*Author for correspondence: Email: syurawasti@gmail.com

#WMHD Talks: Analyses of Mental Health Conversations Among Indonesian Community on Twitter

Syurawasti Muhiddin,[*,1] Griselda Maria Ancela Wodong,[2] Afga Yudistikhar,[3] Azmul Fuady Idham,[4] Audrey Alya Vanessa,[5] and Patricia Cecilia Soharto[5]

[1]Faculty of Psychology, Universitas Hasanuddin, Indonesia
[2]Faculty of Psychology, Universitas Negeri Manado, Indonesia
[3]Halo Jiwa Indonesia / Universitas Islam Indonesia, Indonesia
[4]Halo Jiwa Indonesia / Universitas Airlangga, Indonesia
[5]Halo Jiwa Indonesia

Abstract

One of the right moments to comprehend people's understanding of mental health topics is through World Mental Health Day (WMHD). This study aimed to explore themes related to mental health that are the conversation topics on Twitter as social reactions to WMHD 2021. We collected and analyzed Indonesian tweets that contained #WMHD or Mental Health keywords. From October 1 to 23, 2021, a total of 12,500 tweets were collected utilizing tweepy and request, a python programming-based library. Data cleaning processes left 7,126 tweets to be further analyzed with inductive thematic analysis. This study found seven themes from the most to the least frequently discussed, namely (1) positive mental health, (2) social network and social capital, (3) mental health literacy, (4) stressful events, (5) material economic well-being, (6) mental illness and (7) physical wellbeing. This research showed that social media has the capacity to investigate users' knowledge and perception which might then serve as the foundation for providing relevant mental health education on various platforms to support the improvement of community well-being. Furthermore, knowing the topics of mental health-related conversations on twitter can be a precursor to the development of a measurement tool related to mental health understanding.

The World Health Organization (World Health Organization [WHO], 2022) defines mental health as a healthy state of mind that allows individuals to manage life's pressures effectively, recognize their talents, excel in learning and work, and make meaningful contributions to their community. Mental health is reflected in providing people with skills and resilience to face and most productively deal with abnormal and potentially destructive stressors (Fusar-Poli et al., 2020). Promoting positive mental health can enhance well-being, competence, and resilience, allowing individuals to improve their mental well-being and gain better control over it. This situation is also related to the enjoyment of life, the ability to cope with stress and sadness, the fulfillment of one's potential and purpose in life, and a sense of connection with other individuals (United Nations, 2020). Several factors affecting an individual's mental health include personal remarkable experiences, family relationships and dynamics, and the broader community culture and location where they live (Delphis Learning, 2019; Mula, 2022; Novianty & Cuwandayani, 2018).

Being literate about mental health is essential for fostering well-being and addressing potential challenges. One of the most significant motives of mental health literacy is to empower individuals to manage and maintain well-being in their everyday lives (Chua et al., 2022). Jorm (2019) introduces mental health literacy, which refers to knowledge and beliefs about mental disorders that aid their recognition, management, or prevention. Mental health literacy encompasses the capacity to identify particular mental health conditions, understand how to access mental health resources, be informed about risk factors and origins of these conditions, and be aware of self-care strategies and attitudes that promote recognition and appropriate help-seeking. In

Indonesia, several studies have examined the representation of mental health literacy. A survey conducted by Handayani et al. (2020) reported that the average value of mental health literacy in Indonesia in adults was 73.08%, indicating that the respondents involved in the study had relatively high mental health literacy. Mental health literacy found in this research includes knowledge of psychological symptoms and risk factors for mental disorders. The participants of this study were 139, 51% of whom were over 30 years old, who were selected using a multistage random sampling technique at the sub-district level, hence the individuals sampled were the general public. Through screening, participants were obtained with indications of emotional mental disorders and a total of 80.6% of respondents have undergone examinations regarding their psychological problems. Idham et al. (2019) also reported that mental health literacy in young adults showed sufficient literacy (54.1%). This research was conducted on 501 college students nationally who were given the Mental Health Literacy Scale with three measurable aspects, namely knowledge, beliefs and resources. There are 42.3% of students who are able to identify their mental complaints, but are hampered by finding adequate mental health related resources. Overall, the studies imply that the mental health literacy of the community was generally adequate among students and people with mental health problems, which further points to the importance of understanding mental health literacy in the wider population.

As widely known, individuals with adequate mental health literacy are more likely to have the knowledge to recognize, manage, and prevent mental health disorders (Furnham & Swami, 2018). However, although literacy on mental health is rising, it cannot be denied that mental health problems are still common in Indonesia. Kementerian Kesehatan Republik Indonesia (2019) data shows that in 2017, the three most significant mental disorders in Indonesia were depression, anxiety, and schizophrenia. These facts are strengthened by research conducted by Kaligis et al. (2021), which stated that the most common mental health problem experienced by students in Indonesia was anxiety, with a percentage of 95.4%. Moreover, nearly 50% of them reported having committed acts of self-injury and had suicidal thoughts. The main factor that increases this phenomenon is stigma (Hadi, 2018; Novianty & Cuwandayani, 2018). This indicated that literacy might not apply to other aspects that are also associated with mental health literacy, or in other words not yet comprehensive. Moreover, although an increase in mental health literacy does not guarantee a decrease in the number of mental disorders, a number of other studies have found that mental health literacy increases help-seeking behavior and reduces stigma, thereby promoting better mental health in the future (Cheng et al., 2018; Maya, 2021; Novianty & Cuwandayani, 2018; Novianty & Rochman Hadjam, 2017).

Taking into account that community mental health literacy may not be all-encompassing and limited to certain population groups, it is essential to gain insight into the specific aspects or subjects that individuals comprehend

regarding mental health. World Mental Health Day, celebrated on October 10, presents a fitting opportunity to investigate these phenomena, as it is a time when many people engage in discussions related to mental health. The diverse reactions and responses exhibited by the public during this occasion can serve as indicators of their collective understanding of the significance of mental health. One effective method for comprehending the phenomenon surrounding World Mental Health Day is through the utilization of digital platforms. The modern-day development of information technology plays a pivotal role in facilitating the swift exchange of information and communication, particularly through social media.

The research conducted by Bekalu et al. (2019) stated that the social media environment is relevant in understanding a health phenomenon, especially mental health. This is also indicated by the large percentage of individuals, with an average of 57.1% of users seeking information about mental health services on social media (Indonesia Survey Center, 2020). Moreover, the Covid-19 pandemic's impact on internet latency at a large scale reveals significant effects, particularly in the evening, driven by increased online entertainment activities (Candela et al., 2020). Latency is particularly important not only because it has a profound effect on some classes of applications but also because it is, by itself, an excellent indicator of the good status of the network, which can provide extensive data for a research. Even though it also did not predict mental health status (Fatahya & Abidin, 2022), social media research at the time could potentially provide rich data related to mental health literacy.

The emergence of social media such as WhatsApp, Facebook, Instagram, Twitter, and other social media marks this phenomenon. One of the social media whose development can be utilized by researchers today is Twitter. Twitter is a platform where users share brief, frequent messages, including posts with photos, videos, links, and text, to communicate and maintain connections (Twitter, n.d.). It is a microblogging service from the United States where users share and interact with messages known as tweets (Hetler, 2024). With around 217 million monthly active users, Twitter occupies the fifth position as a widely used social media platform, with 63.6% of users worldwide (Walsh, 2022; Global Web Index, 2023). The advantages of Twitter with this micro-blogging feature make it easy for users to write and share articles in short form (280 characters) with the theme of opinions, information, questions, and discussions on social media. Ermawati and Buliali (2018) found that individual social media users have a habit of expressing emotions, feelings, moods, and daily activities through micro-blogging. People with mental health challenges also use social media to share their personal experiences, gather information related to their mental health and available treatment and provide and receive support for and from their peers or community (Berry et al., 2017; Naslund et al., 2017).

Considering this phenomenon, data collection through social media, especially Twitter, can be efficient for researchers. A large volume of data showing a wide variety

of behaviors was collected to provide opportunities for researchers to conduct naturalistic field research on the psychological aspects of individuals (Chen & Wojcik, 2016; Murphy, 2017). The growth of social media encourages the existence of sizable textual information. Hence, there is a need for data presentation that makes it easier for users to get accurate information through the significant data phenomenon. The phenomenon of big data generated by social media could be public perceptions and the community's social behavior towards an issue (Fuentes & Peterson, 2021). Therefore, Twitter is considered a rich data source and promising for research.

The above statement can be supported by the development of a number of studies related to Twitter. A means of studies have found the benefits of Twitter in increasing mental health literacy and help-seeking behavior. Through the information sharing (tweet) feature, individuals can search for and access content about consultation services and mental health education. Individuals who access mental health information via social media, especially Twitter, tend to have adequate levels of satisfaction and mental health literacy (Halsall et al., 2019; Jamal et al., 2020). It seems that the Twitter community is highly valued for fostering a sense of connection and mutual understanding among its members. It facilitates communication and support among individuals who share similar mental health experiences (Berry et al., 2017), for example psychological problems, such as anxiety disorders, depression, and self-harm behavior. In fact, individuals dare to upload photos of hand cuts, although this tends to be done through anonymous accounts. The response obtained is in the form of support, in the form of advice, motivation and expressions of reinforcement (for example, through love and hug emoticons) (Putri, 2021). In line with these findings, other studies describe a number of topics that are often discussed on Twitter, such as increasing awareness of mental health, political and economic issues related to psychological well-being, stigma, and personal experiences regarding mental disorders (Makita et al., 2020). Twitter was seen as a safe space for honest and open mental health discussions without fear of judgment from others. This phenomenon makes Twitter a real-world source of real-time data on a more natural issue in large quantities and fits as an event detection system and a real-time source of information (Ermawati & Buliali, 2018).

In this regard, this study aimed to discover themes related to mental health that are the topic of conversation on Twitter as a form of social reaction to World Mental Health Day 2021. Since 2021 is still the year of the Covid-19 Pandemic and people in Indonesia had entered the phase of adapting to new habits or new normal after Covid-19 hit, there might be issues related to mental health and well-being among Indonesians which also might show their identification of the mental health topic. The ongoing Covid-19 lockdowns have been associated with numerous instances of suicide, influenced by a variety of factors such as social stigma, withdrawal symptoms related to alcohol dependency, fear of Covid-19 infection, feelings of isolation, and various other mental health concerns (Bakioğlu et al., 2020). Besides, not many studies In Indonesia have examined Twitter data on mental health topics in Indonesia. The results of this study are expected to reflect public understanding and expectations regarding mental health in Indonesia that covers the general population, given that twitter social media users are not limited to a particular group. Having said that, it can reflect the aspect of mental health literacy in the general public. In addition, this study is applicable as a reference for compiling aspects of mental health that often appear in Indonesia, which would become the attention of researchers in this field to help Indonesian people achieve mental well-being.

Methods

This study employed a qualitative research methodology, specifically utilizing Twitter data analysis, thereby situating it within the paradigm of Big Data research as applied within the domain of Psychology (Chen & Wojcik, 2016). One notable characteristic of Big Data is its unstructured nature; data collected from the Twitter platform can be categorized as unstructured, with some classifications considering it as semi-structured data (Bonzanini, 2016). In its raw form, Twitter data encompasses a wide array of information, including textual content, follower counts, and retweet counts. Through data cleaning and reduction processes tailored to research objectives, the data can be transformed into a smaller and more structured format. It is noteworthy that a primary utility of Big Data lies in its capacity to yield 'small data' (Berman, 2013), characterized by a lack of the traditional '3V' attributes of Volume, Velocity, and Variety. Small Data is typically the type most commonly employed by psychological researchers, amenable to representation in spreadsheet format and analysis on a single computing device (Chen & Wojcik, 2016). This study specifically investigated the discourse surrounding mental health during the month of commemoration for World Mental Health Day in 2021 on the Twitter platform, which occurred in October. The discussions pertaining to mental health were defined as those topics that were deliberated in connection to mental health within the context of the observance of Mental Health Commemoration Day on October 10, 2021.

The first step of this Twitter data research is scraping the data, a process of extracting data from a particular site and storing it in a file or database that is used for analysis (Zhao, 2017). The process was performed with the assistance of the Python programming language, specifically by using the Tweepy and Request modules. Tweepy allows researchers to access the Twitter API in Python, hence it takes an access token that contains a special code obtained from the Twitter API. API or Application User Interface is a connection between computers or between computer programs, which is a type of interface for software that offers services to other software (Reddy, 2011). Utilizing Twitter's Big Data resources for research purposes involves the availability of an official pathway facilitated through the Twitter API. In the context of this

study, the researcher leveraged the Search API due to the requirement for historical or past data. The Search API encompasses three distinct categories: Standard, Premium, and Enterprise, as delineated by Campan et al. (2018). Specifically, the Standard API was employed, affording access to complimentary samples of tweets posted within the preceding 7-day timeframe (Campan et al., 2018). To augment the volume of collected tweets within a specified time range, the researcher also employed the Request module, a Python-based tool enabling the transmission of HTTP requests. These requests yield a Response Object encompassing comprehensive response data, including content, encoding, status, and related attributes.

Data acquisition conducted between October 1 and October 23, 2021, with a specific focus on Indonesian-language tweets (identified by the id language code). The search query utilized was the hashtag #WMHD OR Mental Health. This choice was informed by the recognition that October is marked by the observance of World Mental Health Day (WMHD). The inclusion of the term mental health in the query served the purpose of minimizing the inclusion of extraneous tweet content devoid of meaningful mental health context but merely employing the #WMHD hashtag. Researchers extended the data collection period to encompass a span of 9 days prior to the commemorative date of October 10 and continued for 13 days thereafter. This timing was predicated on the consideration that both preceding and following the event, discussions pertaining to mental health were expected to persist. Moreover, it was taken into account that numerous activities and initiatives within the mental health domain would continue in the wake of the event, thereby ensuring a sustained volume of relevant tweet posts. Furthermore, the decision to collect data over this extended period was motivated by the limitations inherent to the Standard API category for historical data, necessitating the retrieval of data over several days within an approximate two-week timeframe.

Data cleaning is included in a series of data processing which is a bridge between data collection and data analysis (Chen & Wojcik, 2016). In this process, there would be a data 'cleaning' process from unnecessary elements attached to the data. The captured data is saved in CSV format. The data stored in JSON form was first converted into CSV form. Following that, cleaning was conducted manually by removing inessential elements from the tweet structure, such as "id", "truncated", "display_text_range", "entities", "source", "in_reply_to_status_id", "in_reply_to_screen_name", "user_id", "geo", "coordinates", "place", "contributors", "is_quote_status retweet_count", "favorite_count reply_count", "quote_count", "conversation_id", "favorited", "retweeted". The data cleaning process only left "created_at", which was the date when the tweet was made, and "full_text" which was the content of the tweets.

The number of tweets scraped from the data collection process was 12,500 tweets. After carrying out the cleaning process, 1,139 tweets were deleted because they were duplicates or had the same meaning. Furthermore, after analyzing the remaining data, there were 4,235 irrelevant

contents, such as tweets containing advertisements, using languages other than Indonesian, and other contents that did not address mental health at all. Therefore, 7,126 tweets were analyzed in the last step, which was 57% of the total tweets collected.

Tweet data analysis using inductive content analysis techniques. This process includes an open coding process, category generation, and abstraction (Patton, 2023), namely the formulation of major themes that also represent aspects of mental health. Researchers did not use theories related to mental health aspects in determining the categories because of the wide range of topics that could arise. The determination of categories based on certain theories might limit the emergence of various topics.

Regarding the credibility of the data, researchers applied methods, such as familiarizing themselves with the research context and having a strong sensitivity to the language and lifestyle of the participants (Korstjens & Moser, 2017). Since this study utilized a dataset of tweets as raw data and Twitter users are a very large number of participants, it would not be possible to induce one user at a time. Therefore, the most preferred technique was to directly dive into what is happening in the interaction settings of users on Twitter and understand the language style and context of Twitter users. We also explored the data directly and participated in the 'field' as a Twitter user to be able to make direct observations. Researchers also conducted peer review, which is an independent review of the themes by separate members of the research team and then discussed them again to obtain mutual agreement. The anonymity of some tweets and the use of fake accounts is one of the threats to data credibility in social media research. To minimize this, the researcher removed accounts that were deemed to be fake accounts, which usually produce repetitive tweets. Meanwhile, for getting higher dependability, researchers implemented structured data analysis and interpret the results systematically, therefore other researchers would also come to the same conclusions when analyzing data with the same perspective (Korstjens & Moser, 2017). Another view is that dependability and consistency in qualitative data research can be achieved by careful verification and examination of the raw data, data reduction, and recording process (Korstjens & Moser, 2017). Researchers had conducted and documented the data collection, cleaning and analysis process systematically to ensure a transparent process. Utilizing researchers to assess and re-check the degree of confidence in the data was also implemented, such as re-checking the results of the formation and categorization of existing themes for reducing the possibility of deviations and errors in the collected and analyzed data.

Results

In this section, we provide descriptions on our collected data. There are illustrations on the tweet frequency, the tweets' content types, and the emerging themes from the pool of tweets.

Trend on Tweet Frequency

All the analyzed tweets were obtained from October 1st to October 23rd 2021. Below we share the illustration on the tweets' frequency distribution based on the dates (Figure 1). The histogram shows the distribution of the

analyzed 12,500 tweets that were collected from October 1st until October 23rd 2021. It can be seen that October 10th 2021 was the day where the peak number of mental health-related tweets were posted. In fact, there were 4,427 tweets posted on the World Mental Health Day in 2021. This was followed by 1,120 tweets posted on October 11th 2021. The number of mental health-related tweets posted gradually decreased days after until it reached a low point on October 16th 2021 with only 221 tweets were found.

From October 1st until October 8th 2021, the number of tweets posted were relatively the same, with an average of 340 tweets per day. On October 9th 2021, the number of tweets that were posted rose significantly from the days before until it spiked to the highest number of posted tweets in the following day. There were no more relevant tweets from October 20th to October 23rd 2021. On an interesting note, we also found that there were some older tweets (e.g. tweets from October 10th 2020) that got included in our pool of tweets, which made the researcher realize the limitations of the package and the functions used.

Distribution of the Tweets' Content Types

All the tweets that we include in our analysis vary in terms of their content. There are tweets that represent the thoughts or opinions of the users (referred to as "personal content"), tweets that contain any informative link(s) (referred to as "web link"), and tweets that were posted to reply to other users' tweets (referred to as "retweet"). The "irrelevant" tweets were not to be discussed further in content analysis. Details and examples are provided in Table 1.

Based on Table 1, the collected tweets are divided into 30% of personally generated tweets, 25,9% of tweets that contain link(s), 6,8% of retweets, and the rest are irrelevant-coded tweets.

Emerging Themes Regarding Mental Health Topics on Twitter

This study found seven themes with each category that are often discussed on Twitter, namely positive mental health, social network and social capital, mental health literacy, stressful events, material economic well-being, mental illness and physical wellbeing. The following is a descriptive table of the main themes and categories obtained. (See Table 2)

Table 2 revealed that there are seven themes with the most emerging theme being "positive mental health" (N=2137) and the least discussed theme is "physical well-being" (N=108). We further describe each theme with each of its prominent categories ($N = <5 - 10\%$). The following table (Table 3) showed the percentage of the emergence of each theme.

Positive Mental Health

As the most emerging theme, positive mental health is the theme used in this study referring to both emotional/affective and cognitive aspects, such as perceived balance, happiness, life satisfaction, emotional well-being, and coping strategies. Below we elaborate the main theme, its categories, as well as a representative Tweet example for each category. See Table 4 Regarding the theme of posi-

tive mental health, previously explained themes are the forms of discussion that are most frequently tweeted by users. As for other categories that were also discussed, such as mental health expectations, positive state, and self-development, although they are still minimally discussed, we indicate that there is a tendency for individuals to be optimistic about mental health issues and their personal well-being. Mental health expectations covers the categories of tweets that talked about the better circumstances expected related to mental health, including expected role performed by specific parties. Positive state theme includes tweets about happiness, gratitude, positive emotion, and satisfaction which are important for mental well-being. Meanwhile, self-development is a specific theme covering the tweets about self-development matters.

Social Network and Social Capital

Apart from positive mental health, the theme of social networks and social capital are also discussed. This theme captured the categories related to the influence of the social environment on psychological issues. In specific, this theme represents the importance of social modality for mental health (presented in Table 5). In addition to the categories described above, there are other categories covered by this theme, namely appreciation of mental health for others who have established actions for improving mental health state, and psychological ethics which refers to the importance of ethics as social capital in building up individual and society mental health.

Mental Health Literacy

Mental health literacy is also one of the emerging themes which include various general categories related to knowledge, beliefs, and individual resources toward mental health phenomena (Jung et al., 2016). Below we elaborate in Table 6 regarding the theme, categories, and tweet examples on mental health literacy. The mental

health literacy theme also covers other minor categories we found, namely media/ entertainment, mental health
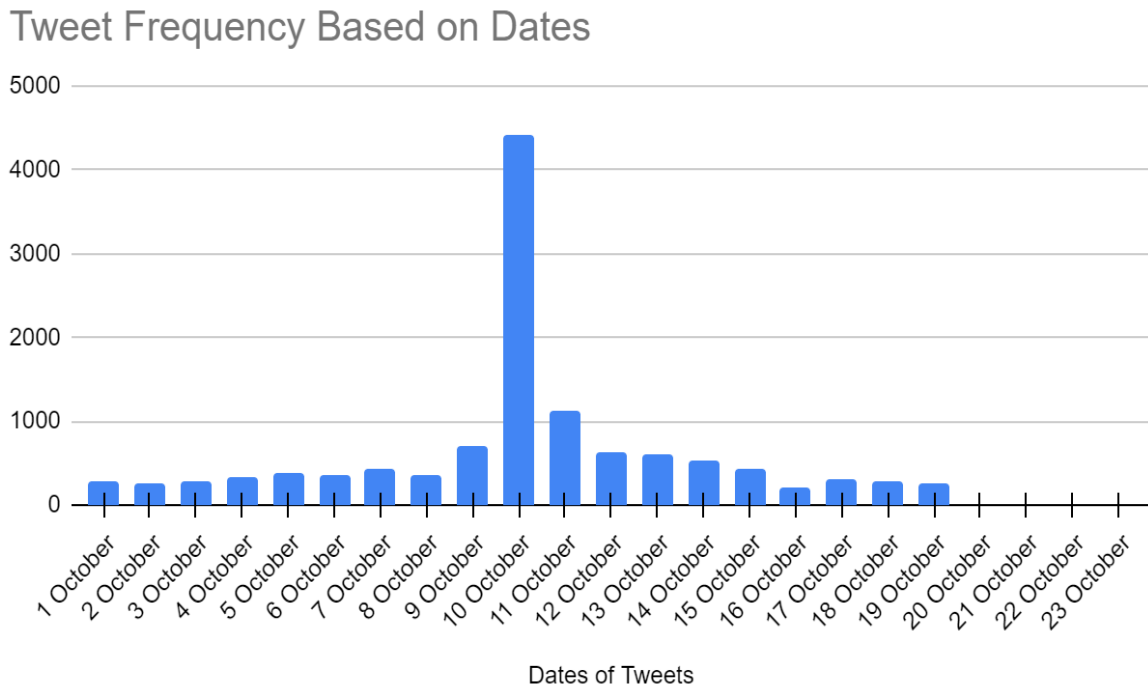
Figure 1
Tweet Frequency Based on Dates

Tweet Frequency Based on Dates

Table 1
Types of Tweet's Content

Item	Content Type	Frequency	Percentage	Example
1.	Personal content	3,406	30%	Mental health is important, as is caring for physical health. Even for certain people, when their mental health is disturbed, their physical health is also disturbed. Don't neglect your mental health and those around you. Seek expert support if necessary.
2.	Web link	2,943	25,9%	On this day of mental health, let's be aware of ourselves not to commit verbal abuse again. #PahamiArtinya and try to rise together to strengthen each other. https://t.co/f5iY5PEOau https://t.co/OTSZJjxkTR
3.	Retweet	777	6,8%	@AdjieSanPutro Get out of a toxic environment and begin to realize that you are actually mentally not okay and need professional help. Happy mental health day! May our mental health always be healthy! #HariKesehatanMentalSedunia #MentalHealth
4.	Irrelevant	4,235	37,3%	Hi bestie Colle, those who are in their fifth semester, what got you occupied?
Total		11,361	100%	

Table 2

The Percentage of Themes and Categories

Themes	Categories	N	Presentation
Positive Mental Health (individual level)	Self-Management	648	30.3
	Self-Love	390	18.2
	Appreciation and Acceptance	321	15.0
	Mental Health in Action	301	14.0
	Affective	263	12.3
	Hopes about Mental Health	91	4.2
	Positive state (e.g., gratitude, happiness, satisfaction)	65	3.0
	Self-Development	58	2.7
	total	2137	100
Social Networks and Social Capital	Greetings about World Mental Health Day	1100	61.2
	Social Support	391	21.7
	Respect for Others	129	7.1
	Family Dynamics	119	6.6
	Mental Health Appreciation	53	2.9
	Psychological Ethics	3	0.1
total		1795	100
Mental Health Literacy	Mental Health Awareness	824	48.5
	Mental Health Information	295	17.3
	The Importance of Mental Health	211	12.4
	Mental Health Opinion	180	10.6
	Media/Entertainment	73	4.3
	Mental Health Studies	32	1.8
	Mental Health Misconception	31	1.8
	Criticism of Conditions Related to Mental Health	30	1.7
	Self-Diagnose	20	1.1
total		1696	100
Stressful Events - Risk Factors	Mental Health Struggles	390	41.0
	Stressful Event	264	27.7
	Social Stigma	98	10.3
	Impact of Social-Media	78	8.2
	Bullying (include verbal violence)	66	6.9
	Circumstances-related problems	55	5.7
total		951	100
Material/Economic Well-being	Mental Health Service	241	87.6
	Material and Economic Issues	34	12.3
total		275	100
Mental Illness	Mental Illness Types	164	100
total		164	100
Physical Well-being	Physical Health	108	100
total		108	100

Table 3
Percentage of Main Themes

Main Theme	N	Percentage
Positive Mental Health	2137	30
Social Networks and Social Capital	1795	25.2
Mental Health Literacy	1696	23.8
Stressful Events - Risk Factors	951	13.3
Material/Economic Well-being	275	3.9
Mental Illness	164	2.3
Physical well-being	108	1.5
Total	7126	100

research, mental health misconceptions, critique of conditions related to mental health, and self-diagnosis. Media/Entertainment represents categories of tweets containing discussions about movies, music, and books that are related to mental health topics. Mental health research is a theme for categories of tweets discussing completed and ongoing studies on mental health themes. Mental health misconceptions refer to categories of tweets talking about false beliefs and opinions about mental health. Critique for mental health conditions represents tweets containing critiques on the situation related to mental health, including mental health policies in Indonesia, and public stigma on survivors of mental disorders. Lastly, self-diagnosis was created as one of the themes to capture the tweets describing how users try to diagnose themselves according to minimal and inaccurate knowledge about mental illness.

Stressful Events-Risk Factors
Stressful events are described as meaningful events that potentially cause people to experience stress to the point it affects or imply changes in their daily routine (Cohen et al., 2019). Details are provided in Table 7.

Aside from the categories that we have elaborated under the theme of "Stressful Events-Risk Factors", we also found other categories such as social stigma, impact of social media, bullying (including verbal violence), and circumstances-related problems.

Material/Economic Well-being
Material well-being is defined in terms of satisfaction with a range economic concerns such as government's handling of the economy, taxes, the cost of basic necessities, household income, pay and fringe benefits from one's job, financial security, standard of living, and agreement within the family regarding how money should be spent (Sirgy, 2018). Below we provide the details in Table 8 regarding the theme, categories, and tweet examples on material/economic well-being. See Table 8 Other categories included under this theme are material and economic issues.

Mental Illness
Mental illness is one of the main themes that were derived from the tweets. There were a high number of users

tweeting about mental illness types as explained in Table 9.

Physical Well-being
Physical well-being is one of the main themes that we found, focusing on physical health. Physical health is a concept of an individual's well-being, but from physical aspects. Examples of the tweets under this theme can be seen in Table 10.

Discussion
Our results show several main themes that represent the topics emerging from Twitter users regarding the commemoration of World Mental Health Day. The themes discussed are positive mental health, social networks and social capitals, and mental health literacy, stressors and risk factors, mental illness, as well as physical and financial well-being's effect on mental health. Self-management, self-love, appreciation and self-acceptance, mental health action, and expression of feeling are categorized under the theme of positive mental health. Meanwhile, subthemes like mental health day-themed messages, social support, and appreciation for others who perform action supporting individual and society's mental health are grouped under the theme of Social networks and social capital. The theme of Mental health literacy covers the sub themes such as mental health awareness, information regarding mental health, mental health urgency, and mental health opinion. Stressful events and risk factor themes cover the categories such as mental health struggles, stressful events, and social public stigma. Mental health services and material and economics issues are categorized as material economic well-being. The other two themes (mental illness and physical well-being) only consist of one category.

The three most prominent themes are interrelated. Positive mental health is a state where individuals are capable of sustaining positive emotions (satisfaction, acceptance, meaningfulness, and other emotions), able to carry out their daily activities (including taking care of oneself, or doing activities in the social relation, occupational, and spiritual contexts), as well as capable to contribute to their social environment (C. L. Keyes, 2012). Social capitals refer to a set of skills that allows individuals to have interconnected relationships (e.g. building social network) with other people or with a group of a larger social system where they may receive social support, trust, and a sense of belongingness. These effects occur in a specified order based on accepted standards and values (Engbers et al., 2016). Social network is a part of social capital which may contribute to positive mental health through social support, intimacy, and social contribution. Moreover, both positive mental health and social capital can be achieved when an individual has an adequate level of knowledge regarding mental health (also known as mental health literacy). Mental health literacy is a set of knowledge about mental illnesses and other psychological issues that could help with recognition, management, and preventive measures. Individuals with a sufficient level of

Table 4

Main Theme (Positive Mental Health), Categories, and Tweet Examples

Main Theme	Categories	Tweet Example
Positive Mental Health	Self-Management	I felt dizzy last Sunday because of a heavy workload, to the point that I feel sick the following Monday and Tuesday. I kept thinking about it until I felt overwhelmed and did nothing. After I calmed down and not panicked, I could handle (the workload) one by one. I really need to learn how to manage my thoughts for the sake of my mental and physical health.
	Self-Love	Ever since that incident, I consulted a psychologist more often, the congested feeling I had got better now, I got to know myself better. Even though I'm still trying, it turns out there are a lot of people supporting me to recover from this mental issue T.T
	Appreciation and acceptance	Respect to (my) mental health that could still survive this far.
	Mental health in action	Minpsy wants to invite Fanpsy Fam to join the crowd of #WMHD2021 using our way as a fan, which is by sharing what activities that fan likes or supports the balance of our life and our mental health! #YouBalanceMe https://t.co/7ubWg4ammw
	Affective	HEAVEN KNOWS, I'M ALWAYS HAPPY WHEN MENTAL HEALTH MONTH ARRIVES AND THERE ARE A LOT OF PEOPLE WANTS TO JOIN CAMPAIGNING 🎁 🎁 💜 💜

Table 5

Main Theme (Social Network and Social Capital), Categories, and Tweet Examples

Main Theme	Categories	Tweet Example
Social Network and Social Capital	Greetings about World Mental Health Day	Let us be grateful to ourselves because we still survive to this day. 💜 Happy World Mental Health Day, dearest fellow readers! Here's a list of book recommendations that could help (us) feeling more alive. 🍀 #bukugpu #WorldMentalHealthDay https://t.co/iiEorf2est
	Social Support and Respect for Others	@tubirfess Sender, you're so strong, keep going, at least you're aware of your mental health, but you have to be aware of your physical health as well, prioritize yourself in that situation. Your late father must have not wished to see you got hit like that. 😠 @FWBESS Wow it's okay, it's a must even! Because your mental health is way more desirable and needs attention. Please do not listen to what other people say! (You) have to always be happy!!! Cheers
	Family Dynamics	He/she was a child who didn't get enough love from his/her father. he/she was forced to study until (he/she's) successful by his/her mother, but his/her mental health was ignored. he/she who was kept being compared to other people, he/she hugs him/herself when problems slowly turned him/her into an adult.

Table 6
Main Theme (Mental Health Literacy), Categories, and Tweet Examples

Main Theme	Categories	Tweet Example
Mental Health Literacy	Mental Health Awareness	It's not a sin when we prioritize our health and our sanity. We are so used to working hard that we forgot it's not only our body that works, (our) mental and thoughts also need a rest. We are expected to love institutions but forget to love ourselves.
	Mental Health Information	Yrl Hello. Whomever needs information on mental health (consultation fee, the differences between a psychologist and a psychiatrist, when to seek for help, ways to self-healing, the dangers of self-diagnose, consultation procedure with BPJS, etc) Check our reply ❤️ First Aid on Mental Illness to Actualize Mental Health for All https://t.co/MN5mqNfo7h (Translated. Note: BPJS is Indonesia's health insurance system).
	The Importance of Mental Health	@convomfs Imho, you should resign. (I'm) not saying you're ungrateful for getting a job. But if it makes your psychological state unhealthy, it's not a good thing right. Your mental health is more important. It's better to have a total rest after you resign so that you can focus on your health. But if (you) think you're still strong enough for a new job, then go ahead.
	Mental Health Opinion	I admit that educating (other people) about things that are related to healthcare, especially on mental health, if you don't do it right your sins will be doubled so you have to learn so well, self-improvement, and educate yourself hehe.

Table 7
Main Theme (Stressful Events-Risk Factors), Categories, and Tweet Examples

Main Theme	Categories	Tweet Example
Stressful Events-Risk Factors	Mental Health Struggles	I get it. I know. (I) understand that having expectations isn't good for (my) mental health. But why (do I) keep doing it, again, and again. (I) know it hurts. (I) don't understand anymore.
	Stressful Event	Health condition is not limited to COVID that gets all the attention, but everything, every types of (health) condition including mental and physical. Who knows, those with poor mental (health) condition escaped quarantine due to that #PONPapuaHebat

mental health literacy are capable of developing strategies to care for their personal mental health (e.g. self-help and access to psychology-based services) and understanding how to provide psychological first aid and/or support for others undergoing psychological turbulence, such as part of social capital (Jorm, 2019).

The number of themes related to positive mental health can indicate that the topic is widely discussed today. This also reflects the public's awareness of the concept. Concepts of mental health are subject to change based on factors such as time, location, culture, and circumstances (Rogers & Pilgrim, 2005). Over the years, various viewpoints have competed regarding the essence of mental health and mental illness. While the majority of mental health literature has predominantly concentrated on investigating and treating mental disorders, viewing them as medical, psychological, or sociological phenomena, there is now a growing trend to explore the concept of positive mental health as a distinct entity that goes beyond the mere absence of mental disorder (Winzer et al., 2014). This shift aligns with the broader adoption of a health promotion perspective, which emphasizes the promotion of positive well-being rather than just the absence of illness. This transformation is also evident in the emergence of disciplines like positive psychology and the development of a well-being policy agenda (Barry, 2019). Moreover, basically the World Health Organization has defined mental

health in more positive terms (World Health Organization [WHO], 2022).

Positive mental health has been defined as a state characterized by positive emotions, including a subjective feeling of well-being and happiness, a personality trait that involves self-esteem and a sense of control, as well as the ability to bounce back in the face of challenges and effectively manage life's stressors (Srivastava, 2011). Vaillant (2003) contrasts six different empirical conceptualizations of positive mental health: 1) mental health as above normal, as an ideal state of complete functioning; 2) mental health as positive psychology and positive personal qualities such as love and wisdom; 3) mental health as healthy adult development; 4) mental health as social-emotional intelligence; 5) mental health as subjective well-being; and 6) mental health as resilience and coping. Considering the aspects, positive mental health is best conceived as a multidimensional phenomenon. This fits in with approaches to positive mental health from other disciplines.

Some categories under the main theme of positive mental health are self-management, self-love, appreciation and acceptance, positive states (e.g., gratitude, happiness, satisfaction), affective feeling, and self-development. This term could refer to the aspects previously mentioned by Vaillant (2003), for example mental health as positive psychology and positive personal qualities (self-management

Table 8
Main Theme (Material/Economic Well-Being), Categories, and Tweet Examples

Main Theme	Categories	Tweet Example
Material/economic Well-being	Mental Health Service	(I) wish I were rich. I really mean it. The thing is, everything needs money, including physical and mental health. (I) want to get treated, get healed. And all those are not free, aren't they?

Table 9
Main Theme (Mental Illness), Categories, and Tweet Examples

Main Theme	Categories	Tweet Example
Mental Illnes	Mental Illnes Type	Now, mental health issues like depression, bipolar disorder, anxiety, to panic attacks, etc. are increasingly discussed often on various platforms. This is a development for us, at least there are more people who are becoming aware with mental health. https://t.co/o77cybXW60

and self-love); mental health as healthy adult development (self-development); mental health as social-emotional intelligence (appreciation and acceptance, and positive affect); and mental health as subjective well-being (positive states).

Talking about positive mental health certainly cannot be separated from the development of positive psychology. Positive psychology proposed by Seligman and Csikszentmihalyi (2000) has brought about a wave of scientific inquiries into the comprehension of well-being and the pursuit of fulfilling life (Heshmati et al., 2023). A contemporary method for grasping well-being revolves around the foundational elements of PERMA, an acronym for Positive emotions, Engagement, Relationship, Meaning, Accomplishment. Several categories of mental health positive themes can be linked to some of the five aspects of the PERMA. Positive emotions can be defined as the hedonic experiences of positivity, contentment, and pleasure. Affect and positive state are the categories emerged from the analysis. Engagement is described as the experience of being in flow while losing track of time. Categories representing this aspect are mental health in action and self-management. Relationship means that individuals are experiencing being cared for and loved by others. Acceptance and appreciation which emerged from the analysis can be related to positive relationships. Meaning is having a sense of purpose in life which may be linked to hopes about mental health and self-love that emerged from this research. Lastly, accomplishment is the successes and achievements experienced in life that can be connected to self development and self-management (Heshmati et al., 2023; Seligman & Csikszentmihalyi, 2000).

Furthermore, well-being is not merely a private phenomenon, since each individual is embedded in social structures and communities and faces multiple social tasks and challenges (C. L. M. Keyes, 1998). Hence, understanding positive mental health cannot be separated from social aspects, such as those found in this research as another main theme, namely social networks and social capital. To fully understand optimal human functioning, social aspects of well-being should be taken into account. Using a similar method to Ryff in 1989, C. L. M. Keyes (1998) based his multidimensional model of social well-being

on classic sociological theories and social psychological perspectives (e.g., Durkheim, Marx, Merton, Seeman, Lefcourt, Srole, and Erikson). He identified five dimensions of social well-being: 1) social contribution; 2) social integration; 3) social actualization; 4) social acceptance; and 5) social coherence. Some of the topics of social capital and networks found in this research can refer to social well-being, such as greetings about World Mental Health Day, social support, respect for others, and mental health appreciation (appreciation for mental health actions).

Basically, positive mental health and social capital are closely related. This claim is supported by a study that found that social connectedness enhances positive mental health - even if it was through social media - specifically on life satisfaction (Fatmawati & Wahyudi, 2021). In accordance with that study, another study revealed that social media has a positive impact on reducing mental health problems (like loneliness), as they provide the medium to stay connected with distant others and build up a social network (Haniza, 2019). Generally, positive mental health is mostly affected by intrinsic factors, such as self-acceptance, optimism, goals, adaptation, and adjustment level. However, it is undeniable that external factors also play a role. A good example of this is social support and positive affiliations (Lucas & Diener, 2008).

Positive mental health is a broad concept, and there are a range of constructs and theories relevant to its understanding and assessment. As outlined above, positive mental health is usually conceptualised as encompassing aspects of emotional (affect/feeling), psychological (positive functioning), social (relations with others and society), physical (physical health) and spiritual (sense of meaning and purpose in life) well-being. Basically, several themes found through this study showed a relatedness to the positive mental health concept, such as material/economic well-being and physical well-being.

One key theme that can also be discussed further is mental health literacy. Increased understanding of positive mental health is also an indication of improved mental health literacy. The most frequent two domains discussed in our findings are positive mental health and social capital, which is also supported by an adequate level of mental health literacy. This implies that to gain positive mental

Table 10

Main Theme (Physical Well-Being), Categories, and Tweet Examples

Main Theme	Categories	Tweet Example
Physical Well-being	Physical Health	The main point is this is what I will fix. I hope that when (my) body is getting better, so is (my) mental health. It is pretty bad right now with all the uncertainties and the overwhelming anxiety. It's invisible yet eating us up from the inside kind of sickness.

health and social capital, individuals are expected to have sufficient knowledge about mental health. This is in line with the third most frequent domain discussed among Twitter users, which is mental health literacy (consisting of awareness of mental health, knowledge of mental health-related information, and research). Our findings are supported by previous research that found the trend for mental health literacy is high, specifically among social media users that followed mental health-related information. In this sense, our respondents tend to display a consistent result of the three aspects of mental health literacy which includes knowledge, belief, and resource (Fatahya & Abidin, 2022). Accordingly, another study revealed that Indonesian adults (73.08 out of 100-scale) were categorized as high in mental health literacy. As many as 56.1% had utilized the mental health service and 46.8% of them stated that they knew how to access and obtain information on mental health (Handayani et al., 2020). The number of supporting prior studies to our findings implies that mental health issues are becoming widely discussed (specifically on Twitter), hence these findings can be an indicator that illustrates the level of awareness and knowledge people have about mental health.

The purpose of social media itself is one of the factors driving the rise in the discussion of mental health. Social media has evolved into a platform for sharing information as well as interacting with others (Anwar & Rusmana, 2017). This is due to the fact that social media is made so that each user can create their own content, such as their own personal tales. Naslund et al. (2017) found in their study that patients with mental diseases can use social media as a platform to share their experiences, connect with other survivors, and discuss how to adjust to their circumstances. As a result, their stories can be widely disseminated and read by others who have not been given a mental illness diagnosis.

Furthermore, there is also a situational factor that starkly enhances the level of mental health awareness. Nations (2020) in their article "The Pandemic Accelerant: How COVID-19 Advanced Our Mental Health Priorities" explained that the COVID-19 pandemic that happened in 2020 was an effective trigger to lead people to become aware that they should be taking care of their mental health. Some clear indications of this phenomenon are the increasing number of people seeking mental health professional help, the development of alternative treatments through telehealth, and the involvement of international organizations (e.g. WHO & UNICEF) in providing content about taking care of mental health.

When taken as a whole, current trends in Indonesia

indicate that there is a rise in both widespread awareness of mental health issues and attempts to promote (mental health) and prevent (mental illness). For instance, creating social media-shared public advertisements about mental health in an effort to promote teenage mental health. This is also an effort to help young people prevent mental health issues. Data demonstrating the significant frequency of mental health issues in adolescents served as the impetus for the project. Then, motion graphic educational videos and other supporting media, including posters and social media posts, were created as promotional and preventive media about self-love. The objective is for adolescents to become aware of their mental state and take steps to maintain good mental health (Mazaya & Muqoddas, 2021).

At the promotional level, the public is now actively being appealed to and educated about mental health issues in a number of local communities. Some of these communities are Halo Jiwa Indonesia, Komunitas Get Happy, Ruang Jiwa/sehatjiwa.id, Sehatmental.id, Ubah Stigma, and many others. There are also a number of online counseling services, such as Alpas, Pijar Psikologi, Ibunda.id, Pulih Counseling, and ARMY Help Center Indonesia. Moreover, there are also support services for mental disorders survivors, such as Komunitas Peduli Skizofrenia (KPSI), Bipolar Care Indonesia, Depression Warriors Indonesia, mother HOPE Indonesia (Into the Light, 2020). So, there are various media and institutions, as well as technological advancements, that can help raise awareness of healthy mental health among Indonesians.

The active use of social media can also be attributed to the interaction between humans and computers. This is also the case with Twitter's data collection process to understand people's understanding of a phenomenon. Human-computer interaction (HCI) is a multidisciplinary field of study that focuses on the design of computer technology and the interfaces between people (users) and computers (Karray et al., 2008). HCI aims to create a conversation between people and machines that seems natural and intuitive. HCI researchers observe the ways people interact with computers and develop new technologies to improve that interaction (Lee, 2022). Expressing thoughts and feelings through a network-based social media is an activity that has become integral to everyday life, reflecting the increasingly common human-computer interaction. Psychology is here to understand the dynamics of human behavior in relation to computers. In addition, developing programs for big data-based research is also part of this interaction, aiming to examine human-computer relationships in everyday life as well.

Our research implies the utilization of social media to investigate user's knowledge and perception on mental health, which might then serve as the foundation for providing relevant mental health education on the platform. Besides, knowing the topics of mental health-related conversations on Twitter can be a precursor to the development of a measurement tool related to mental health understanding. Furthermore, our research also implies that sustaining good mental health consists not only of efforts to mitigate mental illness symptoms, but also the efforts to achieve a better life in every aspect, including psychological, social, physical, and economic. Interventions should focus on fostering positive mental health at both the individual and community levels. This may involve developing resilience-building programs, promoting mindfulness practices, and encouraging community engagement.

Conclusion

The research concluded that some of the main mental health-related themes that were talked about during the 2021 World Mental Health Day commemoration were positive mental health, social networks and capital, mental health literacy, stressful event and risk factors, mental illness, as well as physical and financial well-being's effect on mental health. These show the importance of viewing mental health as a variable that is influenced by various aspects, including physical and financial aspects. Although this study examines social reactions to World Mental Health Day, it may still show what themes often emerge when social media (Twitter) users talk about mental health topics in general, which can essentially reflect their understanding.

Recommendation

As social media-based research, there are some limitations. Firstly, the acquired tweets do not accurately reflect the total number of tweets produced on the specified topic. Free retrieval of tweets is limited in number. Consequently, only a small percentage can be processed from the total tweets taken. Overcoming the limited number of tweets from the free package was done by acquiring tweets once every day for about 20 days and using two different methods (syntax and library package). In order to provide more effective results, future studies on Twitter can employ more diverse data collection techniques through the usage of commercial applications. Another suggestion for future researchers is to modify the Python script that was used to retrieve the data. Researchers also can apply machine learning in data analysis to a more advanced degree. Secondly, although we have minimized tweets from fake accounts, we cannot fully guarantee that no tweets from other fake accounts were analyzed. Future research can adopt combined applications or programming languages for data mining from social media, especially in ensuring that data are collected from verified users and excluding those from multiple fake accounts. Lastly, it is important to highlight that our findings are specific to Indonesian context and limited to Indonesian Twitter users. Consequently, our findings cannot be generalized to all social media users. It is highly encouraged for future studies to conduct similar explorations in other countries' context and different platforms of social media.

Authors' Contributions
SM finalized the overall writing. SM, GMAW, AY, AFI reviewed the theoretical base and previous studies. AY, AAV wrote down the introduction section. SM, AFI wrote down the methods section. GMAW, SM wrote down the result section. AY, PCC wrote down the discussion section. All authors read and approved the final version of the manuscript

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Orchid ID
Syurawasti Muhiddin ⬤ https://orcid.org/0000-0002-7429-8140
Griselda Maria Ancela Wodong ⬤ https://orcid.org/0000-0001-5302-8750

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