the exchange of information. Social movements also utilize social media platforms such as Twitter. Twitter has become a new venue for people to express certain things, such as their feelings on a particular issue. The number of tweets containing the keywords "Nakes" and "RSUD" prompted this study to investigate the public's perception of health workers. This study employs sentiment analysis to examine how the public perceives health workers. Text mining is a term commonly used to refer to the process of extracting datasets from Twitter in the form of text. The findings of this study indicate that Twitter is dominated by negative sentiments regarding healthcare workers. The high value of negative sentiment relative to positive and neutral sentiment may also be attributable to the fact that netizens' perceptions of health workers in the community tend to be negative. Although health workers are spontaneously discussed on social media, the medical community may be able to actively contribute to the conversation by generating positive content.

KEYWORDS: Sentiment Analysis; Health Workers; Twitter

1 INTRODUCTION

The impact of social media on social life in society is considerable. These changes can be observed in social relations or in the balance of social relations, as well as all forms of change in public institutions in society, all of which will have an impact on the social system, including values, attitudes, and behavior patterns between groups. (Nofrima et al., 2020). Positive and negative effects are associated with various social media-generated information and communications. (Untari et al., 2020).

The majority of social media users are between the ages of 18 to 24. The age range between 55 and 64 is the lowest. This indicates that Indonesian youth who are still physically and emotionally developing are the most active users of social media (Irawanto, 2019). Young people have the enthusiasm and physical capabilities to make the best use of social media (Yumitro et al., 2022). Indonesians spend a significant amount of time each day accessing social media. The majority of them spend over three hours and thirty-six minutes per day on Twitter, Facebook, YouTube, Instagram, Whatsapp, and other social media platforms. (Miqdad & Oktaviani, 2021).

Twitter is one of the prominent social media platforms that has been extensively utilized in communication research. Twitter is a microblogging site that is becoming more popular as a place for people to talk about things in posts that anyone can see (Chenworth et al., 2021). Twitter was founded in early 2006 and quickly gained popularity in Indonesia. Twitter is a free internet-based microblogging service that allows users to send 140-character messages to one another. Twitter has 326 million monthly active users, 100 million daily active users, and a daily tweet volume of 500 million. (Salman Aslam, n.d.). The interface is based on the rapid exchange of ideas and information between friends, acquaintances, and all Twitter users (Suryandari & Lutviana, 2020). Twitter messages are referred to as "tweets." These tweets are presented in chronological order from the message stream. They are displayed on the screen of a computer or mobile device. A 'hashtag' is a type of keyword that can be added to a tweet to link it to multiple other messages, making it easier to follow conversations (Ardha, 2014)

In addition to being used to build relationships with other users, Twitter is frequently used as a platform for social movements (Juditha, 2019). Twitter is transforming into a new media that is not only a substitute for social movements, but also a part of a complementary movement (Aisyah, 2020). Twitter is also utilized in the sociopolitical sphere, such as in collective social movements, the reporting of information such as traffic jams, weather conditions, and natural disasters, and the dissemination of alerts for upcoming events (Hartanto, 2017).

In contrast to traditional media, which function as one-way communication channels, social media links such as Twitter enable users to actively exchange opinions and ideas. (Setiawan et al., 2021). Twitter has become a new platform for people to practice and express certain behaviors, such as the expression of opinions on particular issues. The public will then engage in bullying in response to controversial Tweets or certain issues that garner considerable attention (Wirawanda & Wibowo, 2018). The Digital Opinion Movement can grow more rapidly than traditional opinion (Prihantoro et al., 2021). Due to their widespread and user-friendly nature, social media provide the opportunity to collect and analyze discussions and perspectives on a variety of topics, including health-related topics (Chenworth et al., 2021). Such as the issue of Health Workers, which was popular and widely discussed among the public some time ago. The keyword 'Nakes' or health workers is among the top 20 trending topics in Indonesia on Twitter. During the time period of 2-3 June 2022, there were 26,000 tweets containing the hashtag Nakes.
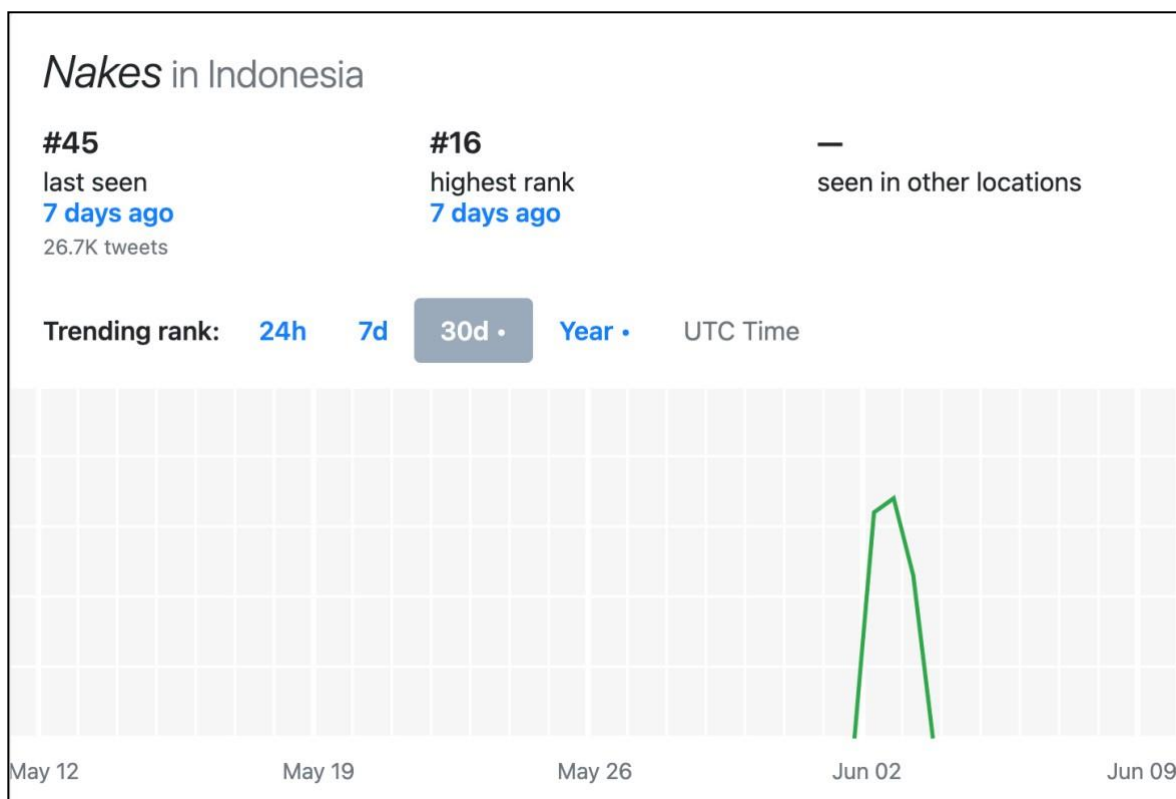

Figure 1. Trending keyword 'Nakes' on Twitter

The presence of the keyword Nakes in public discourse is influenced by the viral content created by nursing students on Tiktok who are completing clinical rotations at the Regional General Hospital (RSUD Wonosari). Students imagine installing a Urine Catheter on an attractive male patient in the course material. This then elicits a response from netizens whose opinions are predominantly negative. As multiple Twitter accounts with numerous followers amplified the issue, this case became increasingly crowded. This Twitter account with many followers is then referred to as a buzzer, an influencer, or a celebrity. This concept is nearly identical to that of a 'opinion leader' or opinion leader within the realm of communication (Hananto, 2014). Until finally, the case that initially went viral on Tiktok entered the top 20 trending topics on Twitter. On June 1st, 7,000 tweets containing the keyword RSUD Wonosari were published on Twitter. This then increased the Twitter popularity of the viral keyword Wonosari Hospital.
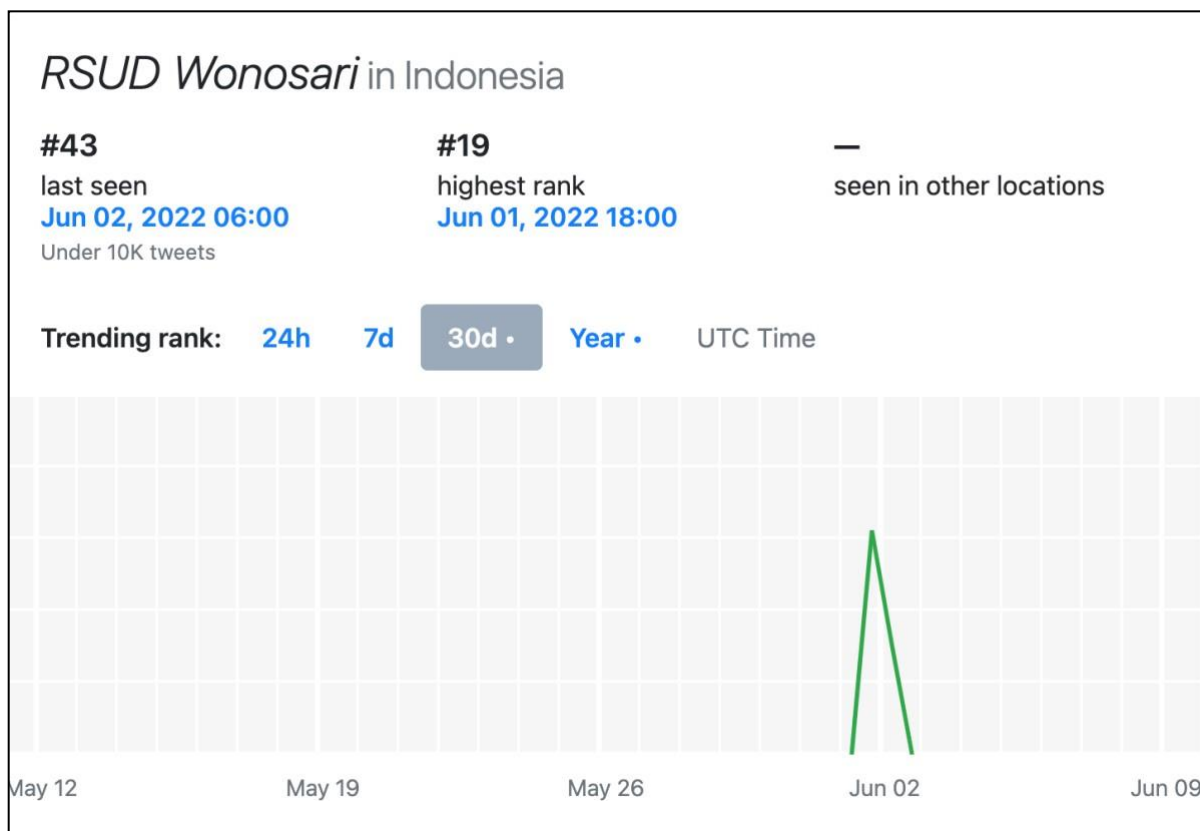
Figure 2. Trending keyword "RSUD Wonosari" on Twitter

Social media Twitter is increasingly a platform for netizens to exercise their freedom of speech and association. (Rofiah et al., 2021). Twitter conversations containing the keywords "nakes" and "RSUD" provide an opportunity to examine the public's attitude toward health workers. Current sources, including social media platforms, enable the collection of data that can be analyzed and processed. This data can be used as a basis for opinion mining and sentiment analysis, which is quite interesting. (Alamoodi et al., 2021). Based on this, this study intends to analyze public sentiment on Twitter, both positive and negative, using the keyword "Nakes.".

2   METHOD

This study employs sentiment analysis to examine how the public perceives health workers. Sentiment analysis is a computational linguistic process and text mining that analyzes the opinions, sentiments, evaluations, attitudes, judgments, and emotions of a speaker or writer in relation to a specific topic, product, service, organization, person, or activity (Liu, 2010). Text mining is the process of extracting datasets from Twitter in the form of text to collect data. Text mining is an interdisciplinary field that includes data mining, machine learning, statistics, and computational linguistics (Agarwal, 2014). After data collection, the reporting data analysis stage consists of multiple steps. The initial step is to apply the Pre-Processing Data procedure to all collected text data. This phase is then continued with the deletion of duplicate data, cleaning, casefolding, stopword removal, stemming, tokenization, and data labeling. After the Pre-Processing Data stage, the weighting process utilizing the Term Frequency-Inverse Document Frequency (TF-IDF) method is carried out. The classification process with Machine Learning algorithms requires this weighting. The next step is data exploration, which entails generating word clouds and investigating categories with positive, negative, and neutral sentiments.

3   RESULT AND DISCUSSION

The data used in this study was obtained from Twitter using the tweet stream method and the Twitter API. The R Studio application is utilized for data retrieval. The variables used to characterize public sentiment toward Health Workers in Indonesia are denoted by the keyword 'Nakes' Following the tweet stream extraction procedure, 64 thousand tweets were successfully extracted from the text data. Along with the viral content of nursing students demonstrating catheter insertion, the frequency of tweets containing the keyword 'Nakes' experienced a significant increase on Twitter. According to Twitter API analysis results, the upgrade began on June 1, 2022.
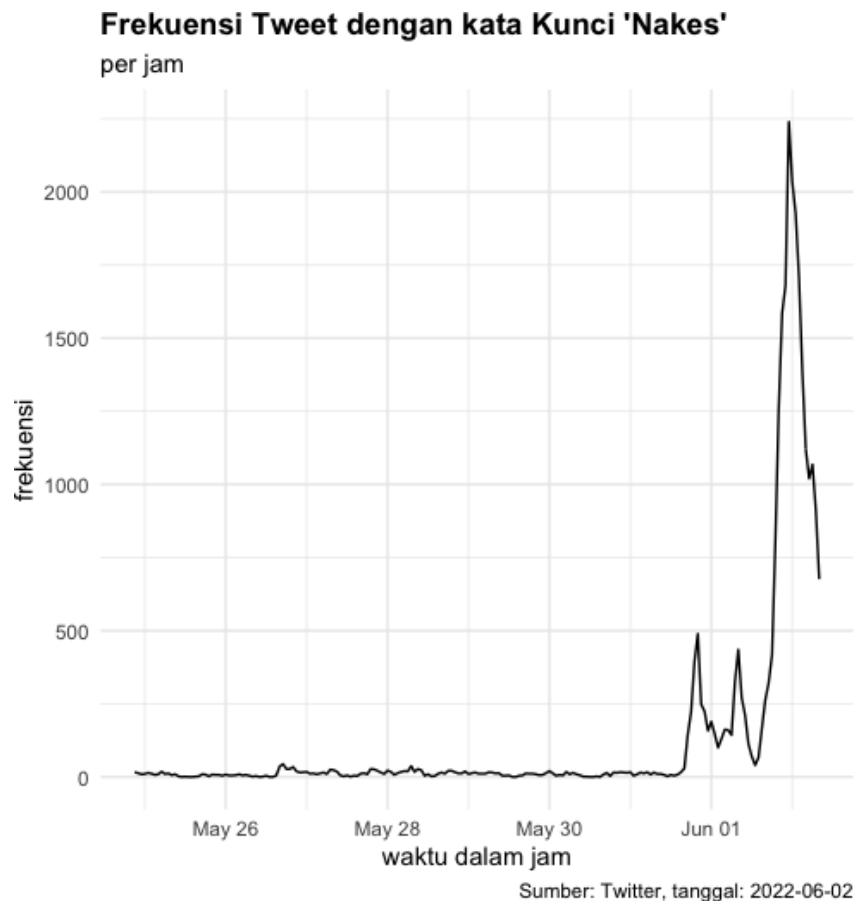

Figure 3. Number of tweets containing the keyword 'Nakes'

Text data collected in the form of tweets containing the keyword 'Nakes' typically contains some noise. So that the text data undergoes a text preprocessing procedure to eliminate noise and improve the accuracy of the sentiment analysis procedure. After undergoing data preprocessing, the filtered tweets reached a total of 26,000 tweets. In this process, the function "[!duplicated(y[,c("text net")]),]" written in the R programming language is also used to delete duplicate data. This process also removes information that is irrelevant to the sentiment classification process, such as hashtags (#), mentions (@), links (http://www), punctuation, numbers, slang, and abbreviations. The remove punctuation stage aims to remove characters that have no impact on the sentiment classification process after case folding, such as commas (,), periods (.), hashtags (#), mentions (@), links, and non-alphanumeric characters. In addition, this stage eliminates redundant data from retweeting (RT) Twitter users and removes words that are deemed unnecessary for this research. (Nooryuda Prasetya & Winarso, 2021).
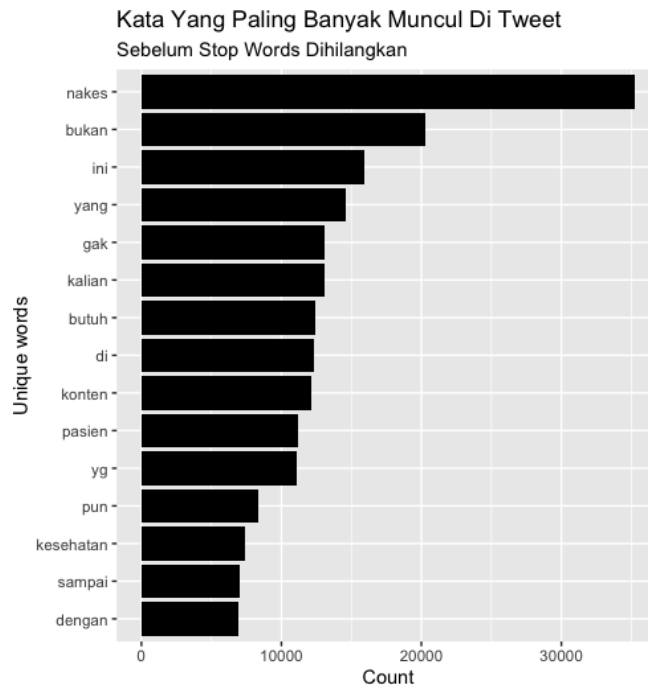
Figure 4. The most frequent word in tweets containing the keyword 'Nakes'

Stopwords are then used to eliminate words with no impact on the sentiment classification process, such as time, connectors, and others. (Vijayarani et al., 2015). Tokenization is the final step of the data preprocessing procedure. Text data that has been cleaned is then divided into tokens based on the delimiter, which is the space character. The results of this tokenization procedure are then classified using the Lexicon dictionary. After all of the data preprocessing stages have been completed, a total of 8,000 tweets are obtained and are ready for classification using the lexicon dictionary. The final step is to visualize the results of the Lexicon-Based method's classification of public sentiment towards Health Workers. Classification includes positive, negative, and neutral categories. The results of the bar chart visualization are shown in the following diagram.
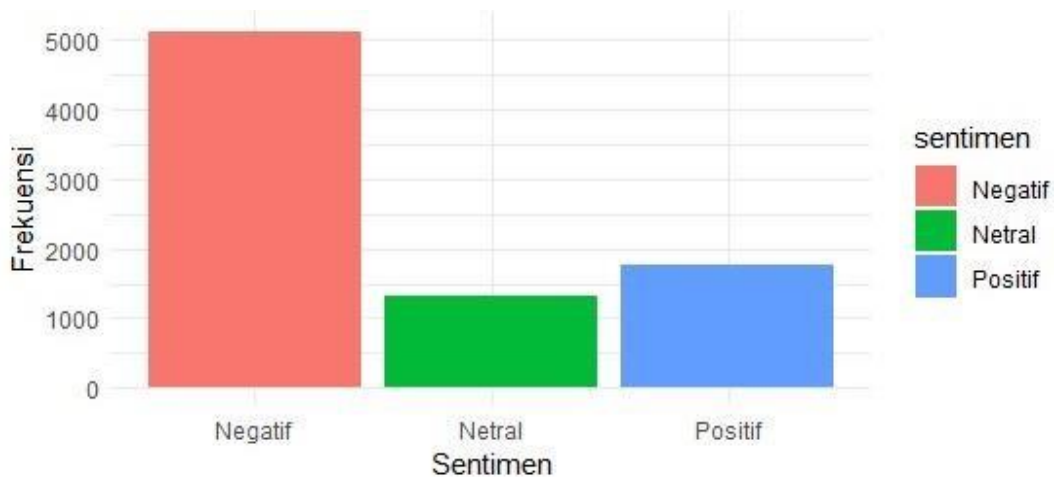

Figure 5. Sentiment Analysis of Health Care Professionals on Twitter

The results of the analysis depicted in Figure 5 indicate that negative sentiment dominates public opinion on Twitter regarding Health Workers. The results indicate that there are a large number of negative public perceptions of Health Workers in Indonesia. Along with trust, fear, sadness, and anger, opinion becomes one of the primary emotions that can be identified. Tweets that have been preprocessed for classification can be translated using sentiment analysis. These tweets are dissected word by word and then classified as positive or negative. Next, the total score is categorized as positive, negative, or neutral (Rai, 2021).

The large number of negative sentiments relative to positive and neutral sentiments enables a correlation with the large number of tweets with negative sentiments that originate from individuals and organizations. Whether an issue is positive or negative will impact the value of the analyzed sentiment. Therefore, this must also be comprehended systematically from the standpoint of mass communication. Because the perception of issues on social media will be determined by the ability to interpret information, not the interpretation of the object, but how the object appears, not the interpretation of the object itself (Mulyana, 2017). The high value of negative sentiment relative to positive and neutral sentiment can also be attributed to the fact that netizens' perceptions of Health Workers in the Community tend to be negative. Although previously, the Covid-19 pandemic situation has provided Health Workers with a favorable environment. However, a topic will develop dynamically and massively on Twitter based on space and time, and will be influenced by the current socioeconomic climate.

Then, the visualization in the form of a wordcloud in Figure 6 reveals that the topic of Health Workers frequently contains a number of words with negative connotations. Among these are the terms fyp, gossip, be made fun of, unscrupulous, mockery, harassment, and content, as well as a few others that can provoke negative attitudes. The emergence of these words cannot be separated from the problem caused by nursing students' Tiktok content. This prompted netizens to respond with negative sentiments on Twitter, which ultimately led to Health Workers. Emotions are always associated with the type of content being communicated. After analyzing the viral content of nursing students on Tiktok, this study examines the most popular topics in tweets pertaining to health care professionals.

Figure 6. Wordcloud Health Worker terms that appear frequently on Twitter

To interpret a phenomenon on social media effectively, sufficient knowledge is required, and this knowledge comes from media literacy (Mailo & Lazuardi, 2019). Social media literacy is not an effort to restrict the use of or even access to social media; rather, it aims to raise awareness regarding the consumption of social media in a more critical and regulated manner. As a result of the positive and negative effects of technology on the younger generation in Indonesia, particularly communication technologies such as social media, there is a need for educational reform (Untari et al., 2020). Social media can serve as a tool for bolstering civil society and the public sphere. By analyzing social media data, we will be able to track communication responses and identify the type of public sentiment towards an issue. Because recognizing emotions when communicating in cyberspace is essential for establishing positive communication relationships (Kaur et al., 2021).

4   CONCLUSION

Although Health Workers are spontaneously discussed on social media, the medical community may be able to actively contribute to the conversation by generating positive content. It aims to foster favorable public attitudes and perceptions of health workers. Health professionals must communicate with care, particularly when sharing content on social media. Because a single error can cause the public to mistrust health workers. Therefore, compiling an engaging message with positive sentiments can restore the public's faith in Indonesia's Health Workers.

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