

# FACEBOOK SENTIMENT ANALYSIS ON HEALTHCARE OF TIMOR-LESTE: ANALYSING PUBLIC PERCEPTION THROUGH SOCIAL MEDIA

*Cristovão De Alexandria Barros\**, *Marcelo Amaral Mali*, *Evalisa Adão Mendonça*, *Osmenia de Jesus Neto*

Timor-Leste National Institute of Public health, Timor-leste (INSP-TL)

Correspondence: [crisbarros@iuj.ac.jp](mailto:crisbarros@iuj.ac.jp) , [ivanzeruwsky@gmail.com](mailto:ivanzeruwsky@gmail.com)

## ABSTRACT

This study investigates public sentiment toward healthcare in Timor-Leste using Facebook comments from four pages: the Ministry of Health, Guido Valadares National Hospital, ANTIL, and Jornal Independente.

Data from November 2023 to November 2024 were analyzed using Natural Language Processing (NLP) techniques, including Python's VADER sentiment analyzer. The study categorized sentiments as positive, neutral, or negative and identified key healthcare themes, such as medicine availability, good healthcare policy, poor healthcare management, and health services.

From the 2,095 comments analyzed, results reveal that positive sentiment dominates at 58.4%, followed by neutral (22.7%) and negative (18.9%). Comments on institutional pages showed predominantly positive sentiments, attributed to posts highlighting achievements and activities. Conversely, news agency posts received more negative sentiments due to coverage of issues like medicine shortages and hospital service criticisms.

The findings demonstrate the significant role of agenda-setting and social media framing in shaping public perceptions of healthcare. This analysis highlights the need for strategic communication and reforms in healthcare delivery to address public concerns. It underscores the importance of using social media as a tool for gathering public feedback and enhancing healthcare policies in Timor-Leste.

## KEYWORDS

Timor-Leste, social media, Ministry of Health, Facebook, agenda-setting, sentiment analysis, healthcare

## INTRODUCTION

### BACKGROUND

Timor-Leste has improved its national health system since independence in 2002. However, there are still many public health issues facing the country. Based on the WHO [1] report, 23 % of Timorese women of reproductive age are anaemic, 47 % of children below five years of age are stunted, and 8.6 % suffer from acute malnutrition. Maternal mortality is still high, with 195 per 100,000 live births, and still 57% of births are attended by qualified health professionals [2]. In addition,

almost half of its population (42%) lives below the national poverty line [3]. The child mortality rate is 48.6 deaths per 1,000 live births, which is considered high in the region [4].

Regarding the internet usage, according to Kemp [5], Timorese Facebook users are 578.5 thousand, and internet users are 742.4 thousand. The Facebook users constituted 42.2 % of the population. With the number of internet and social media users that are quite high, it is very helpful for the public to get information about health and can have a positive impact on the government through their interactions and comments regarding the health services they receive and their satisfaction. That way, the government can improve what problems need to be fixed in the health sector. Of course, this can only be achieved through research related to social media sentiment analysis to find out public perception.

Significant obstacles confront Timor-Leste's healthcare system, including ongoing medicine shortages, a lack of public confidence, and social media criticism. Political meddling, poor inventory control, and a lack of coordination have all been blamed for stockouts, which have left health institutions without necessary medications [6]. Furthermore, even with free public healthcare, access is still unequal, with richer people using services at a rate that is almost twice as high as that of poorer populations. This is mostly because of transportation issues and bad experiences with medical personnel [7]. Due to decreased service usage brought on by fear of infection, the COVID-19 pandemic made these problems worse and further damaged public confidence in the system of healthcare [8].

Social media has developed into a forum for voicing discontent, drawing attention to structural flaws and the need for better healthcare delivery. This emphasizes how urgently reforms are needed to improve service quality and accessibility [9]. The state of healthcare in Timor-Leste is characterized by significant challenges and opportunities for improvement. Preventive health measures, such as health screenings for non-communicable diseases (NCDs), remain underutilized, particularly among males, rural residents, and those with lower education levels and income [10]. Additionally, traditional medicine plays a crucial role in rural healthcare, with many individuals relying on indigenous practices alongside formal healthcare systems, indicating a complex landscape of medical pluralism [11]. Access to healthcare is framed as a fundamental human right, yet disparities persist, particularly affecting vulnerable populations [12]. Maternal and child health services face quality issues due to resource constraints, inadequate infrastructure, and limited training for health workers [13]. As evidence, a study conducted in Europe showed that health professionals are increasingly using digital technologies, and there is a pressing need for further training to enhance their skills in this area [14]. Therefore, addressing these multifaceted issues is essential for improving health outcomes in Timor-Leste.

Medicine stockouts in Timor-Leste significantly impact healthcare outcomes and patient satisfaction. Research indicates that stockouts of essential medicines occur frequently, with community health workers experiencing shortages nearly one-third of the time, which is substantially higher than health centres [15]. This situation leads to increased out-of-pocket expenses for patients, poor adherence to treatment regimens, and overall dissatisfaction with healthcare services [15]. Factors contributing to these stockouts include poor coordination, inadequate inventory management, and a weak logistics system [6]. These systemic issues hinder the effective distribution of medicines, exacerbating the problem and affecting patient care. Furthermore, the lack of reliable data and infrastructure complicates efforts to address these shortages [6]. The cumulative effect of these challenges not only undermines health outcomes but also diminishes patient trust in the healthcare system, highlighting the urgent need for comprehensive reforms to improve medicine availability and patient satisfaction in Timor-Leste [16,17].

Moreover, the integration of culturally appropriate training and standard treatment guidelines is essential for improving medicine use and addressing stockouts. However, the lack of infrastructure and resources complicates these efforts, further diminishing trust in the system [6,18]. Thus, addressing these systemic issues is crucial for rebuilding public confidence in healthcare services in Timor-Leste.

Sentiment analysis, which offers understanding of patient experiences and attitudes, is essential to comprehending how the public views healthcare in Timor-Leste. This method, which makes use of natural language processing, enables medical professionals to evaluate the opinions expressed in social media, including patient reviews, among other types of feedback. Stakeholders can pinpoint opportunities for development and raise the standard of healthcare services by

examining this data. Sentiment analysis aids in assessing patient feedback by exposing their expectations of medical professionals as well as their degree of satisfaction [19].

The accuracy of sentiment analysis in understanding public perception is influenced by several key factors. Firstly, the choice of algorithms plays a crucial role; for instance, the NLTK Vader algorithm demonstrated superior performance in analysing sentiments related to COVID-19 vaccination, outperforming others like TextBlob and Flair NLP in accuracy [20]. For social media text analysis, including microblogs, VADER's rule-based method works well as it uses a sentiment lexicon with intensity ratings and is still a popular option because of its ease of use and efficacy. VADER is especially well-suited for social media content analysis due to its capacity to handle emoticons, acronyms, and online lingo [21,22,23].

## LITERATURE REVIEW

Previous research on sentiment analysis in healthcare, particularly in developing countries, highlights the growing importance of extracting insights from patient feedback to enhance healthcare services. A systematic review emphasizes the role of cognitive analysis in understanding user opinions, especially post-COVID-19, to improve healthcare systems through advanced machine learning techniques [19]. Another study discusses the application of sentiment analysis to assess patient attitudes, which is crucial for improving service quality and patient satisfaction during hospitalization [24]. Moreover, the introduction of specialized tools like SentiWordNet Adjusted Vader Sentiment Analysis (SAVSA) demonstrates a tailored approach to understanding emotional tones in medical contexts, addressing challenges faced by conventional methods [25]. Research indicates that social media platforms are valuable sources of patient opinions, which can significantly influence health-related policymaking and service recommendations. However, challenges such as language peculiarities and data privacy remain critical considerations in the effective implementation of sentiment analysis in these settings [26]. Overall, these studies collectively underscore the potential of sentiment analysis to transform healthcare delivery in developing countries.

Social media has become a crucial forum for public debate, greatly impacting healthcare policies by enabling in-the-moment interaction between the public and decision-makers. It improves public health literacy and community engagement by acting as a channel for the dissemination of health information, raising awareness, and influencing policy changes [9,28]. Health organizations may publish educational content and collect public opinion on social media platforms like Facebook, Instagram, and Twitter. This information can be used to influence policy choices and rally support for health initiatives [29,30]. But the spread of false information presents problems as it might skew public perception and prevent people from making well-informed decisions [9]. Therefore, social media requires rigorous management to preserve the trustworthiness of information and to protect public health interests, even when it provides chances for advocacy and involvement [30].

Government postings on Facebook can result in more attention in mainstream media, demonstrating the reciprocal interaction between social media platforms and conventional media agendas [31]. By influencing how news stories are shared and how people engage with them, private news organizations have a big impact on public opinion on Facebook. They play a variety of roles, including news presentation, user interaction, and the influence of bias and dependability on public opinion. Content produced by private news organizations is frequently more intensely engaged with by consumers in private contexts than in public ones. This implies that in private groups, conversations on news stories are more complex and intimate [32].

Users choose news that is untrustworthy and slanted to the right, suggesting that the kind of material that is disseminated might influence public opinion in favour of viewpoints [32]. Moreover, Facebook and other social media platforms act as arenas for conflicting narratives, where news framing may sway social movements and rally political support [33].

## RESEARCH PROBLEM

Community perceptions of health services in Timor-Leste vary. Will influence their behaviour, such as preference for medical consultation at the private clinic, loss of trust in public health facilities, and loss of trust in the effectiveness of the drug from public hospitals. In addition, there is almost no research about the sentiment analysis of healthcare in Timor-

Leste. There are many criticisms on Facebook related to healthcare issues in Timor-Leste; people tend to generalize the responses on social media (Facebook) and take the conclusion based on those comments. There are a lot of debates and comments on social media regarding medicine stockouts, intra-hospital deaths of patients, and health services in general. That is why, with this research, the authors intend to present what exactly is the public sentiment towards healthcare is for a one-year period.

## OBJECTIVES

The objectives of this study are to analyse public sentiment towards healthcare services in Timor-Leste based on comments from Facebook pages and to identify key issues and concerns raised by the public.

## RESEARCH QUESTIONS

- What are the predominant sentiments (positive, negative, neutral) in Facebook comments about healthcare in Timor-Leste?
- Which issues are most frequently discussed and criticized?
- How do sentiments differ between different Facebook pages (Ministry of Health, National Hospital, news agencies)?

## MATERIALS AND METHODS

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### STUDY DESIGN

This is a quantitative method study that used descriptive and exploratory design. First, a descriptive design because the primary focus of this study is to describe the sentiments expressed in Facebook comments related to healthcare in Timor-Leste for a one-year period. With this design, the authors are trying to understand the distribution of sentiments (positive, negative, neutral) and the nature of the issues discussed. Exploratory design because there is limited existing research on public sentiment towards healthcare in Timor-Leste as expressed on social media. With these research designs, this study aims to uncover new insights and patterns in public opinion that have not been previously documented.

### RESEARCH METHODOLOGY

#### Sampling Method

This study used purposive sampling, a non-probabilistic sampling method, as it targeted specific Facebook pages and specific posts related to healthcare issues. The population of this study is all comments on healthcare issues from November 2023 until November 2024. The sample of this study is all comments from posts about healthcare issues on four Facebook pages mentioned earlier for a one-year period.

The inclusion criteria in this study are all comments in Portuguese, Tetum, English, or any other language from posts relevant to healthcare services. The exclusion criteria are posts outside of healthcare issues, comments from posts not related to healthcare issues, spam, unrelated topics, duplicate comments, stickers, images, links, and emojis.

Facebook is the most used social media platform in Timor-Leste, making it the most relevant for this study. In December 2024, Facebook accounted for about 94% of mobile social media use, while Instagram and Twitter (X) were much lower, around 1.3% and 0.9%. In 2018, there were already around 390,000 Facebook users, about 30% of the population. Because of this wide reach, focusing only on Facebook makes sense, and excluding Instagram and Twitter is reasonable given their low use in the country. In addition to that, at the time of the assessment, there was no official page on Twitter (X) or Instagram of the targeted institution [34,35,36].

#### Data Collection

This study used secondary data, and the source of the data is comments from the posts related to healthcare issues for a one-year period collected from four Facebook pages. Two official Facebook pages of health institutions and two Facebook pages of news agencies (public and private news agencies). These pages are "Palácio das Cinzas" of the Ministry of Health of Timor-Leste, "Guido Valadares National Hospital—HNGV," "Jornal Independente," and "ANTIL" (Tatoli

National News Agency). The data are the user's comments on Facebook posts related to healthcare from these pages over a one-year period (November 2023-November 2024). The data were manually extracted and downloaded as Excel files using the Exportcomments.com tool. Data extracted are in Excel format, and there is one Excel file per post. Those separated files were then later merged as one file using a merger tool from Aspose.app.

## Data Analysis

After cleaning the unnecessary columns and deidentification process, the data is then translated into English by the researchers manually and with the use of tools such as Google Translate.com and Tetun.org and later will be revised manually. The fact that Google Translate's accuracy in translating medical terms is limited [37] including Tetun, the Timor-Leste official language, means that human assistance is frequently required to improve AI-generated translations when translating culturally sensitive words, especially from Tetun into English. Several studies have shown that manual translation of comments in research might generate possible bias. Priyansha et al. [38] highlight the difficulty of maintaining cultural subtleties in translations and recommend employing sophisticated natural language processing models to give cultural sensitivity precedence above literal correctness.

In this research, during data translating, almost all comments are written in short sentences or abbreviated sentences, and some are mixed with other languages. So, it is very difficult and takes time to translate into English with Google Translate. In the translation phase, our research team fixes and completes the comments sentence structure so that it can be understood well by the translation machine (Google Translate and tetun.org). Useless words and emojis are removed during the data cleaning and translation process. Each comment is revised to make sure its meaning or significance is maintained, preventing deviation from the original meaning. Then, the results of the English translation were reviewed again manually to see whether they were really the same as the actual meaning of the comment.

The data is then processed using the programming language Python on Google Collab with the use of VADER and Lexicon libraries and the NLTK and Panda libraries for converting all words into lowercase, removing punctuation and stop words, and then tokenizing each word. Later, the VADER sentiment analyser was used to create a sentiment score for each word and finally interpret them into 3 categories, such as positive if the sentiment score is  $> 0.05$ , negative sentiment if the score is  $< -0.05$ , and neutral if the score is between  $-0.05$  and  $0.05$ . Finally, after the results were obtained, the Matplotlib library was used to generate a visual graphic of the result, and the WordCloud library was used to generate a word cloud of the comment words.

The categories of positive, negative, and neutral were developed in order to adequately represent the wide variety of human emotions that are conveyed through text. A sophisticated comprehension of attitudes is made possible by this categorization, which is essential for applications in opinion mining, product evaluations, and social media. Since not all neutral feelings are created equal, the sentiment scores, which range from  $-0.05$  to  $+0.05$ , are used to quantify the degree of neutrality. Since neutral attitudes may affect decision-making, this categorization is crucial for companies and organizations to appropriately assess public opinion [39]. Therefore, according to Bandyopadhyay et al. [40], this scoring approach can increase the precision of sentiment recognition, especially in situations with mixed emotions when sentiments may overlap.

## ETHICAL CONSIDERATIONS

The data are obtained from an openly accessible public source, which is Facebook posts and comments, where the authors, both page admins and users, have accepted the Facebook (Meta) terms of service regarding the data use and privacy. Therefore, the consent information for both page admins and users is not needed. Even though, ethically, the authors of this study will keep secret the user's information through deidentification during data processing. Also, the data were stored in a password-protected computer where only authors had access. These data will be eliminated five years after the publication of this study. Therefore, no approval is needed from the Research Ethics Committee.

## RESULTS

### DESCRIPTIVE STATISTICS

From one year's period of comments extracted, the Ministry of Health's page "Palácio das Cinzas" got the highest number of comments. It is because the page is actively posting daily many activities of the minister and her vice ministers, such as meetings, speeches, site visits, and inaugurations. The page also actively posts health-related promotions, job vacancies, and many more. However, for the private sector news agency "Jornal Independente," the posts about health were fewer, and that is why the number of comments is also fewer.

TABLE 1: DISTRIBUTION OF COMMENTS FROM FOUR PAGES

No	Name of page	# of Posts	Percentage	# of Comments	Percentage
1.	Palácio das Cinzas	361	79.7%	1708	81.5%
2.	Guido Valadares National Hospital-HNGV	57	12.6%	162	7.7%
3.	Jornal Independente	12	2.6%	32	1.6%
4.	ANTIL	23	5.1%	193	9.2%
	Total	453	100%	2095	100%

### SENTIMENT DISTRIBUTION

This section shows the sentiment distribution according to two categories. First, health institutions pages, and second, news agencies' pages. The sentiment distribution for "Palácio das Cinzas," the official page of the Ministry of Health of Timor-Leste (Figure 1), shows that from 1708 total comments, more than half of the comments (62.94 %) are positive, neutral sentiment accounts for 22.6%, and negative sentiment accounts for 14.46%, which is the lowest.

FIGURE 1: SENTIMENT ANALYSIS OF COMMENTS ON PALACIO DAS CINZAS POSTS

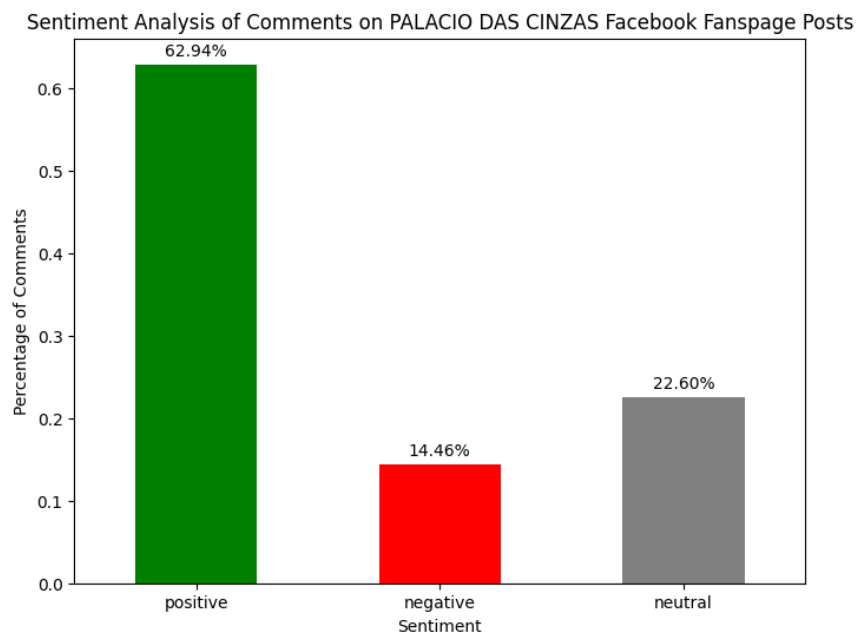
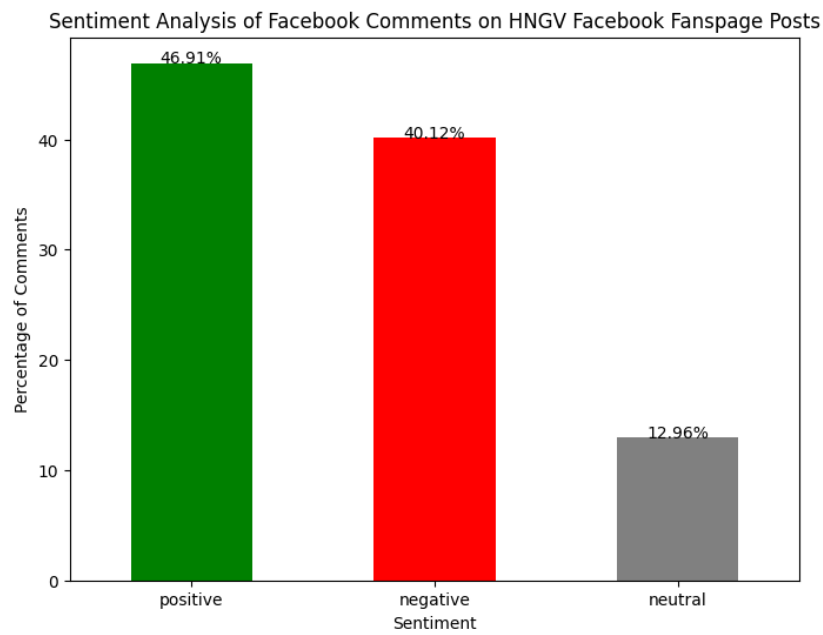


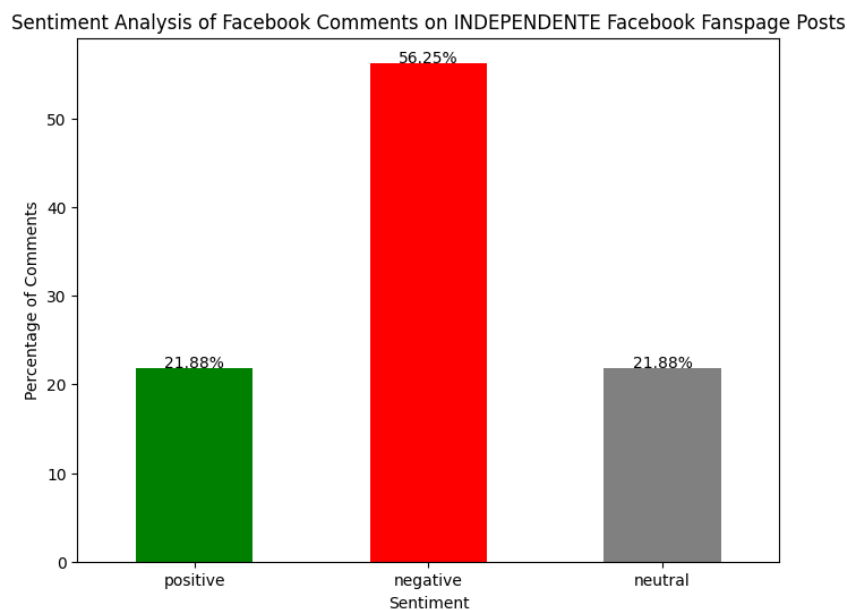
Figure 2 shows that from 162 total comments on the "Guido Valadares National Hospital-HNGV" page, 46.91 % are positive sentiment and 40.12 % are negative sentiment. The neutral sentiment is the lowest, with 12.96 %.

**FIGURE 2: SENTIMENT ANALYSIS OF COMMENTS ON GUIDO VALADARES NATIONAL HOSPITAL-HNGV**



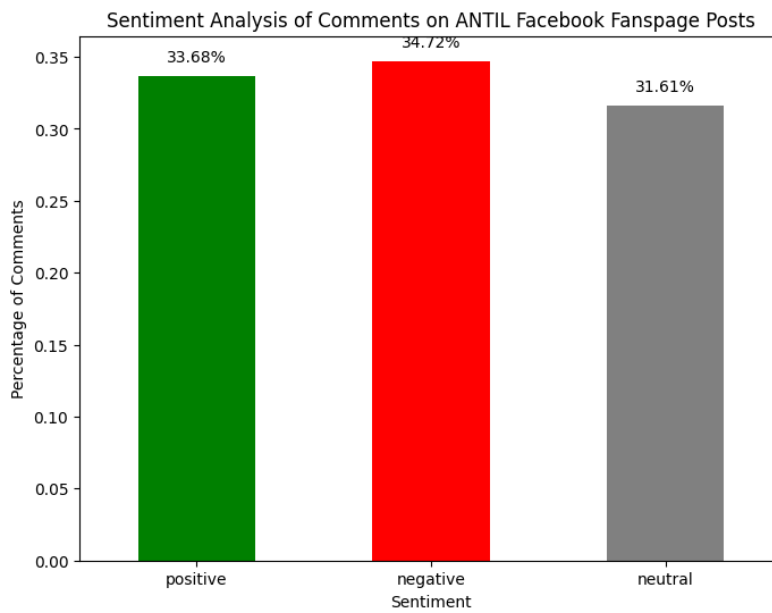
For section two, which is the news agencies, both private and public news agencies have results that are different from the health institutions. The “Jornal Independente,” a private news agency with a total of 32 comments in this study, has more than half (56.25 %) of comments with negative sentiment and an equal percentage of positive and neutral sentiment with 21.88%, as shown in Figure 3.

**FIGURE 3: SENTIMENT ANALYSIS OF COMMENTS ON JORNAL INDEPENDENTE POSTS**



The sentiment distribution of comments on the official page of “ANTIL” (TATOLI: Agencia Noticioso de Timor-Leste.IP), a public news agency, from the total 193 comments, 34.72 % are negative, 33.68 % are positive, and 31.61 % are neutral (Figure 4).

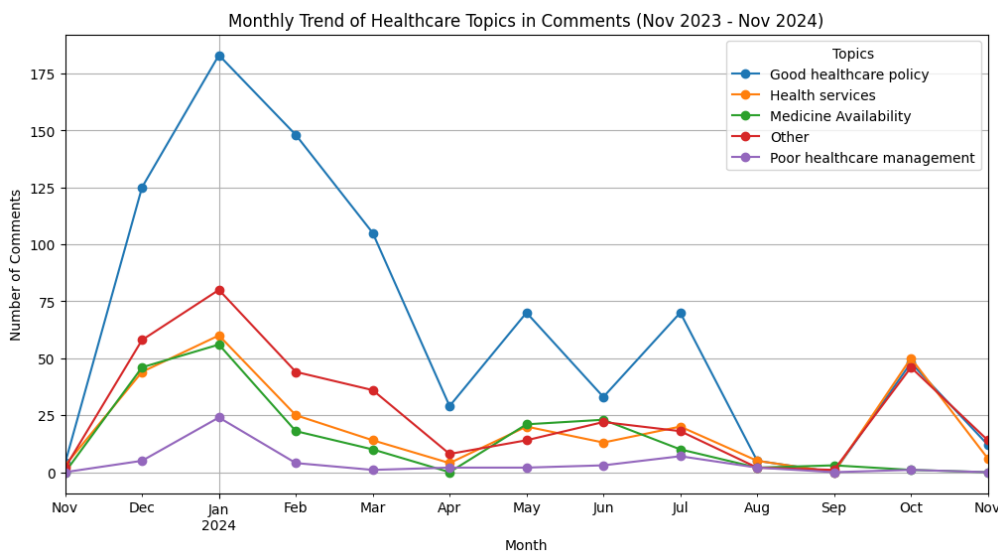
**FIGURE 4: SENTIMENT ANALYSIS OF COMMENTS ON ANTIL POSTS**



**THEMATIC ANALYSIS**

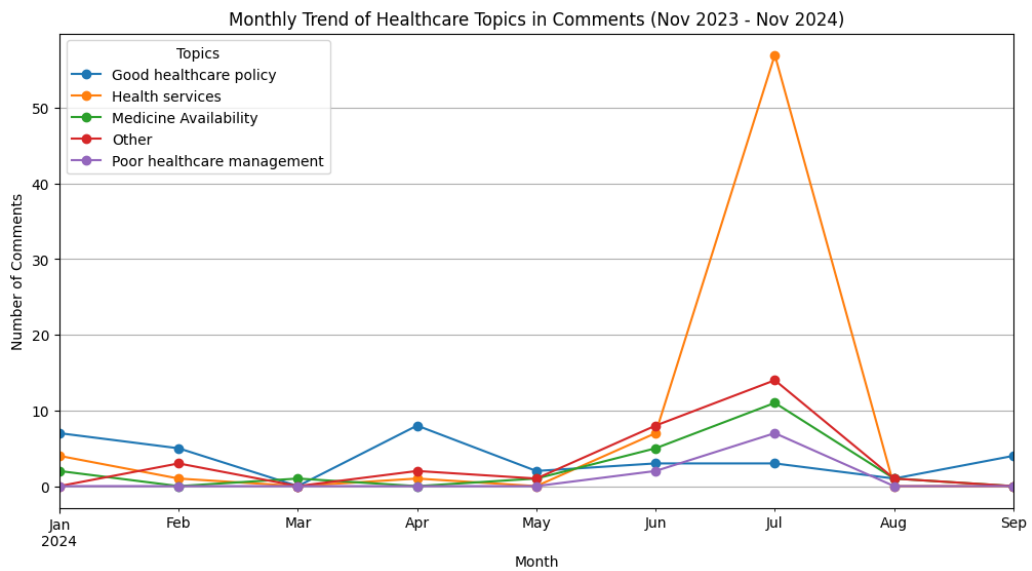
From all those comments, the authors organized them into four main themes. First, "Medicine Availability," which encompasses all the following words: medicine, buy, pharmacy, private pharmacy, private, stockout, stock out, drugs, drug, stock, vaccine, sames, infpm, and import. Second, "Health Services" encompasses the following words: hospital, referral, private clinic, patient, disease, health post, health center, doctor, doctors, nurse, midwives, medicine, clinic, people, HNGV, die, ambulance, death, private, public, facilities, and facility. Third, "Poor healthcare management," which encompasses the words "stupid, liar, less, dismiss, incapacity, fired, management, investigate, no capacity, blame, blaming, people, blaming each other, wrong, worst, corruption, lie, problem, media, and defend. Fourth, "Good healthcare policy" encompasses the words "good, good management, congratulations, interview, congratulation, result, name, vacancy, published, municipality, good job, job, good work, vacancy, best, smart, intelligence, excellent, support, better, her excellency, resolve, thank, thanks.

**FIGURE 5: MONTHLY TREND OF HEALTHCARE TOPICS IN COMMENTS FOR MOH PAGE**



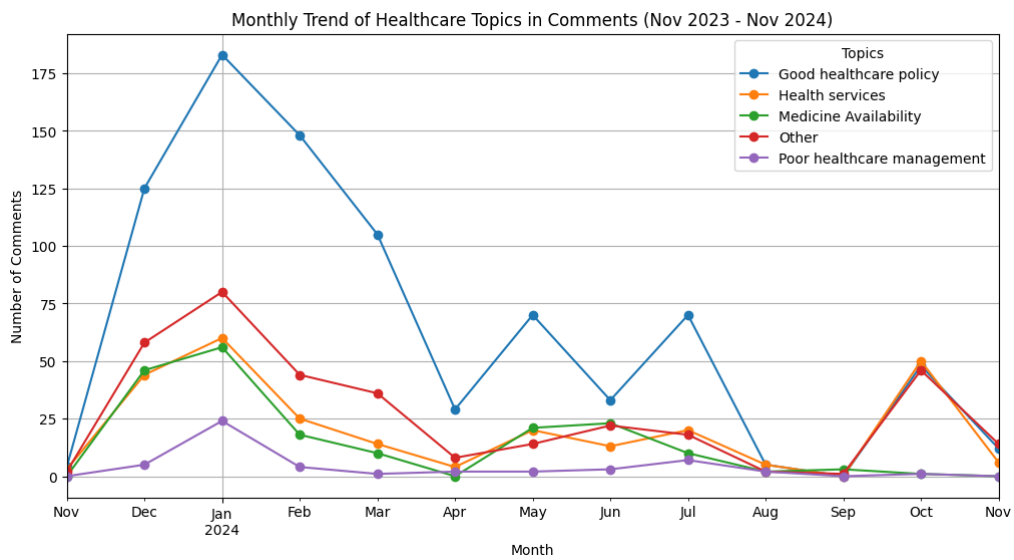
According to the topics debated in comments on the MoH page for one year (Figure 5), the Good healthcare policy and Medicine availability themes are the most debated since November 2023. However, this trend decreased in April and increased again during April-July until it decreased in August. There is also another topic that the authors did not identify, which increased from November 2023 until April 2024.

**FIGURE 6: MONTHLY TREND OF HEALTHCARE TOPICS IN COMMENTS FOR HNGV PAGE**



On the other side, comments on the HNGV page for one year show Health services theme is the most debated during June and August 2024. Other topics that the author did not mention were also highly debated from May to August 2024, as shown in Figure 6.

**FIGURE 7: MONTHLY TREND OF HEALTHCARE TOPICS IN COMMENTS FOR ANTIL PAGE**



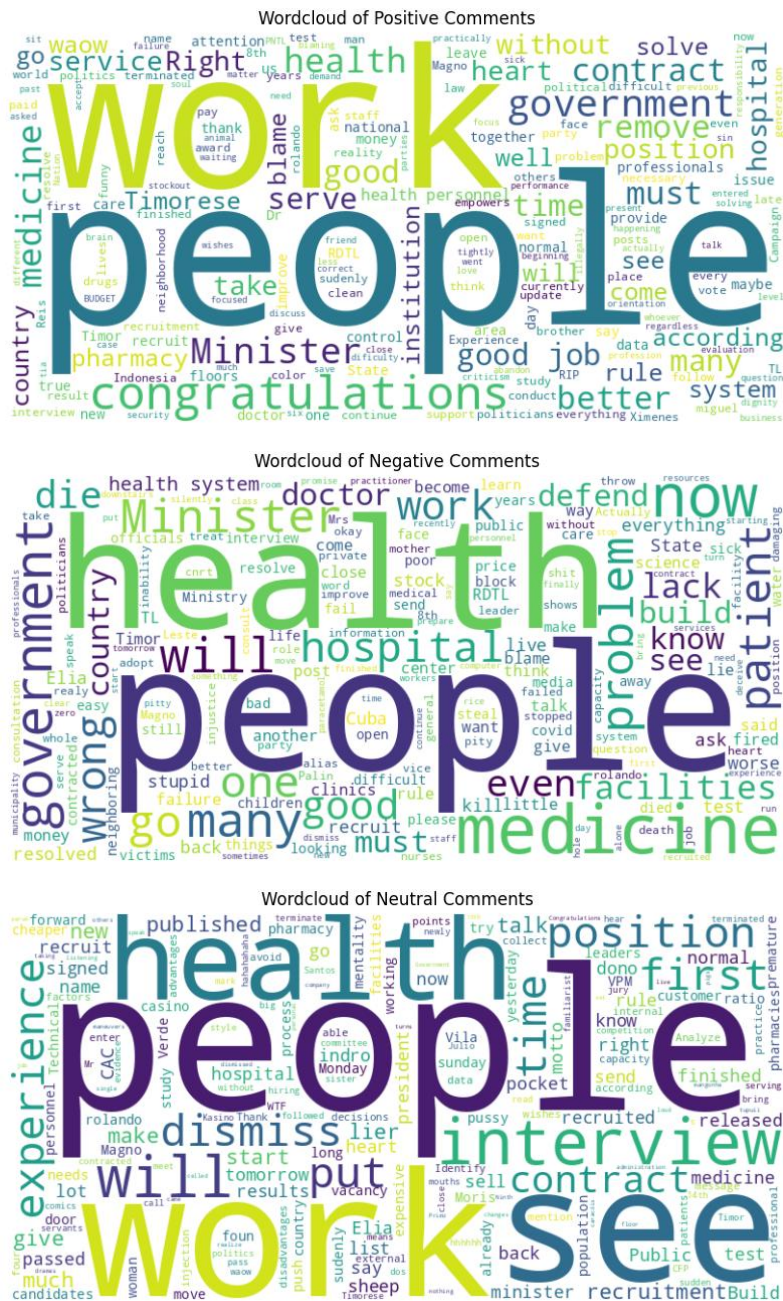
The public news agency ANTIL page shown in Figure 7 had an increased number of comments on Good Healthcare Policy topic from November 2023 until August 2024. Health Services and Medicine Availability also moderately debated during November 2023 to April 2024.







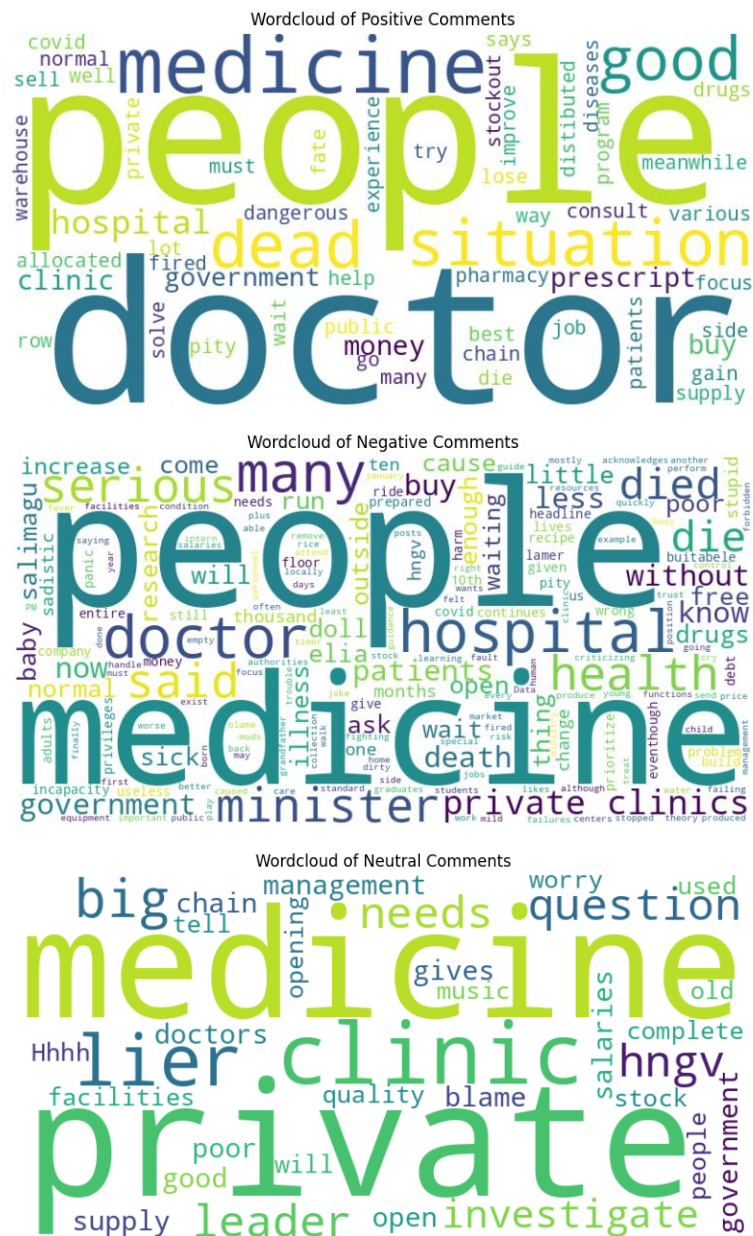
FIGURE 11: POSITIVE, NEUTRAL, AND NEGATIVE SENTIMENT WORD CLOUDS OF ANTIL PAGE



From the public news agency (ANTIL) page, the word cloud shown (Figure 11) The phrase “people” and “work” are highly mentioned words in “positive sentiment.” People are commenting on the agency’s posts, expecting the newly appointed health institution’s leader to improve the health services and solve the medicine stockout the country is facing at that time. On the other side, “people,” “health,” and “medicine are frequently mentioned in “negative sentiment” because, again, the medicine stockout, poor health services, and people dying in hospitals are hot topics during the study period.

Generally, the words "medicine" appears most frequently (28 times), raising concerns about shortages and stockouts. "People" mentioned 25 times and "health" 22 times, suggesting conversations on access to public healthcare. Additionally, “work” mentioned 20 times, "government" 18 times, and "minister" 14 times reflect political complaints. The terms "hospital" 16 times, "service" 15 times, and "system" 12 times; imply discontent with the medical establishment. Moreover, "Contract" mentioned 9 times, "recruit" 8 times, and "staff" 9 times all allude to issues with hiring. In conclusion, the most urgent difficulties include governance issues, low service quality, and shortages. Problems with medicine availability, healthcare administration, and political meddling in Timor-Leste’s health sector are revealed by this study.

FIGURE 12: POSITIVE, NEUTRAL, AND NEGATIVE SENTIMENT WORD CLOUDS OF JORNAL INDEPENDENTE PAGE



As a private news agency, Jornal Independente always posts about the reality of the country's health system issues. Therefore, the result showed “people” and “doctor” are the words highly mentioned in “positive sentiment.” It highlights the comments supporting the doctors efforts in attending to the patients. Meanwhile, “medicine” and “people” are frequently mentioned in “negative sentiment” (Figure 12) as the result of criticism of medicine stockout and patient dissatisfaction about the country's health system.

Generally, the words "People" which is mentioned 18 times, is the most often mentioned word. This implies that human experiences or problems impacting individuals are at the heart of the conversations. Meanwhile, in medical context, the terms "medicine" mentioned 16 times, "doctors" 11 times, and "hospital" 9 times; all suggest a focus on medical services and healthcare. This represents health-related worries or conversations, perhaps in relation to a medical emergency or persistent problems. The government and private sector related terms such as "government" which is mentioned 6 times and "private" 8 times imply conversations about the functions of various healthcare sectors, potentially tackling concerns related to healthcare policy or access.

## COMPARATIVE ANALYSIS

From the result shown in Table 2, the positive sentiment was more dominant on institutions' (National Hospital-HNGV and MoH) official pages than on both public and private news agencies (Jornal Independente and ANTIL). Negative sentiment was found to be more dominant in comments in the private news agency (Jornal Independente) and slightly higher in the public news agency ANTIL.

The reasons behind a huge difference in sentiment on public institutions and news agencies are that public institutions have a higher number of healthcare-related posts that predominantly address achievements issues, seminars and inauguration activities, job vacancies, and other topics related to the good part of the healthcare services in the country. Meanwhile, the news agency has fewer posts related to healthcare issues, which leads to fewer comments. Their posts are mainly about "hot" issues regarding medicine stockouts, poor health management and policy, intra-hospital patient death, poor health infrastructures, partialism and favouritism in health institutions, malnutrition among children under five years old, and other healthcare-related issues that triggered an increasing number of opinions and comments among Facebook users.

**TABLE 2: SENTIMENT DISTRIBUTION ACROSS PAGES**

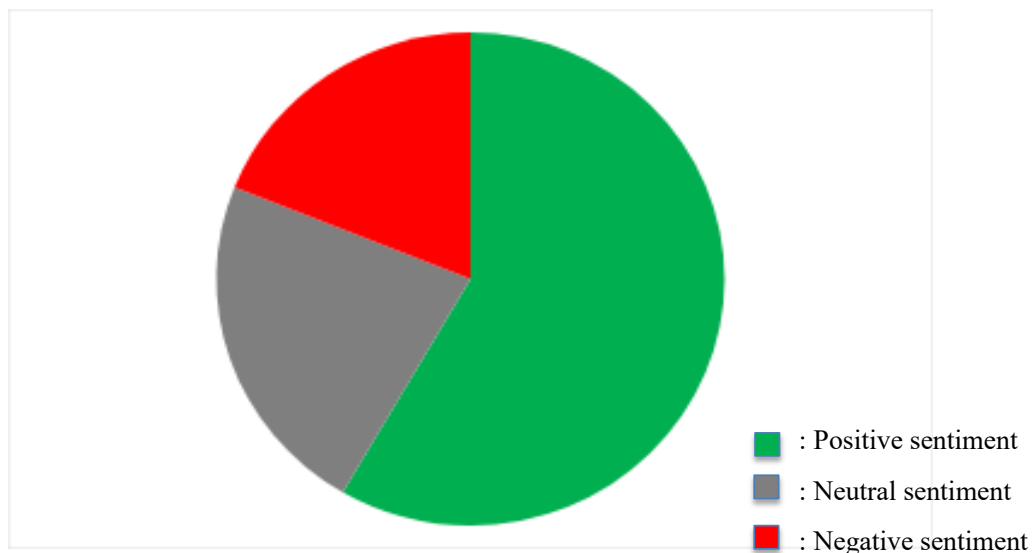
No	Name of fanpage	# of comments	Sentiment					
			Positive	%	Negative	%	Neutral	%
1.	Palácio das Cinzas	1708	1075	87.9%	247	62.2%	386	81.3%
2.	Guido Valadares National Hospital-HNGV	162	76	6.2%	65	16.4%	21	4.4%
3.	Jornal Independente	32	7	0.6%	18	4.5%	7	1.5%
4.	ANTIL	193	65	5.3%	67	16.9%	61	12.8%
	Total	2095	1223	100%	397	100%	475	100%

This study found that overall, from a total of 2095 comments on 453 healthcare-related posts within a one-year period, 58.4 % are positive sentiment, followed by neutral sentiment with 22.7% and negative sentiment with 18.9%, as shown in Table 3 and Figure 13.

**TABLE 3: OVERALL SENTIMENT RESULT**

Sentiment	Comments	Percentage
Positive	1223	58.40%
Neutral	475	22.70%
Negative	397	18.90%
Total	2095	100.00%

FIGURE 13: OVERALL SENTIMENT



## DISCUSSION

The overall sentiments of Facebook users' comments on healthcare related posts from four official pages of health institutions and news agencies (public and private) are "Positive" with 58 % from a total 2,095 comments, Neutral sentiment with 23 %, and following with 19 % of Negative sentiment. This result answers the research question that the Positive sentiment is the one that predominant in Facebook comments during November 2023 until November 2024.

The "Medicine availability", "Good healthcare policy" and "Health services" are broad themes that most frequently discussed and criticized. There are differences in the sentiment result of comments between health institution (national hospital and the MoH) and news agency (public and private). Majority of comments from healthcare institutions' pages are "Positive sentiment" while "Negative sentiment" predominantly in comments from news agencies. According to the findings of this study, the differences happen because posts from the official's pages of healthcare institutions such as from the Ministry of Health and HNGV (national hospital) mainly about the important activities of the leaders of these institutions like meetings, seminars, speeches, site visits, inaugurations, and job vacancies. Meanwhile, Jornal Independente as a private news agency, generally posted about the principal issues that the community facing regarding healthcare system such as medicine stock out, health services quality, poor health management, poor health facilities, malnutrition, and intra-hospital deaths of patient. On the other hand, the public news agency (ANTIL) was more moderated in publishing these issues compared to the private news agency.

Over the course of almost two years (March 2020–February 2022), a study by Ravenda et al. [41] performed sentiment analysis on 151,738 Facebook posts from 274 Spanish hospital pages. Posts on security precautions and situational updates had a more negative tone, reflecting the gravity of the epidemic and the difficulties hospitals were facing, but posts about vaccines had a more optimistic tone and showed an emphasis on public advice and comfort. Therefore, this study confirmed the result of our study where the stockout of medicine, intrahospital deaths, and poor healthcare services triggered negative sentiment. However, posts related to the inauguration, the minister's activities such as meetings, and job vacancies received positive sentiment. This suggests that during the COVID-19 outbreak, hospitals utilized Facebook to control public opinion, modifying their communication tactics in response to the changing situation and meeting the audience's demand for direction and confidence. reflecting the gravity of the epidemic and the difficulties hospitals were facing.

Facebook's role in spreading internet news is crucial in influencing public opinion. People's perceptions of issues can change significantly because of the way private agencies provide news [11]. This study confirmed the authors' study in

which comments in private news agency's Facebook page were predominantly negative sentiment than the public institution pages.

According to the study from Afiq et al. [27], a total of 1852 Facebook reviews from 48 public hospitals in Malaysia were examined for, which concentrated on how patients felt about the quality of the services they received. With the use of machine learning sentiment analyzer, the study found 27.9% as negative and 72.1% as positive. Even though the author's study sample does not match with the sample of this study, in this case, the result is almost same because from 2095 comments 58 % was positive.

According to the Kemp [5], the Facebook users in Timor-Leste are 578.5 thousand in early 2024. Therefore, with the finding of this study showed even though, more than half comments shown positive sentiment; there is still big portion of user who have negative sentiment towards healthcare system in Timor-Leste. This reflects the use of social media such as Facebook in Timor-Leste that has increased rapidly. Almost everyone who uses a smartphone has a Facebook account.

Facebook is very important in everyday life. Many people use Facebook to access news and other issues. one of the issues is related to the availability of medicines, health services, and other issues related to health. With the results of this study, decision makers from the Ministry of Health can find out what public sentiment really is about the health sector. Based on that, they can make the right decisions to improve the health problems this country is facing and can enhance patient care. In addition, the results of this study are very useful for health institution's Facebook page admins to be more careful in posting news or articles, which can influence public opinion to become negative. Thus, it can impact the performance of health workers and can reduce the level of public trust on Timor-Leste's healthcare system.

## LIMITATIONS

The number of comments from news agencies is smaller compared to comments from health institution pages. Ideally, the data should be the same in the number of comments from 4 pages for a fair comparison, and this is one of the limiting factors in this study. Moreover, the results of translated comments may not reflect the true meaning of the comments, as this is influenced by the researcher's capacity to translate the comments from other languages into English. Another important point is the incapacity of machine learning to interpret sarcasm during the sentiment scoring and analysis process. Therefore, we suggest incorporating advanced NLP techniques like transformer-based models in future studies to improve sentiment detection accuracy with the reason; these models are very expressive because they can encode long-range relationships in input sequences via self-attention methods [42].

## FUTURE RESEARCH

With these limitations, the authors recommend future studies to be related to other social media platforms such as Tik-Tok, YouTube and Instagram because Timor-Leste users are increasing over time. The author really hopes that there will be a sentiment analysis study using other methods to get more accurate results so that they are useful as evidence to be used for decision making by policy makers.

## CONCLUSION

This study sheds light on public sentiment toward healthcare in Timor-Leste, leveraging Facebook comments as a lens to understand public perception. The findings reveal a predominance of positive sentiment on institutional pages, driven by posts showcasing achievements and policy initiatives, while negative sentiment was more prevalent in comments on news agency posts highlighting systemic challenges such as medicine shortages and healthcare management issues. Key themes such as medicine availability, good healthcare policy, poor healthcare management, and health services underscore the complexity of public expectations and experiences with the healthcare system.

The results demonstrate the critical role of social media as a platform for public discourse, providing valuable insights for policymakers and stakeholders. By addressing the concerns raised in online discussions and enhancing communication strategies, healthcare leaders can build trust, improve service delivery, and prioritize reforms that resonate with public

needs. Future studies could expand the scope of sentiment analysis to other social media platforms and explore longitudinal trends to further support evidence-based decision-making in healthcare policy and management.

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