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A QUANTITATIVE CONTENT ANALYSIS OF THE SOUTH AFRICAN PRESIDENCY'S USAGE OF TWITTER IN RESPONSE TO COVID-19 IN 2020

Tarryn Govender

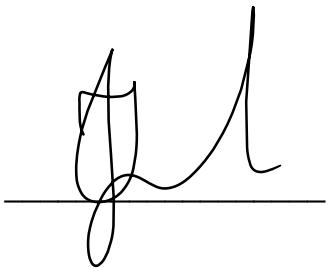


A research report submitted to the Wits School of Public Health, Faculty of Health Sciences, University of the Witwatersrand in partial fulfilment of the requirements for the degree of Master of Public Health

Johannesburg, July 2022

DECLARATION

I declare that this research report is my own unaided work. It is being submitted for the degree of Master of Public Health at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



Tarryn Govender

26th day of July in the year 2022.

ABSTRACT

Background: Social media for risk communication has become widely used globally. The way messages are communicated via social media plays a role in the general public's perception of risk and consequently their behaviour. The Presidency of South Africa used several platforms for risk communication during the COVID-19 pandemic, including social media such as Twitter.

Aim: To characterise the South African Presidency's communication about COVID-19 on Twitter during the national lockdown period in 2020.

Methods: A retrospective quantitative content analysis study design was used for the study. All tweets from the South African Presidency were filtered using the advanced search function with search words "COVID-19" and "coronavirus" and search dates 27th March 2020 to 28th December 2020. The text and visuals from these tweets were retrieved and exported to an Excel worksheet using an automatic data extraction software. A total of 699 COVID-19 related tweets were yielded and analysed. Descriptive statistics were formulated in relation to each study objective.

Results: The South African Presidency's communication on Twitter displayed many effective risk communication attributes, such as timeliness, use of visuals, frequent strategic actions, and situational awareness tweets to keep the public informed. Core capacities of risk communication, such as community engagement and management of false information, were not addressed. Even though tweets displayed a positive emotional frame, a majority of the tweets were neutral, which is not considered effective.

Conclusion: Overall, the effective risk communication characteristics identified from the South African Presidency's COVID-19 related tweets, together with guidelines for risk communication via social media, can be optimized for future use to reduce the spread of new diseases or even for ongoing COVID-19 communication.

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CHAPTER 1: INTRODUCTION

This introductory chapter begins with a brief background, which describes the COVID-19 disease, statistics, risk communication and social media use in South Africa. It is followed by descriptions of effective risk communication in emergencies, the use of framing in communication, the government's use of social media, and the public's perceptions of the economic and social impact of COVID-19. The chapter ends with the aims and objectives of this study.

1.1. Background

Coronavirus (COVID-19) is an infectious disease caused by SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) (1). The disease was first reported on 31st December 2019 in Wuhan, People's Republic of China, and has resulted in a pandemic (2). Globally, there are over 472 million COVID-19 cases and 6 million associated deaths (3).

This disease can spread from respiratory aerosols or droplets from an infected person's mouth or nose when they cough, speak, sneeze or breathe (1). Most people infected with COVID-19 exhibit mild to moderate respiratory illness with common symptoms such as fever, dry cough, and fatigue (1, 2). Some people experience severe respiratory illness with additional symptoms such as shortness of breath, difficulty breathing, chest pain or pressure in the chest, which could lead to death without medical intervention (1, 2). Elderly people and those with underlying medical conditions are at a greater risk of developing severe respiratory illness (1, 2). Examples of underlying medical conditions include chronic respiratory disease, high blood pressure, diabetes, cardiovascular disease, obesity, or cancer (1, 2).

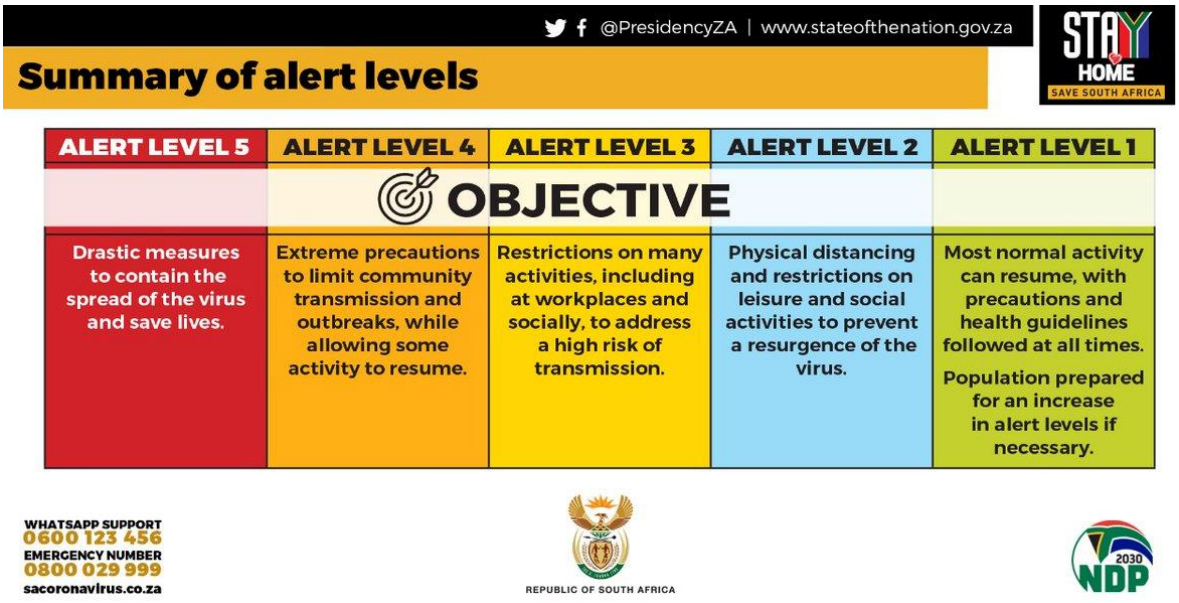
According to the World Health Organization (WHO), the best approach to prevent and reduce the transmission of COVID-19 is to be knowledgeable about the disease and how it spreads (1). In addition, numerous preventative measures have been prescribed, including vaccination, physical distancing, wearing a mask, regularly cleaning your hands, keeping rooms well ventilated, and avoiding crowds (1, 2).

The first COVID-19 case in South Africa was reported on 5th March 2020 (4). The number of cases in South Africa exponentially increased to 1655 within a month and by the end of December 2020 there were over 1 million cases (5, 6). During 2020, there were two considerable waves of COVID-19 infections, which started at the

beginning of June and the middle of November (7). A COVID-19 wave is the interval from when the weekly incidence of COVID-19 is equal to or greater than 30 cases per 100 000 persons until the weekly incidence of COVID-19 is equal to or less than 30 cases per 100 000 persons (7). To date, South Africa has approximately 3.7 million COVID-19 cases and 99 800 associated deaths (8).

A national state of disaster was declared by the president of South Africa, Cyril Ramaphosa, on 15th March 2020, where a number of strategies were announced to curb the spread of COVID-19 (4, 9). These strategies included a travel ban on nationals from high-risk countries, school closure, prohibition of gatherings more than 100 people, implementation of hygiene control in public facilities, and strengthening surveillance and testing systems (9). Several of these strategies were contextualized to the needs of South African citizens and modelled from countries that have been successful in controlling the spread of the virus (4).

Subsequently, five different levels of lockdown, also known as alert levels, were designed and implemented by the South African government (10). These five lockdown levels included various measures based on the rate of COVID-19 transmission and the capacity of the South African health care system to provide services to those infected (10). Figure 1 below outlines the objective of each lockdown level.



Source: The South African Government Website (10)

Figure 1 Summary of alert level objectives

During lockdown level 5, which was introduced on 27th March 2020, only essential service sectors were permitted to operate (10, 11). These sectors included those providing food, healthcare, medicine, essential municipal services, fuel, internet, and banking services (11). Retail stores were only authorized to sell food, medical, cleaning and hygiene products. People were allowed to leave their home to provide an essential service, seek medical care or purchase essential goods (11). Interprovincial movement of people was prohibited except for transportation of goods and exceptional circumstances (11). Transport services were allowed to operate with limitations on vehicle capacity, and strict hygiene conditions at restricted hours (11).

All essential service sectors in addition to a few with a low rate of transmission and high economic value were authorized to operate when the country moved to lockdown level 4 on 1st May 2020 (10, 11). Retail stores were allowed to sell educational books, stationery, office equipment and IT equipment in addition to essential goods (11). Restaurants and fast-food establishments were allowed to open for food delivery only (11). Interprovincial movement of people was still prohibited, with the exceptions mentioned above and for people to return to their usual place of residence (11).

South Africa moved to lockdown level 3 on 1st June 2020 (10, 11). A broader range of sectors were permitted to operate, which included sectors with a low to moderate risk of COVID-19 transmission that could be effectively controlled (10). Clothing and hardware stores were allowed to reopen (11). Alcohol was allowed to be sold in limited quantities and within restricted times for off-site consumption only (11). Domestic air travel was permitted for work purposes, with a limitation on the number of flights per day (11).

Most sectors were permitted to operate when lockdown level 2 was introduced on 18th August 2020, with restrictions remaining where the risk of COVID-19 transmission was still high (10, 11). All retail stores were allowed to reopen, and restaurants and fast-food establishments were allowed to open for dining in (11). Interprovincial movement of people was allowed, but people were encouraged to stay at home and limit their interactions with others (11).

South Africa moved to lockdown level 1 on 21st September 2020, where all sectors and retail stores were permitted to operate (10, 11). Restaurants were allowed to

operate with stringent social distancing and hygiene measures (11). Domestic air travel was restored, but only essential travel was recommended (11).

Each lockdown level lasted approximately a month except for lockdown level 3 and 1 which lasted just over two and half months. There was a curfew in place at all lockdown levels with varied time restrictions (11). Table 1 below summarizes the dates and keys measures of each lockdown level.

Table 1 Key measures during each lockdown level

Lockdown Level	Time Period	Key Measures
5	27/03/2020 – 30/04/2020	• Only essential services sector permitted to operate • International air travel prohibited • Interprovincial travel prohibited • Curfews between 8pm and 5am • Sale of alcohol prohibited • Education permitted on specified dates • All public gatherings prohibited • Mandatory use of face masks • Social distancing and hand hygiene emphasized
4	01/05/2020 – 31/05/2020	Same as above with the following amendments: • More sectors allowed to operate (mostly essential services) • Restaurants and fast-food establishments allowed to open for food delivery only
3	01/06/2020 – 17/08/2020	Same as above with the following amendments: • More sectors permitted to operate • Limited domestic air travel • Sale of alcohol permitted (restricted hours) • Consumption of alcohol off-premises only • Restaurants and fast-food establishments allowed to open for take-away
2	18/08/2020 – 20/09/2020	Same as above with the following amendments: • Most sectors allowed to operate • Domestic air travel restored • Interprovincial travel permitted • Accommodation for business travel permitted • Restaurants and fast-food establishments allowed to open for dining in
1	21/09/2020 – 28/12/2020	• All sectors allowed to operate • No limitation on personal movement • Essential travel recommended • Mandatory use of face masks • Social distancing and hand hygiene emphasized

Source: COVID-19 Online Resource & News Portal (11)

Government officials communicated about the outbreak, and the various measures and prescribed preventative behaviours to the public during all the lockdown levels. This type of communication is called risk communication. According to the WHO, risk communication can be defined as the exchange of information, opinions and advice in real time between experts or government officials and the public who face a threat to their survival, health or social or economic well-being (12). The ultimate purpose of risk communication during a disease outbreak is to empower people to make informed decisions in order to take preventive action (12).

Every member state of the WHO must be able to provide risk communication and community engagement (RCCE) in a public health emergency according to the International Health Regulations (2005) (IHR) (13). The IHR is a legal framework which defines countries' rights and obligations in response to public health emergencies (14). South Africa, as a member state of the United Nations (UN) and the WHO, is therefore legally required to implement RCCE under the IHR (13). RCCE is considered one of the eight pillars of an effective governmental response to a public health emergency (13).

All available and relevant communication channels should be used for risk communication such as mass media (TV, radio, newspapers), social media (social networks, microblogs, media sharing), community media (local radio stations and newspapers), and personal communication (community leaders, health care workers and influencers), as one individual communication channel will not be able to reach everyone (13, 15).

Social media can be characterized as interactive online platforms that facilitate sharing of information, ideas and interests through virtual communities and networks (15). It has grown and evolved rapidly over the years, and can be considered one of the first sources of news for many people, since it also allows for the convergence with mass media (16). A large portion of social media content comes from mainstream mass media, however, during the COVID-19 pandemic there has been a considerable divergence from mass media, in terms of deliberate attempts to disseminate false information or rumours to undermine public health response and advance alternate agendas (16, 17).

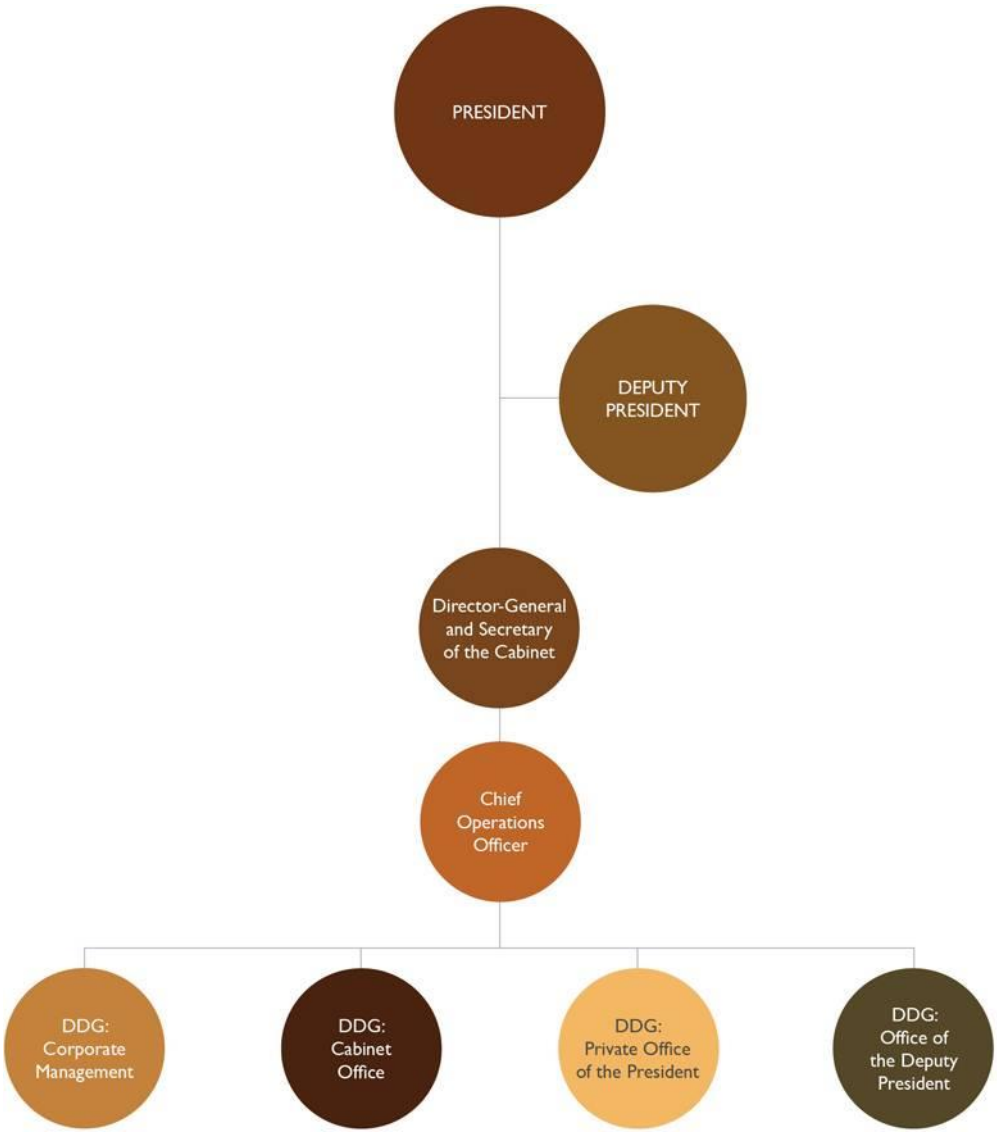
False information consists of misinformation and disinformation (13). Misinformation is false information that is shared by people who don't realise it is false and don't mean any harm, while disinformation is false information which is deliberately engineered and disseminated with malicious intent to cause public harm or to serve agendas (13). Rumours are unverified information which can be true or false and spread quickly through a group, stories or reports (13).

It has been noted that false information and rumours can spread rapidly through interaction among social media communities and networks, however, this can be managed with a coordinated governmental response (13, 18). There are significant advantages for governments to use social media for risk communication which includes the ability to provide immediate, accurate and the latest information; manage false information or rumours more effectively and timeously; as well as incorporate website links to valuable resources (16). Virtual communities and networks can quickly interact with this information and resources to better protect themselves and the population at large during a public health emergency, if governments use social media advantageously and effectively (15).

The COVID-19 pandemic is the first in history in which technology and social media were used on a massive scale to keep the public informed and connected, however, it has also enabled and amplified an infodemic (17). An infodemic is an overabundance of information, predominately false information, via digital and physical information systems during a disease outbreak (13, 17, 19). This makes it difficult for people to find trustworthy sources and reliable guidance which can affect their risk perception and decision making, consequently, undermining governmental response efforts (13, 17, 20).

The term infodemic originated in 2003, but it was unused and forgotten until the COVID-19 pandemic when the WHO proclaimed that, in addition, we are facing an infodemic (19). Due to the astounding volume and speed of information sharing during the COVID-19 pandemic, the WHO called on all member states to develop and implement a national plan to manage the infodemic through their existing risk communication (13, 17, 19).

The Presidency of South African, which refers to the executive management of government (21), used several platforms for risk communication during the lockdown, including social media (Twitter, Facebook, YouTube, and Instagram). A hierarchy of the South African Presidency, with the president at the apex, is presented in Figure 2 below.



Source: The Presidency Republic of South Africa Website (21)

Figure 2 Organogram of the South African Presidency

As of January 2021, South Africa had 38 million internet users and 25 million social media users which is equivalent to 64% and 42% of the total population respectively (22). According to a broad global survey, 59% of South African internet users aged 16 to 64 use Twitter each month and there was a significant 15% increase in Twitter usage in 2020 (22).

Twitter is a social media service on which people interact with short messages called tweets (23). Registered Twitter users can post, like, and retweet tweets, as well as comment on tweets and follow other Twitter users, whereas unregistered users can only read tweets (23). Tweets can consist of 280 text characters (24) and may include visuals (images and videos), links to relevant websites and resources allowing information to be shared quickly and efficiently with a large number of people (25).

The Presidency of South Africa's Twitter page has the most followers (1.8 million) compared to their other social media platforms, even though Twitter is not the most-used social media platform in South Africa, compared to WhatsApp, Facebook and Instagram (22). This is a small percentage of the SA population, and these followers may not be representative of the broader SA population. However, unregistered Twitter users still have access to read tweets (23), therefore the Presidency of South Africa's Twitter page followers is not a true representation of the actual number of people who access this page for updates and information. Considering there are over 500 million unregistered monthly Twitter users globally (26) and 38 million internet users in SA (18), unregistered Twitter users in SA may be representative of the broader SA population.

When facing an infodemic together with a public health emergency, Twitter, in addition to mass media communication, may represent a valuable tool for governments to manage false information and communicate accurate information directly as well as rapidly to citizens (27).

1.2. Literature Review

1.2.1. Effective Risk Communication in Emergencies

According to the WHO, effective risk communication from the government or leaders during a public health emergency needs to be quick and organized (13). The five key functions, or core capacities of risk communication, include risk communication systems; internal and partner communication and coordination; public communication; communication and engagement with affected communities; and dynamic listening and rumour management (13). These core capacities are outlined in Figure 3 below.



Source: National Department of Health/UNICEF Risk Communication and Community Engagement Training Manual (13)

Figure 3 The five core capacities for risk communication

Risk communication systems include human resources, standard operating procedures and structures to specify who will do what in a public health emergency (13). There needs to be a strategy which describes the objective of the governmental response and the behaviour change required from the public (13). Secondly, there needs to be a clear process for the stakeholders at all levels to communicate and coordinate the response (13).

Public communication in an emergency involves the dissemination of timely and accurate information to the public across as many communication channels (13). In addition, communication engagement with the public and affected communities is vital to understand the difficulties in following the prescribed advice and behavioural change (13). Lastly, there needs to be a system to tackle false information and rumours, by monitoring media and social media as well as gathering feedback from community engagement (13).

Risk communication in conjunction with community engagement, either physically or virtually, can be useful in controlling the transmission of COVID-19 and the related impacts (28). Conflicting messages and recommendations from the government can

often cause confusion or mistrust, therefore it is important to engage with the community regarding their concerns to ensure the uptake of preventative actions and health services (28). It is important that the public is given the opportunity to ask questions and express themselves, as people will be more likely to listen to the advice (13, 16). The government in turn needs to be responsive to the public's concerns and needs as this will facilitate better outcomes for behaviour change (13, 16).

The COVID-19 infodemic makes it difficult for people to find trustworthy sources and reliable guidance when needed, due to the large volume of false information in circulation in physical and digital information systems (13, 17, 20). In this regard, community engagement becomes increasingly important (20). Social listening, which can be defined as the tracking, analysis, and synthesis of community inputs, has proven to be key in detecting rumours and false information (20). Concerns, questions, complaints, and suggestions shared by the affected communities can be easily identified through social listening (20). A study conducted in Eastern and Southern Africa found that the COVID-19 pandemic has unquestionably emphasized the need and importance of reinforcing social listening on digital platforms across regional and national response levels (20).

False information is often associated with an inappropriate health behaviour intention during a public health emergency (18). A study conducted on this very topic revealed that even a single exposure to false information may prompt a undesirable behaviour (18). Although the change in behavioural intention identified in the study is relatively small (5%–12%), it was highlighted that small changes can lead to significant behaviour implications (18). In addition, it was found that generic warnings about the dangers of online false information had no change in behavioural intention and were therefore unlikely to be effective (18).

According to the Centers for Disease Control and Prevention (CDC), effective risk communication in emergencies are based on six principles, namely, be first, be right, be credible, express empathy, promote action and show respect (16). These principles are detailed in Figure 4 below.



Source: CDC's Crisis and Emergency Risk Communication (CERC) Manual (16)

Figure 4 CDC principles of effective risk communication

The CDC has documented that people process information and act on information differently during a public health emergency, due to the high levels of uncertainty and complexity (29). People may illogically simplify messages, hold on to current beliefs or look for additional information and opinions (29). When minimal information is available, people may speculate certain details or believe the first message they receive, even though more accurate information may follow (16, 29). It is therefore essential to be proactive and communicate quickly, clearly, and frequently to prevent false information or rumours from spreading (13, 16). Since the situation is constantly evolving in an emergency, communication also needs to be transparent, easy to understand, complete and precise (13, 16). This helps to build trust and rapport as it is insufficient to just communicate the message (13, 16). The public needs to realize the seriousness of the situation and have confidence in the person or organization communicating the message (13, 16).

Reliable and evidence-based information about the risk of contracting COVID-19 and practical measures to prevent COVID-19 should be communicated to the public (13, 16). The reason for these measures needs to be clearly explained to facilitate understanding and uptake of preventative behaviours, as behaviour change is not easy (13, 16). Expressing empathy by acknowledging the public's feelings and their challenges also helps to build trust and rapport (13, 16). Respectful communication is further recommended to promote cooperation from the public (13, 16).

Research in communication related to health warnings conducted in the United States of America (USA), prior to COVID-19, found that the timely and transparent dissemination of evidence-based, accurate information regarding an infectious disease outbreak and progress regarding governmental response can create public confidence and trust (30). Additionally, frequent and sufficient communication can help increase the public's perceived risk, leading to a positive behavioural response, since an individual's perceived risk is dependent on the information they receive (30).

Other global studies, have also indicated that governments who have responded timeously and effectively communicated information regarding COVID-19 to their citizens have been successful in curbing the exponential spread of the virus as well as the social and economic consequences (31).

1.2.2. Use of Framing in Communication

Framing in communication refers to how a message defines an issue within a context (32). Use of communication framing during a public health emergency can be helpful to persuade and motivate people to act (32). It can also play a significant role in alleviating fear and uncertainty amongst the public (33). Therefore, information disseminated by governments during risk communication need to be framed in a way that addresses the needs of the public and their emotional distress, to be effective (32).

According to the WHO, messages that display honesty; express care and empathy; and identify with the audience are factors that make risk communication effective (12). In addition, reassurance about the risk can also offer emotional support and reduce anxiety (32). Effective risk communication messages should therefore be designed using these positive emotional frames (32).

Ineffectively communicating the situation, risk, and measures with the use of general, vague, complex, or fear-based message frames can cause confusion, anxiety, and panic amongst the public leading to an inappropriate behavioural response (30, 34). This may result in adverse consequences such as burdening the health system and causing preventable deaths (30, 34).

When using framing in social media it is important to remember that it involves interpersonal communication, so it should therefore offer some interaction and emotional support during public health emergencies (16). If the messages come across as generic, uncaring, and impersonal, they will not encourage the public to build trust and rapport with the government (16). The CDC recommends that social media risk communication messages should be communicated with compassion, concern and empathy (16). This is in keeping with the above global research findings regarding the effectiveness of positive emotional frames (32).

1.2.3. Governments' Use of Social Media

Many risk communication guidelines and policies published in the last decade introduced the importance of social media (30). The latest WHO guideline for emergency risk communication policy and practice indicates that social media be useful in interacting and engaging with the public, (35). It can serve as a means of creating situational awareness; addressing public concerns and reactions; and monitoring and responding to rumours during a public health emergency (35). In theory, social media may be useful as outlined above, but the national, regional, and local contexts dependent on the country (risk levels, people's perceptions, needs, local capacities and current situations) will influence how effective the risk communication can be (35). Globally, there are a limited number of studies on the governments' use of social media for risk communication, especially within SA. Therefore, the studies cited below are depictive of very different social, governmental, and cultural contexts compared to SA.

A study focused on Twitter use by the G7 world leaders during the initial outbreak of COVID-19 concluded that most tweets were informative, followed by morale-boosting tweets, which were considered more beneficial than political tweets (27). Similarly, a study conducted on the Italian government's use of Facebook revealed that the messages were adapted to the different levels of lockdown and the communication

tone shifted from prescriptive to informative when the public health emergency became less severe (36).

A study on Weibo, a social media platform similar to Twitter, was conducted in China. The study found that government's risk communication was timelier and more transparent than their response to the 2003 SARS outbreak (34). Weibo was mainly used to provide situational awareness and information about the virus, prevention tips, policies, guidelines, and government actions (34). A more empathic communication style was recommended since the public became more empathic with people affected with COVID-19 as the pandemic evolved (34). Finally, the study concluded that there was insufficient emotional support and an inadequate response to public concerns (34).

Another study conducted on Weibo in China, found that the types of messages appearing most frequently on this social media platform were as follows: disease prevention, new evidence, health care services, action, reassurance, and uncertainty (32). A narrative style of communication, such as sharing a story, was also found to be useful in public engagement since it identifies with the public and offers emotional involvement (32). Similarly, a global study on visual risk communication concluded that tweets with images were most effective when alongside text because the images attract attention and promote understanding of the text (37). This is in keeping with research which shows that visual aids positively influence attention, comprehension, recall and behaviour change (38).

Lastly, a study conducted in the USA revealed that government stakeholders using Twitter initially underestimated the pandemic (30). Substantial effort was thereafter employed to create situational awareness and inform the public on preventative measures (30). Situational awareness, external resources/knowledge, strategies and guidelines, and executive orders were considered as important and necessary message types (30). Even though these message types were the most used , there were insufficient tweets noted for these message types across the study period (30).

With a global average of 192 million registered daily users (39) and over 500 million unregistered monthly users (26), Twitter has great potential for immediate and strategic risk communication since it allows government stakeholders to reach and engage with masses of people and communities (37).

1.2.4. Public Perceptions of the Economic and Social Impact of COVID-19

The University of Johannesburg (UJ) and Human Sciences Research Council (HSRC) conducted multiple surveys during the COVID-19 pandemic to understand the public perceptions of the economic and social impact of COVID-19 in South Africa (40). The findings of the surveys were weighted to match SA demographic statistics in terms of race, education, gender, and age (40). The surveys are therefore broadly representative of the SA population and allows for comparability between surveys (40). The first two surveys took place between the period 13th April to 11th May 2020 and 3rd July to 8th September 2020, respectively (40, 41).

Approximately 75% of the public in both surveys reported that they knew a lot or a fair amount about the COVID-19 pandemic (40, 41). However, approximately 30% of the public from the first survey and 40% of the public from the second survey felt that the threat of COVID-19 was exaggerated (40, 41). It was recommended, by the HSRC, to address this important issue as it could impact the uptake of preventative measures and adherence to safety regulations (41).

In terms of the public's sources of information about COVID-19, approximately 70% of the public, from both surveys, consider mass media (television, radio, and newspaper or online articles) as their dominant source (40, 41). In addition, approximately 30% of the public from both surveys relied on social media as their main source of information about COVID-19 (40, 41). Friends, family, and colleagues; and government health officials were equally regarded as a key source of information (40, 41).

Trust in government is considered a critical determining element in the uptake of preventative measure in emergencies (16, 41). A large portion (85%) of the public from the first survey believed that the President was doing a good job in managing the COVID-19 pandemic, however there was a 20% decline noted in the second survey that was conducted months later in the pandemic (40, 41). Similarly, there was a slight decline of public trust in the national government's response to the pandemic from the first to the second survey (41).

A majority of the people in both surveys were concerned about their financial situation and difficulties keeping up with their expenses, as their income or employment were severely affected (33, 34). In the first survey, 48% and 22% of the

public reported that either themselves or someone else in the household went to bed hungry, respectively (40). In the second survey, the was a slight increase in these already significant statistics (41). These findings indicate that the economic consequences of the pandemic continued to affect South Africans as the pandemic progressed (41).

In addition, access to basic household services such as electricity and water were also other challenges experienced by many (40). Approximately 24% and 10% of the public in the first survey reported electricity and water access issues, respectively (40). These figures doubled by the second survey and were most likely attributed to the reintroduction of loadshedding and water supply problems (41).

The month of April 2020 was an especially challenging time for South Africans since the country was experiencing its most severe form of lockdown (10). Government relief efforts only began in May 2020 (increase to existing government grants) and in June 2020 (launch of the Special COVID-19 Social Relief of Distress Grant) (11). The dominant emotions experienced by the public during the pandemic, which were noted in both surveys, included stress, fear, frustration/ irritability, and depression (40, 41).

1.3. Problem Statement

Social media for risk communication has become widely used globally (30, 35). The way messages are communicated via social media can play a role in the general public's perception of risk and consequently their behaviour (12, 30, 42). It is important to explore how the Presidency's tweets were characterized on Twitter to determine if they encompassed effective communication attributes.

1.4. Justification

An outbreak of a new infectious disease places the public at a high risk of infection and creates an extremely uncertain situation (34). Effective risk communication is therefore critically important in assisting individuals to make informed decisions to take preventive action (12, 34). Risk communication requires a combination of communication channels, of which social media is one (27, 35).

Research suggests that social media can potentially play an instrumental role in risk communication (30, 35). There are mainly studies in the USA, Europe and China on risk communication using social media which occur in very different social,

governmental, and cultural contexts. There is a paucity of studies using social media for risk communication within the SA context and this will be the first study to characterize the Presidency of South Africa's communication about COVID-19 on a social media platform, Twitter. This research could be used to inform future social media risk communication strategies when facing infectious disease outbreaks, similar to COVID-19.

1.5. Research Question

How did the Presidency of South Africa use Twitter to communicate information about COVID-19 during the national lockdown period in 2020?

1.5.1. Aim

To characterise the South African Presidency's communication about COVID-19 on Twitter during the national lockdown period in 2020.

1.5.2. Objectives

1.5.2.1. To describe the timeliness and frequency of COVID-19 tweets made by the Presidency of South Africa in 2020 across five lockdown periods.

1.5.2.2. To identify the types of COVID-19 tweets made by the Presidency of South Africa in 2020 across five lockdown periods.

1.5.2.3. To identify the framing of COVID-19 tweets made by the Presidency of South Africa in 2020 across five lockdown periods.

CHAPTER 2: METHODS

This chapter describes the methodological approach used to characterise the South African Presidency's communication about COVID-19 on Twitter during the national lockdown period in 2020. It also describes the study population, sampling methods, data collection, data analysis and ethical considerations.

2.1. Study Design

A retrospective cross-sectional study design using quantitative content analysis was used to analyse how the Presidency's tweets on Twitter were characterized across five distinct lockdown periods. Quantitative content analysis is the systematic and replicable examination of characteristics of communication (textual, visual, or aural) which have been coded by means of assigning numeric values (43). The analysis of these numeric values using statistical methods can be used to describe the communication or draw inferences about its meaning (43). In quantitative content analysis, the coding scheme is established a priori, which is, before coding begins (44). Therefore, the variables in this study were deductively based on literature.

2.2. Study Population

The study population was all unique COVID-19 related tweets made by the Presidency of South Africa during the period 27th March 2020 to 28th December 2020 from the Presidency Twitter account (https://Twitter.com/PresidencyZA). The Presidency used the following social media platforms: Facebook (835 694 followers), Instagram (30 200 followers), YouTube (12 400 followers) and Twitter (1.8 million followers). Twitter was chosen for the study since it had significantly more followers than the other Presidency social media accounts. Furthermore, this Twitter account was selected because it represents leaders within the South African government. It also had the most tweets, variation of information and followers compared to other government Twitter accounts.

2.3. Sampling Methods

All tweets, containing text, images, and videos, from the South African Presidency's Twitter account from 27th March 2020 to 28th December 2020 which were COVID-19 related were eligible and included in the study. This timeframe reflects the 5 different lockdown levels in 2020. Lockdown level 5 began on 27th

March 2020 and lockdown level 1 ended on 28th December 2020. Tweets were considered COVID-19 related if they contained the words “COVID-19” and “coronavirus”. Tweets containing documents, speeches and videos of events were excluded as these were considered as resources instead of tweets due to their length and format.

2.4. Data Collection

All tweets from the South African Presidency were filtered using the advanced search function with the following inclusion criteria, search words “COVID-19” and “coronavirus” and search dates 27th March 2020 to 28th December 2020. The text and visuals from these tweets were retrieved and exported to an Excel worksheet using an automatic data extraction software called Octoparse (45).

2.5. Data Management and Analysis

Each tweet was treated as a separate unit of measure in the Excel worksheet. Irrelevant tweets, duplicate tweets occurring on the same day and tweets containing documents, speeches and videos of events were manually excluded by the researcher. The text and visuals from each tweet were then systematically coded into quantitative response options by the researcher, in the form of numeric values, under each variable to capture specific characteristics relevant to the research aims, using a closed-ended quantitative codebook. The variables in the codebook were used to define the number, types and frames of tweets using the measures described below.

The number of tweets over each lockdown period was calculated to describe the frequency of tweets made by the Presidency, while the lockdown period in which they were tweeted were described to address timeliness.

The types of tweets in relation to their format and content were identified and categorized. The format of tweets in relation to their visual properties were identified and categorized. The following five categories were chosen: text, text with image, text with video, text with webpage link, and text with image/ video and webpage link (see Appendix B for detailed description of each format of tweet category).

Since risk communication involves the exchange of information to create situational awareness, address public concerns, and respond to rumours (12, 35), the following eight content categories were chosen; informational, strategic actions, situational awareness, management of false information/rumours, new research evidence, events, community engagement, and other (see Appendix B for a detailed description of each type of tweet category).These categories were also consistent to those found in other studies (30, 32, 34).

The frames of tweets in relation to how their content was portrayed in terms of sentiment were identified and categorized. According to risk communication guidelines by the WHO and CDC, effective risk communication generally encompasses characteristics such as empathy and reassurance and identifies with the needs of the public (12), whereas characteristics such as fear and blame are considered ineffective (15), therefore the following seven categories were chosen: empathy, fear, reassurance, uncertainty, praise, blame and neutral (see Appendix B for a detailed description of each frame of tweet category). Since these categories are based on general guidelines, they may not apply in particular contexts, however, some of these categories were also consistent with those found in COVID-19 related studies (30, 32, 34). The number of tweets per category in terms of types and frames were also compared across each lockdown level.

A random sample of tweets was double coded by supervisors early in the coding process, to finalise the codebook, and to ensure the reliability of the codebook. Relevant and frequently occurring data was identified in the sample tweets. Therefore, the following inductive categories were added to the codebook: call to action, economic response, corruption, and acknowledgements; and the category motivational in relation to content and frames of tweets, respectively (see Appendix B for detailed description of these categories).

Finally, the data were statistically analysed using Microsoft Excel supported by the codes. Descriptive statistics were formulated in relation to each objective. The number of tweets was reported as a line chart to display the frequency of tweets across the lockdown levels. The type and frame of tweets were reported in proportions and presented in clustered bar graphs to represent these categorical variables. Summary statistics were presented in tables. The data was then

interpreted and validated with findings from other published research before report writing.

2.6. Ethical Considerations

As the Presidency Twitter account and tweets included in this study are available to the public, the research protocol was submitted to the Postgraduate Assessor Group and the Human Research Ethics Committee (HREC) of the University of Witwatersrand in South Africa for an ethical waiver. Since the study did not involve humans or their medical records, this was granted (see Appendix C).

CHAPTER 3: RESULTS

This chapter presents the main results of the study. The South African Presidency's tweets in relation to COVID-19 are described according to the number of tweets, types, and frames of tweets over each lockdown level. The results are presented over each lockdown level using descriptive statistics.

3.1. Timeliness and Frequency of COVID-19 Tweets

A total of 1665 COVID-19 related tweets were identified on the South Presidency's Twitter account during the study period, 27th March 2020 to 28th December 2020. A large portion of the tweets were excluded due to their length and format. These consisted of documents, speeches, and videos of events. For example, 94 tweets were used to communicate the entire president's speech (progress in the national effort to contain the COVID-19 pandemic) on 11th November 2020.

The final number of COVID-19 related tweets that were coded and analysed were 699. As seen in Table 2 and Figure 5 below, most tweets occurred during lockdown level 5 (n=245; 35.1%), followed by lockdown level 3 (n=196; 28.0%). The least number of tweets occurred in lockdown level 2 (n=53; 7.6%).

Table 2 Number of COVID-19 tweets per lockdown level

Lockdown Level	Dates	Duration (Weeks)	Week Number	Weekly Average	n	%
5	27/03/2020 – 30/04/2020	5	1 – 5	49	245	35.1
4	01/05/2020 – 31/05/2020	4	6 – 9	33	130	18.6
3	01/06/2020 – 17/08/2020	11	10 – 20	18	196	28.0
2	18/08/2020 – 20/09/2020	5	21 – 25	11	53	7.6
1	21/09/2020 – 28/12/2020	13	26 – 38	6	75	10.7
Total		38			699	100

The duration of lockdown level 5, 4 and 2 were approximately 4-5 weeks each, however, lockdown level 5 had more tweets than lockdown level 4 and 2 combined. Conversely, lockdown level 1 with the longest duration had the second lowest number of tweets (n=75; 10.7%). It can be concluded that the number of tweets were not in proportion to the duration of the lockdown level.

However, the average number of tweets per week at each lockdown level could be related to the severity of the lockdown level. During lockdown level 5, when the strictest regulations were in place, the average number of tweets per week were 49. As presented in Table 2 above, the average number of tweets per week continuously decreased as South Africa progressed to lockdown levels with fewer restrictions. When South Africa eventually reached lockdown level 1, there was a mere average of 6 tweets per week.

Figure 5 below displays the frequency of tweets across the weeks during the study period. The number of tweets from week to week were not predictable. In fact, the number of tweets increased and decreased drastically from week to week. A significant increase in the number of tweets were noted at the end of each lockdown level when a change in lockdown level was announced by the president. An increase in tweets was also noted when events took place or public facilities were visited by the president. The most tweets occurred during week 4 (n=91) of lockdown level 5 and week 7 (n=62) of lockdown level 4.

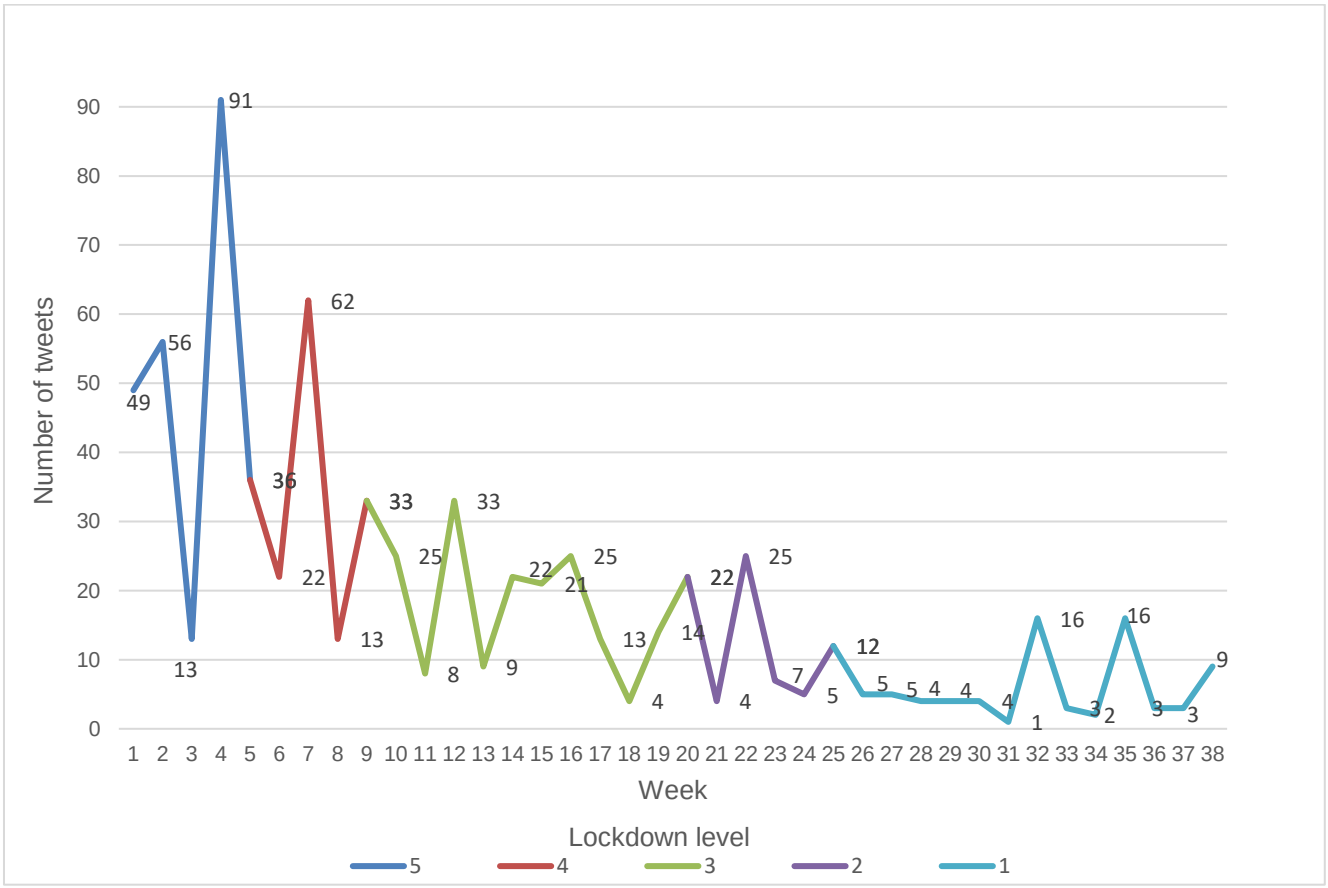


Figure 5 Frequency of COVID-19 tweets

During lockdown level 1 there were a consistently low number of tweets over the 13-week period, especially between week 26 to 31. This was the only lockdown level in which this type of prolonged period of minimal tweets occurred. There were two peaks of tweets noted at week 32 and 35, which were associated with the president's address to the nation on developments in the COVID-19 response, that took place on 11th November 2020 and 3rd December 2020, respectively.

3.2. Types of COVID-19 Tweets

3.2.1. Format of Tweets

The text with image format was the most used format for COVID-19 related tweets used by the South African Presidency and accounted for almost half of the tweets across all lockdown levels, except at lockdown level 2, where text was the most used format. As reflected in Table 3 and Figure 6 below, tweets in the text with image format represented most tweets (n=310; 44.3%), while the text with video format accounted for the least number of tweets (n=58; 8.3%).

Table 3 Format of COVID-19 tweets per lockdown level

Format	Lockdown Level 5		Lockdown Level 4		Lockdown Level 3		Lockdown Level 2		Lockdown Level 1		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Text with image	114	46.5	63	48.5	86	43.9	14	26.4	33	44.0	310	44.3
Text	54	22.0	14	10.8	31	15.8	18	34.0	12	16.0	129	18.5
Text with webpage link	38	15.5	22	16.9	37	18.9	7	13.2	16	21.3	120	17.2
Text with image/ video and webpage link	12	5.0	14	10.8	33	16.8	13	24.5	10	13.3	82	11.7
Text with video	27	11.0	17	13.1	9	4.6	1	1.9	4	5.3	58	8.3
Total	245	100	130	100	196	100	53	100	75	100	699	100

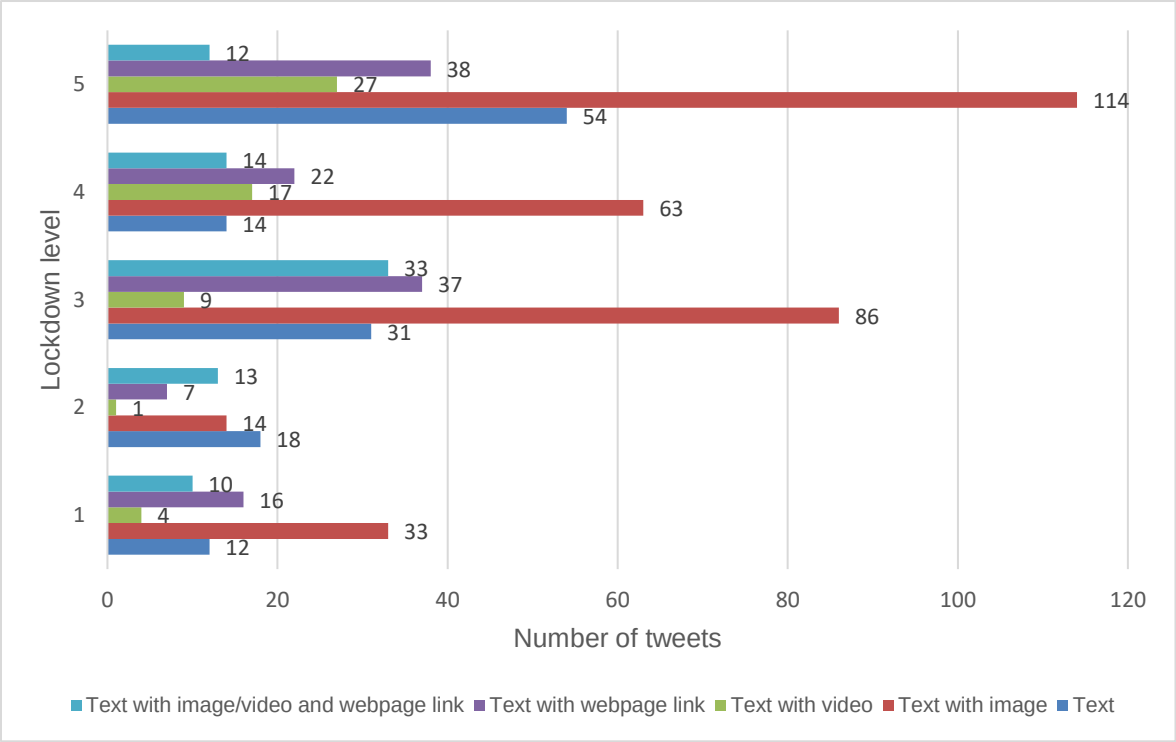


Figure 6 Format of COVID-19 tweets per lockdown level

Of the 380 tweets that included images, the majority of these images included text and pictures to present strategic actions (n=168; 44.2%) or included pictures of the president (n=147; 38.7%). The strategic action images detailed regulations announced at each lockdown level. These images also included contact numbers for WhatsApp support and emegencies as well as webpage addresses for the “COVID-19 Online Resources & News Portal” (sacoronavirus.co.za) and “The State of the Nation” (stateofthenation.gov.za) websites. However, the contact numbers and website addresses were not hyperlinked to allow for direct calling or access to the websites, respectively. Therefore, these tweets were excluded from the formats of tweets that involved webpage links, unless there were hyperlinks with direct access to websites included in the text portion of the tweet. An example of this strategic action tweet in the text with image format is presented in Figure 7 below. The tweets which included images of the president consisted of pictures of the president at events, on event schedules and with quotations from statements or speeches. The tweets concerning a picture of the president with quotations also included contact details and webpage addresses as described above. An example of this event tweet in the text with image format is presented in Figure 8 below.



Figure 7 Lockdown Level 3 tweet about strategic actions



Figure 8 Lockdown Level 4 tweet about a speech related event

Text with webpage links were the second most used format during lockdown level 4, 3 and 1. A significant number of these webpage links directed Twitter users to statements, speeches and event-related information on “The Presidency Republic of South Africa” website (thepresidency.gov.za). Webpage links to the “COVID-19 Online Resources & News Portal” website (sacoronavirus.co.za) were also noted, however, very few in comparison, which is surprising considering this website is data free (46). The webpage links to these two websites consisted of random numbers and letters. Due to the format of these webpage links it was not evident which website the user would be directed to. While these webpage links may have been shortened to fit the text character limit of a tweet, the name of the website could have been provided along with the webpage link for clarity. An example of a tweet with a webpage link is presented in Figure 9 below.



Figure 9 Lockdown Level 5 tweet with quotation from the president’s statement

The text with video format was the least used format during lockdown level 3, 2 and 1. These videos mostly showcased events and visits to public facilities. Some videos detailed the lockdown strategies and preventative measures. There were also resource videos to apply for food parcels and the COVID-19 Social Relief Grant, as well as guidance on how to download and use the COVIDAlertSA app, which was developed to improve contact tracing.

3.2.2. Content of Tweets

Of the 699 tweets, 170 tweets included content that was relevant to two content categories; therefore, these tweets were allocated two content codes. A total of 11 unique categories were identified for content, with the remaining tweets coded as “Other”. These categories, their definitions, and examples of each are presented in Table 4, after which the number of each type of tweet is summarised by lockdown level in Table 5.

Table 4 Definitions and examples of types of content tweets

Content Type	Definition	Examples
Events	Tweets providing information on events such as national speeches, visits to facilities, media briefings, interviews, etc.	“President @CyrilRamaphosa will address the nation at 20h00 today, Monday 28 December 2020, on developments in relation to the country’s response to the #Coronavirus pandemic.” Lockdown level 1
Strategic actions	Tweets describing governmental regulations to curb the spread of infection (travel restrictions, provision of resources, environmental measures, etc)	“As we enter the next stage of our COVID-19 response, government will focus on careful monitoring, dealing with hotspot areas & measures to protect frontline workers & the most vulnerable members of society.” Lockdown level 4
Situational awareness	Tweets providing official updates about the latest epidemic situation of COVID-19 mostly about number of newly confirmed cases or deaths and some epidemiological backgrounds	“From The Desk of the President - Monday, 29 June 2020 https://bit.ly/2NEcsok The number of deaths from coronavirus recently passed the 2,000 mark. Among those who have lost their lives are health care workers, consummate professionals who cared for the ill.” Lockdown level 3
Economic response	Tweets specifying the impact of COVID-19 on the economy or livelihoods.	“The coronavirus pandemic has also caused hardship for many South Africans and their businesses. Government has provided a range of social and economic relief measures to help those affected.” Lockdown level 2
Call to Action	Tweets prescribing certain protective and preventative behaviours	“Even as we begin to ease some of the lockdown restrictions, it is vital that all South Africans continue to observe critical social-distancing and hygiene practices to contain the spread of the coronavirus. #COVID19 #CoronaVirusSA” Lockdown level 5
Informational	Tweets providing information about the severity of COVID-19, easy transmission of the infection, preventative measures, clinical symptoms, and treatment	“Social distancing, hand hygiene and the use of masks remain our key weapons against Covid-19. By following these simple guidelines, we can prevent a second wave of infections and the need for tighter restrictions on our daily lives.” Lockdown level 1
Acknowledgements	Tweets that commemorate those affected by COVID-19 and those providing support to the country’s response efforts.	"Deputy President David @DDMabuza in his capacity as Chairperson of the SA National AIDS Council has today, in commemoration of the #InternationalNursesDay, saluted South African nurses for their service in the fight against the novel coronavirus disease.” Lockdown level 4
Corruption	Tweets including information on corruption and transparency of government spending related to COVID-19	“Government is taking decisive action not only to safeguard COVID-19 funds but also to strengthen our response against the broader problem of corruption in our society.” Lockdown level 3

Community Engagement	Tweets that seek information from the public regarding their needs and concerns	"Feedback and/or comments should be submitted in writing preferably for #Level4 and following the attached guidelines. South Africa will be moving to Level 4 economic activity as of 1 May 2020 hence comments particularly on the proposals as contained in Level 4 is encouraged." Lockdown level 5
New research evidence	Tweets sharing up to date scientific reports about COVID-19	"Strong new evidence suggests that the coronavirus can also spread through the air. This makes preventative measures like masks and social distancing especially critical to reduce airborne transmission." Lockdown level 3
Other	Tweets that do not fall under any of the above-mentioned types	"Public and staff access to the Union Buildings is currently limited following the confirmation that a staff member has tested positive for COVID-19." Lockdown level 4

As presented in Table 5 below, the largest proportion of the South African presidency's COVI9-19 related tweets were associated with events (n=263; 30.3%) and strategic actions (n=199; 22.9%). The majority of these two types of tweets occurred following the introduction of each lockdown level.

Table 5 Content of COVID-19 tweets per lockdown level

Content	Lockdown Level 5		Lockdown Level 4		Lockdown Level 3		Lockdown Level 2		Lockdown Level 1		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Events	76	27.0	54	32.5	70	27.5	13	18.8	50	51.0	263	30.3
Strategic actions	85	30.2	49	29.5	44	17.3	8	11.6	13	13.2	199	22.9
Situational awareness	14	5.0	22	13.4	39	15.4	9	13.0	4	4.1	88	10.1
Economic response	45	16.0	9	5.4	16	6.3	8	11.6	9	9.2	87	10.0
Call to Action	6	2.1	9	5.4	25	9.8	7	10.3	9	9.2	56	6.4
Informational	12	4.2	5	3.0	21	8.3	5	7.2	8	8.2	51	5.9
Other	30	10.6	12	7.2	2	0.8	0	0	0	0	44	5.1
Acknowledgements	10	3.5	6	3.6	16	6.3	4	5.8	4	4.1	40	4.6
Corruption	0	0	0	0	14	5.5	15	21.7	1	1.0	30	3.5
Community Engagement	4	1.4	0	0	5	2.0	0	0	0	0	9	1.0
New research evidence	0	0	0	0	2	0.8	0	0	0	0	2	0.2
Management of false information	0	0	0	0	0	0	0	0	0	0	0	0
Total	282	100	166	100	254	100	69	100	98	100	869	100

Event tweets accounted for the most tweets during lockdown level 4, 3 and 1. Almost a third of tweets occurring at lockdown level 4 and 3; and half of the tweets from lockdown level 1 were event related. Event related tweets provided information on planned events, for example, national speeches, ministerial briefings, visits to facilities and meetings held with other government officials or organizations. Some tweets provided details such as the venue, date, and time while other tweets provided an agenda, webpage links to watch the event or pictures/videos from the events.

Strategic action tweets described the current regulations imposed by the government to manage the COVID-19 pandemic and accounted for the most tweets during lockdown level 5. Regulations such as the movement of people and the sectors permitted to operate were outlined across all lockdown levels. The tweets during lockdown level 5, in addition to those mentioned above, detailed strategic actions such as the alert system, meetings to coordinate the COVID-19 response, widespread testing and associated quarantine facilities, provision of water and food parcels to communities and provision of resources at health/special facilities. During lockdown level 4, tweets highlighted quarantine and treatment facilities, as well as the need to ease restrictions with caution to prevent a large increase in the number of COVID-19 infections. Tweets during lockdown level 3, 2 and 1 described the need for targeted interventions and restrictions in hotspot areas as well as increased monitoring, screening, and testing in preparation for a surge in COVID-19 cases or a second wave of infections.

There were a substantial number of tweets that fell under situational awareness (n=88; 10.1%) and economic response (n=87; 10.0%). Situational awareness tweets provided official updates about the latest epidemic situation of COVID-19, including the number of confirmed positive cases or deaths, hotspot areas, outbreaks at public facilities and the occurrence of a wave of infections. Economic response tweets focused on the impact of COVID-19 on the economy or livelihoods, in terms of hunger, unemployment, and business distress. The tweets also outlined the range of social and economic relief measures made available by the government and organizations such as the COVID-19 Social Relief Grant, COVID-19 Loan Guarantee Scheme, and food parcels. These tweets were mostly noted during lockdown level 4

and 5. There was only one tweet in lockdown level 1 which stated that the COVID-19 Social Relief Grant would be extended by three months.

Call to action tweets (n= 56; 6.4%) prescribed certain protective and preventative behaviours. Overall, there were minimal tweets in this category across all lockdown levels. However, there was a slight increase in tweets as South Africa progressed to each lockdown level. These tweets appealed to the public to observe preventative behaviours such as social distancing, mask wearing and hygiene practises, both when the number of COVID-19 cases were increasing or decreasing. Most tweets during lockdown level 3 and 4 called on the public to play their part in protecting healthcare workers, high risk individuals and employees returning to work. The public were also urged to download the contact tracing app (COVIDAlertSA) to protect themselves and their loved ones during lockdown level 2. In addition, a few tweets during lockdown level 1 were noted to dissuade gatherings and encourage appropriate behaviour over the festive season.

The informational tweet (n= 51; 5.9%) category, which provided information about the severity of COVID-19, transmission of the infection, preventative measures, clinical symptoms, and treatment, also consisted of minimal tweets across all lockdown levels. The importance of wearing a mask, social distancing and handing washing were highlighted across all lockdown levels. Tweets also provided information regarding the need for strict limits on movement and gatherings in order to curb the spread of COVID-19. Tweets during lockdown level 3 provided details on how to stay safe while carrying out daily activities such as shopping or travelling in public transport. In addition, there were a small percentage of tweets in lockdown level 3 and 4 which mentioned that individuals with underlying medical conditions and elderly persons are at a greater risk of developing severe COVID-19 symptoms. However, the underlying medical conditions were not specified in the tweets.

Acknowledgement tweets (n=40; 4.6%) commemorated those affected by COVID-19 and those providing support to the country’s response efforts. Some of these tweets made mention to healthcare workers and organizations providing support. While other tweets, empathised with government officials who contracted COVID-19 and the public who had lost loved ones due to COVID-19.

Corruption tweets (n=30; 3.5%) included information on corruption and transparency of government spending related to COVID-19. These types of tweets were only noted from lockdown level 3 following the reported misuse of COVID-19 funds. Subsequently, tweets during lockdown level 2 and 1 provided information regarding investigation and implications regarding corruption, in addition to providing public access to the register of COVID-related procurement.

Tweets pertaining to new research (n=2; 0.2%) along with community engagement (n=9; 1.0%) accounted for the least number of tweets and there were no tweets regarding the management of false information or rumours. The two tweets pertaining to new research, outlined evidence-based information regarding the success of a nationwide lockdown and social distancing measures in limiting the spread of COVID-19, and that COVID-19 can also spread through the air. Both these tweets occurred during lockdown level 3. The community engagement tweets did not directly engage with the public. Instead, the tweets encouraged the public to submit comments on the schedule of services to be phased in during lockdown level 4, submit questions for a virtual Presidential Imbizo, and to share ideas to help South Africa's economy recover. The first community engagement topic occurred in lockdown level 5 and the latter occurred in lockdown level 3.

3.3. Framing of COVID-19 Tweets

Of the 699 tweets, 39 tweets included frames that was relevant to two framing categories; therefore, these tweets were allocated two framing codes. A total of eight distinct frames were identified. Table 6 below provides definitions and examples of tweets for each frame category, after which the number of each frame of tweet is summarised by lockdown level in Table 7.

More than half of the COVID-19 tweets from the South African Presidency's Twitter account displayed a neutral frame (n=422; 57.2%), whereas the frames fear (n=6; 0.8%) and blame (n=1; 0.1%) were rarely displayed, across all lockdown levels. Figure 10 below clearly displays this pattern. Tweets with a neutral frame included tweets with a neutral emotional response. Examples of these tweets included those announcing events, detailing strategic actions, and providing media statements.

Table 6 Definitions and examples of frames of tweets

Frame	Definition	Examples
Neutral	Tweets that have a neutral emotional response	"President @CyrilRamaphosa held a virtual meeting today, Wednesday, 2/9/2020, with interfaith leaders as part of ongoing consultation and collaboration between government and various sectors of society on South Africa's response to the COVID-19 pandemic." Lockdown level 2
Reassurance	Tweets expressing confidence in the control of the epidemic or urging the public not to worry/ fear about the epidemic	"As we enter the next stage of our COVID-19 response, government will focus on careful monitoring, dealing with hotspot areas & measures to protect frontline workers & the most vulnerable members of society." Lockdown level 4
Motivational	Tweets expressing encouragement to be more cautious and accountable for their actions.	"It is vital that we celebrate the festive season responsibly to prevent a second wave of coronavirus infections. If you are travelling, it is more important than ever to follow all safety protocols to protect yourself and others." Lockdown level 1
Praise	Tweets expressing appreciation or compliment individuals/ organizations (healthcare workers, government, etc) for their contribution in combatting the COVID-19 epidemic	"We want to thank all South Africans who in their majority heeded the call of our President and of Government to stay home in order to save lives. Working together, we will overcome this #CoronaVirus. @JacksonMthembu_ #CoronaVirusSA #StayHomeStaySafe" Lockdown level 5
Empathy	Tweets expressing empathy to affected people, providing encouragement or good wishes to the public	"President @CyrilRamaphosa offers his condolences to the victims of #COVID_19 Yesterday, 8 June 2020, the number of our fellow citizens who have lost their lives to #coronavirus passed the 1000 mark reaching 1080." Lockdown level 3
Uncertainty	Tweets expressing uncertainty in the control of the epidemic and future of SA	"From The Desk of The President - Monday, 4 May 2020 - https://bit.ly/2W0mXHN The entire world is in the unrelenting grip of the coronavirus pandemic, whose spread has been rapid. A vaccine has yet to be found." Lockdown level 4
Fear	Tweets expressing fear about the risks of COVID-19	"These figures are a cause for great concern. There can no longer be any doubt – the country has entered a second wave of coronavirus infections. Statement by President @CyrilRamaphosa on progress in the national effort to contain the COVID-19 pandemic" Lockdown level 1

Table 7 Frames of COVID-19 tweets per lockdown level

Frame	Lockdown Level 5		Lockdown Level 4		Lockdown Level 3		Lockdown Level 2		Lockdown Level 1		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Neutral	172	67.5	79	59.0	104	48.6	29	52.7	38	47.5	422	57.2
Reassurance	57	22.4	22	16.4	42	19.6	8	14.5	18	22.5	147	19.9
Motivational	11	4.3	18	13.4	34	15.9	10	18.2	9	11.3	82	11.1
Praise	9	3.5	7	5.2	21	9.8	1	1.8	8	10.0	46	6.2
Empathy	5	2.0	5	3.7	5	2.3	3	5.5	3	3.8	21	2.8
Uncertainty	1	0.4	2	1.5	5	2.3	3	5.5	2	2.5	13	1.8
Fear	0	0	1	0.7	2	0.9	1	1.8	2	2.5	6	0.8
Blame	0	0	0	0	1	0.5	0	0	0	0	1	0.1
Total	255	100	134	100	214	100	55	100	80	100	738	100

After neutral, the most common frames noted amongst the rest of the tweets were reassurance (n=147; 19.9%) and motivational (n=82; 11.1%). Reassurance was the second most used frame of tweets across all lockdown levels, except at lockdown level 2, where the motivational frame was most used. Reassurance tweets were frequently paired with strategic action and economic response tweets while motivational tweets were frequently paired with call-to-action tweets.

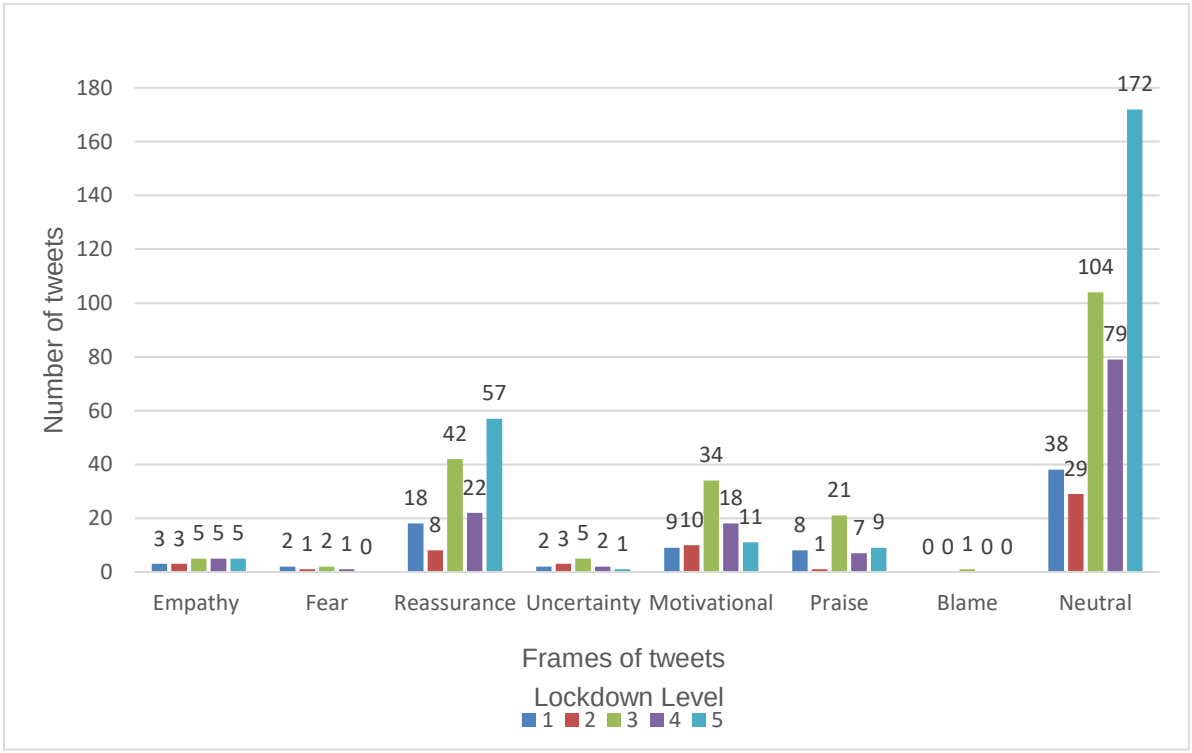


Figure 10 Frames of COVID-19 tweets per lockdown level

As depicted in figure 10 above, minimal tweets were framed in the categories praise (n=46; 6.2%), empathy (n=21; 2.8%) and uncertainty (n=13; 1.8%). Tweets under the category praise were mostly associated with acknowledgement and event related tweets which honored those providing support to the country's response efforts. The majority of tweets framed under the category empathy were associated with acknowledgement tweets that commemorated those affected by COVID-19. Tweets under the uncertainty category were associated with situational awareness, economic response, and event related tweets (media statements in particular).

Lastly, tweets that were framed in the categories fear and blame represented less than 2% of the total number of tweets. The fear-based tweets referred to COVID-19 being "one of the greatest threats to global health in over 100 years" and other tweets expressed concern regarding the high number of COVID-19 cases. The one tweet which was framed as blame referred to South Africans who have ignored the lockdown regulations which were in place to control the transmission of COVID-19. This was a direct quote from the president's address to the nation on 12th July 2020. This tweet is displayed in figure 11 below.



Figure 11 Lockdown Level 3 tweet framed as blame

CHAPTER 4: DISCUSSION

This chapter discusses the results of the study in relation to each study objective and the literature on risk communication. The South African Presidency's COVID-19 associated tweets are also described in context to the country's social and economic state. The chapter also highlights the strengths of the study and addresses the study limitations.

4.1. Timeliness and Frequency of COVID-19 Tweets

There were a large portion of tweets that occurred in lockdown level 5 since this lockdown level was at the beginning of the pandemic. This shows that communication was timely, as prescribed for risk communication (13, 16). A study conducted in USA found that timely communication resulted in an opportunity to build public confidence and trust (30). Additionally, global studies have highlighted that timely communication can contribute to curbing the exponential spread of a disease outbreak and associated social and economic consequences (31).

The number of tweets drastically decreased as lockdown levels progressed. In addition, the number of tweets from week to week were not frequent and most tweets occurred before and after the country moved from one lockdown level to another. Research has found that risk communication should remain frequent and sufficient throughout a pandemic to help increase the public's perceived risk, leading to a positive behavioural response (30). This was not noted during the study period, especially during lockdown level 1, where the least number of tweets occurred on a weekly basis. Considering a second wave of COVID-19 infections began in the middle of November 2020, more frequent tweets regarding the situation could have been provided to the public. In contrast, the USA study revealed that government stakeholders using Twitter initially underestimated the pandemic, subsequently resulting in the substantial effort to create situational awareness (30).

4.2. Types of COVID-19 Tweets

4.2.1. Format of Tweets

Almost half of the tweets over the study period were in the format of text with image and this format was predominantly used in 4 out of the 5 lockdown levels. The risk communication of the Presidency of South African may have been effective due to this factor, since research has found that visual aids positively influence attention,

comprehension, recall and behaviour change (38). A global study on risk communication also found that tweets with images were most effective when alongside text because the images attract attention and promote understanding of the text (37). However, it should be noted that a large percentage of the South African Presidency's images on Twitter consisted of photos of the president which may not influence attention and understanding of text in the tweets.

Although text with webpage links were the second most used format during lockdown level 4, 3 and 1, webpage links were mostly directed to "The Presidency Republic of South Africa" website (thepresidency.gov.za), as opposed to the "COVID-19 Online Resources & News Portal" website (sacoronavirus.co.za) which was data free (46). This data free website address appeared on images; however, it was not hyperlinked for direct and easy access to the website. In addition, there were no webpage links to health organizations such as the NICD and WHO. Surveys conducted by UJ and HSCR found that the public of South Africa considers government health officials as a key source of information (40, 41). The Presidency may have missed an opportunity to quickly redirect people to trustworthy sources of information and valuable resources.

4.2.2. Content of Tweets

A large proportion of tweets focused on events and strategic actions; this was useful for providing visibility for the South Africa Presidency's response to the COVID-19 pandemic. Since the situation in a public health emergency is constantly evolving, the information communicated needs to be transparent, accurate, relevant, and easy to understand, as prescribed for effective risk communication (13, 16, 30). These attributes were noted in the strategic action and event related tweets, which could possibly facilitate trust with the public and aid in the uptake of preventative measures or advice (13, 16).

Situational awareness and economic response tweets are also considered pertinent during a public health emergency. The public needs to realize the seriousness of the situation and have confidence in the leaders communicating the messages to respond accordingly (13, 16). In doing so, the public will understand their risk of infection and the social or economic measures in place to aid in the challenges caused by the disease outbreak (13, 16). The South African Presidency most likely

achieved this with regard to situational awareness, but not with economic response tweets.

Many economic response tweets outlined the range of social and economic relief measures made available by the government and organizations such as the COVID-19 Social Relief Grant, COVID-19 Loan Guarantee Scheme, and food parcels. This directly addressed the needs of the public which is one of the key principles of effective risk communication (13, 16). Unfortunately, most of these tweets were only mentioned during lockdown level 4 and 5. According to the second UJ-HSRC survey, which occurred during part of lockdown level 3 and 2, majority of the people were still concerned about their financial situation and difficulties keeping up with their expenses (33, 34). In addition, there were a substantial number of people that reported either themselves or someone else in the household went to bed hungry. A 20% decrease in the public's trust in the president's ability to handle the COVID-19 response, from the first survey which occurred mostly during lockdown level 5, could be attributed to the government's inadequate response to the needs of the public (33, 34). An inadequate response to public concerns was also noted in the study from China, which analysed government risk communication via social media (34).

Call to action, informational and new research tweets were minimal across all lockdown levels. This is concerning, especially from the executive management of government, considering these types of tweets can inform the public about the risk of infection and the appropriate behaviour change, which is the purpose of risk communication (12). Most of these tweets highlighted the importance of wearing a mask, social distancing, and hand washing; and appealed to the public to observe these COVID-19 preventative measures. In addition, only a small percentage of tweets during lockdown level 3 and 4 mentioned that individuals with underlying medical conditions and elderly persons are at a greater risk of developing severe COVID-19 symptoms. However, the underlying medical conditions were not specified in the tweets. Approximately 75% of the public in both surveys, conducted by UJ and HSRC, reported that they knew a lot or a fair amount about the COVID-19 pandemic (40, 41). Even though 75% is a substantial portion of people, this statistic indicates that the public's knowledge about COVID-19 most likely remained unchanged from lockdown level 5 to 2. This highlights the need for frequent and in-depth informational tweets during a public health emergency. Similarly, the USA study found that

insufficient tweets were used across critical message types such as situational awareness, external resources/knowledge, strategies and guidelines, and executive orders (30).

Lastly, tweets pertaining to community engagement were few and did not directly engage with the public, and there were none related to the management of false information or rumours. This is remarkable since these are essential aspects of risk communication during a public health emergency (13, 35). Considering that there is an infodemic occurring in relation to the COVID-19 outbreak, community engagement has become an increasingly important aspect in order to detect rumours and false information that may affect the public's risk perception and decision making as well as trust in the government (20, 28). In addition, research has found that even a single exposure to false information may prompt a undesirable behaviour (18). Small changes can lead to significant behaviour implications (18). These findings highlight the need for and importance of community engagement and false information management during a public health emergency.

4.3. Framing of COVID-19 Tweets

Twitter, as a social media platform, is meant to provide interpersonal communication during a public health emergency (16). More than half of the COVID-19 tweets from the South African Presidency's Twitter account displayed a neutral frame, which did not provide any interpersonal communication, in terms of interaction and emotional support. According to the UJ and HSRC surveys, the dominant emotions experienced by the public during the pandemic, included stress, fear, frustration/ irritability and depression (40, 41). These public emotions were not adequately supported via the governmental risk communication on Twitter. Similarly, a study from China concluded that insufficient emotional support was provided by governmental risk communication via social media and a more empathic emotional response was required (34).

Although a significant number of tweets had a neutral frame, a substantial number of tweets displayed reassurance as a common frame. According to research, reassurance about the risk of contracting a disease during a public health emergency can offer emotional support and reduce anxiety (32). Another common frame noted was motivational tweets, with the most occurring during lockdown level 2. These tweets urged the public to download the COVIDAlertSA to protect themselves and their loved ones; this frame was used to improve the governmental response with

regard to contact tracing. More tweets framed as motivational could have been used during lockdown level 1, to encourage people to observe preventative behaviours, since a second wave of COVID-19 infections began in the middle of November 2020.

Research prescribes that effective risk communication messages should incorporate positive emotional frames (16, 32). The tweets from the South African Presidency's Twitter account can be considered effective in this regard since the majority of non-neutral frames expressed positive emotions such as praise, reassurance, motivation, and empathy as opposed to fear, blame and uncertainty. Tweets with positive emotional frames such a reassurance and motivational were frequently paired with strategic action, economic response, and call to action tweets, indicating that the Presidency's tweets may have been more effective in these areas.

4.4 Strengths and Limitations

A strength of the study is that the data analysed was sourced from a credible, popular, and public social media platform. The study method can also easily be replicated to other social media platforms or countries for comparisons due to the content analysis method which directly examines the text and visuals.

A limitation to the study is that some relevant tweets may have been omitted if they did not contain the search words "COVID-19" or "coronavirus". In addition, the intercoder reliability of the double-coded tweets, in terms of consistency and validity of coding, was not calculated. Lastly, this study cannot draw conclusions regarding the effectiveness of tweets in influencing perceptions or behaviours of the public since the public's engagement with tweets from the South African Presidency's were not analysed.

CHAPTER 5: CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

This study characterized the South African Presidency's COVID-19 risk communication on Twitter and compared it to effective risk communication attributes. The key findings from the study concluded that the South African Presidency's COVID-19 related tweets were timely in the initial response to the COVID-19 disease outbreak. However, the communication was not frequent across the lockdown levels as prescribed for risk communication (30).

Text with image and text with webpage links were the most used format for COVID-19 related tweets. These formats are considered optimal for risk communication and social media, since visual aids positively influence attention, comprehension, recall and behaviour change; and webpage links can provide direct access to valuable resources, respectively (15, 37).

There were some effective risk communication attributes displayed across the content type COVID-19 related tweets. Strategic action and event related tweets consisted of transparent, relevant and easy to understand information, as prescribed for effective risk communication (13, 16). In addition, there were many tweets in these two areas which may have contributed to increased awareness or knowledge regarding the lockdown regulations and associated behaviours. The South African Presidency most likely achieved the goal of facilitating the public in understanding their risk of infection with regard to situational awareness tweets. However, economic response tweets did not adequately address the social and economic needs of the public. Call to action, informational and new research tweets, which could be used to inform the public about the risk of infection and the appropriate behaviour change, were minimal. Lastly, tweets pertaining to community engagement were few and there were none regarding management of false information or rumours. This was surprising, considering these are essential aspects of risk communication (35). The frequency and quantity of all content type tweets should be scaled up for effective risk communication.

The South African Presidency's tweets predominantly displayed a neutral frame which did not offer interpersonal communication and emotional as prescribed for social media and risk communication (16). However, the remaining tweets

expressed positive emotions such as praise, reassurance, motivation, and empathy, which is preferable to fear-based messages.

5.2 Recommendations

By drawing on these findings and the literature on how to use social media efficiently, government should consider the following recommendations on how social media can be used to reduce the spread of new diseases or even for ongoing COVID-19 communications.

5.2.1 Planning

Many risk communication guidelines and policies published in the last decade have highlighted the importance of social media in addition to mass media (16, 30). The latest WHO guideline for emergency risk communication policy and practice as well as the CDC Crisis and Emergency Risk Communication Manual, indicates that social media may be useful in interacting and engaging with the public, and should not be considered a replacement to mass media (16, 35). Therefore, South African should improve their national risk communication plan to ensure that communication via social media incorporates all the core capacities for effective risk communication. In this way the existing governmental risk communication can be optimized. Effective risk communication areas identified in the study such as timeliness, formatting of tweets, strategic actions and situational awareness tweets, and positive emotional frames can be scaled up and vital risk communication areas such as community engagement and management of false information and rumours should be included in future risk communication.

5.2.2 Twitter Use

Twitter is intended to be used as a means for people to interact with short messages and may include visuals (images and videos), links to relevant websites and resources (23, 25). The tweets from the South African Presidency did not promote any interaction or two-way communication. This functionality of social media should be optimized for future risk communication (16). The images used on Twitter should also be hyperlinked for direct and easy access to websites with relevant and valuable resources.

In addition, many pertinent tweets were lost between numerous tweets of national speeches and ministerial briefing videos. This does not allow information to be shared

quickly and efficiently with many people. The South African Presidency Twitter account can be used more efficiently for risk communication by using Twitter in the intended way. The Twitter Help Center page provides useful resources on how to use Twitter (47). In addition the CDC's Crisis and Emergency Risk Communication Manual on Social Media and Mobile Media Devices, provides guidance in using social media in health emergencies (15).

5.2.3 Further Research

Government communication via other social media platforms such as WhatsApp, Facebook and Instagram can be analysed in the same way as this study. Even though the Presidency of South Africa's Twitter account has the most followers compared to their other social media accounts, more people have reported to use the above mentioned social media platforms (22). However, mass media communication was the main source of information about COVID-19 in South Africa and should be utilized during public health emergencies (40, 41).

The public's engagement with tweets on The Presidency Twitter page were not analysed. Future studies should examine the public's engagement with tweets to determine the effectiveness of tweets in influencing perceptions or behaviours of the public during a public health emergency.

APPENDICES

APPENDIX A: PLAGIARISM DECLARATION



PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I Tarryn Govender (Student number: 0711041P) am a student registered for the degree of Master of Public Health in the academic year 3.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature: _____ Date: 26 July 2022

APPENDIX B: CODEBOOK

Variable 1: Lockdown Level	
1. Level 1	Tweets posted from 21/09/2020 to 28/12/2020
2. Level 2	Tweets posted from 18/08/2020 to 20/09/2020
3. Level 3	Tweets posted from 01/06/2020 to 17/08/2020
4. Level 4	Tweets posted from 01/05/2020 to 31/05/2020
5. Level 5	Tweets posted from 27/03/2020 to 30/04/2020
Variable 2: Types of Tweets (Format)	
1. Text	Tweets containing only text
2. Text with image	Tweets containing text and an image
3. Text with video	Tweets containing text and a video
4. Text with webpage link	Tweets containing text and a URL link
5. Text with image /video and webpage link	Tweets containing text, an image or video and a URL link
Variable 3: Types of Tweets (Content)	
1. Informational	Tweets providing information about the severity of COVID-19, easy transmission of the infection, preventative measures, clinical symptoms, and treatment
2. Call to Action	Tweets prescribing certain protective and preventative behaviours
3. Strategic actions	Tweets describing governmental regulations to curb the spread of infection (travel restrictions, provision of resources, environmental measures, etc)
4. Situational awareness	Tweets providing official updates about the latest epidemic situation of COVID-19 mostly about number of newly confirmed cases or deaths and some epidemiological backgrounds
5. Economic Response	Tweets specifying the impact of COVID-19 on the economy or livelihoods
6. Management of false information/ rumours	Tweets clarifying rumours or false news and warning about harmful impacts of spreading rumours
7. New research evidence	Tweets sharing up to date scientific reports about COVID-19
8. Events	Tweets providing information on events such as national speeches, visits to facilities, media briefing, interviews, etc.
9. Community Engagement	Tweets that seek information from the public regarding their needs and concerns

10. Corruption	Tweets including information on corruption and transparency of government spending related to COVID-19
11. Acknowledgements	Tweets that commemorate those affected by COVID-19 and those providing support to the country's response efforts.
12. Other	Tweets that do not fall under any of the above-mentioned types
Variable 4: Frames of Tweets	
1. Empathy	Tweets expressing empathy to affected people, providing encouragement or good wishes to the public
2. Fear	Tweets expressing fear about the risks of COVID-19
3. Reassurance	Tweets expressing confidence in the control of the epidemic or urging the public not to worry/ fear about the epidemic
4. Uncertainty	Tweets expressing uncertainty in the control of the epidemic and future of SA
5. Motivational	Tweets expressing encouragement for people to be more cautious and accountable for their actions.
6. Praise	Tweets expressing appreciation or compliment individuals/ organizations (healthcare workers, government, etc) for their contribution in combatting the COVID-19 epidemic
7. Blame	Tweets expressing blame to individuals/ organizations in contributing to the spread of COVID-19
8. Neutral	Tweets that have a neutral emotional response

APPENDIX C: ETHICS WAIVER

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG	HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research & Post Graduate Affairs)

22/06/2021

Ref: W-CBP-210622-01

TO WHOM IT MAY CONCERN

Waiver: This certifies that the following research does not require clearance from the Human Research Ethics Committee (Medical)

Investigator: Ms T Govender
Student No. (if appropriate): 07 1104 1P
Staff No. (if appropriate):

Supervisor: Dr S Nieuwoudt

School: Public Health
Department: Social and Behavioural Change
Medical School
University

Project title: *A quantitative content analysis of the South African Presidency's usage of Twitter in response to COVID-19 in 2020*

Reason: Review of information in the public domain
No human participants will be involved in the study

Dr CB Penny
Chairperson: Human Research Ethics Committee (Medical)

Research Office Secretariat:
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https://www.wits.ac.za/research/researcher-support/research-ethics/ethics-committees/

APPENDIX D: TURNITIN REPORT



Research Report Tarryn Govender 0711041P.pdf

ORIGINALITY REPORT

10%	9%	6%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	hdl.handle.net Internet Source	1%
2	www.uj.ac.za Internet Source	1%
3	bmcpublichealth.biomedcentral.com Internet Source	<1%
4	trepo.tuni.fi Internet Source	<1%
5	Www.esp.org Internet Source	<1%
6	www.discovery.co.za Internet Source	<1%
7	www.researchsquare.com Internet Source	<1%
8	wiredspace.wits.ac.za Internet Source	<1%
9	www.primeugandasafaris.com Internet Source	<1%

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