

Ministry of National Health Services Regulation and Coordination (MoNHSRC) Pakistan's Communication Amid the COVID-19 Crisis: An Analysis of Vaccine-Related Social Media Engagement

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Abstract: This research analyses how the Ministry of National Health Services Regulation and Coordination (MoNHSRC) Pakistan utilized Facebook as a channel for crisis communication during the COVID-19 pandemic, with an emphasis on vaccine-related communications. By using a quantitative content analysis method, 375 Facebook posts published between February 1, 2021, and September 23, 2022, were reviewed to identify the most prevalent themes and to determine how frequently specific target audiences were mentioned in vaccine-related call-to-action messages. The data reveals that the most popular theme was "Up to Date Information," followed by "Call for Vaccine" and "Vaccine Supportive" and "Addressing public concerns and side effects" related to vaccine material, underlining Ministry of National Health Services Regulation and Coordination (MoNHSRC)'s importance on transparency and public health promotion. However, "Vaccine Availability" was the least highlighted theme, revealing a potential gap in logistical communication during a period of widespread concern and limited availability. With regard to targeting audience, the general public was targeted in the most of posts, while specific segments such as old citizens, healthcare workers, pregnant and breast-feeding women, and children received very less direct message. These results imply that while MoNHSRC maintained a constant online presence and offered vital information during the COVID-19 crisis, its communication strategy lacked personalized interaction with high-risk or hesitant populations. The study underlines the necessity of integrating focused, accessible, and inclusive messaging into future public health initiatives, especially in developing nations where social media plays a crucial role in crisis response.

Key Words: Crisis Communication, COVID-19, Vaccine Messaging, Social Media, Facebook, Public Health Communication

Introduction

The spread out of coronavirus disease 2019 (COVID-19) rapidly spread, beginning in mid-December 2019 in Wuhan, China. Pakistan verified its first case of the disease in Karachi on February 26, 2020, with the index patient having a travel history to Iran (Saqlain et al., 2020; Yousaf et al., 2020). The rapid worldwide transmission and the seriousness of the resulting illness led the World Health Organization (WHO) to classify it as a global pandemic on March 11, 2020, (Abid et al., 2020). In the start of the Covid-19 epidemic, a lot of preventive measures were adopted with varying levels of strictness and enforcement, including physical distancing rules, the induction of lockdowns and the reallocation of healthcare workers (Cash & Patel, 2020). Although, the effective implementation and sustained application of these

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strategies presented considerable challenges, underlining the serious and urgent need for the development of a safe and affordable vaccine (Cash & Patel, 2020). As the pandemic proceeded, the growth and spread of effective vaccines became a foremost priority.

The COVID-19 pandemic has placed major damage on Pakistan's already unstable political system, struggling economy, and unstable healthcare infrastructure, leading to a lot of socioeconomic challenges (Haqqi et al., 2021). The government of Pakistan, through entities like the Ministry of National Health Services, Regulations & Coordination (MoNHSRC), implemented different techniques to control the spread of the virus, including lockdowns, public awareness campaigns and social distancing. Effective crisis communication became necessary during this period to control the public health response. This involved strategic public communication to disseminate vital information, addressing public concerns, and encouraging adherence to preventative guidelines. Managing the COVID-19 epidemic in Pakistan involved navigating the complexities of rising infection and death tolls alongside the need to minimize extensive economic and social upheaval caused by lockdown implementations (Shafi et al., 2020).

Although broadly acknowledged as a serious and successful public health measure, vaccination faces a progressing perception of being unsafe and not important among parents, causing a challenge to public health actions (Dubé et al., 2015). Decisions related to vaccination are complicated and restricted to specific contexts, potentially mediated by a wide range of variables encircling attitudes, trust in authorities, social values within communities, moral frameworks, individual belief systems, overarching worldviews, as well as systemic structural barriers (Carson et al., 2021).

In handling these difficulties and spreading important information about the COVID-19 vaccines, public health organizations increasingly switched to social media platforms, including Facebook, due to their global reach and potential for direct engagement with the public. The broad and powerful reach of social media platforms offers a strategic medium for mediations aimed at increasing vaccine adoption (Winters et al., 2023). Maintaining a consistent flow of persuasive health messages, monitoring for inappropriate content, and responding to user concerns represent significant hurdles in building an interactive social media platform (Jha et al., 2016). According to Napoleon Cat, an all-in-one social media management platform (NapoleonCat, 2019). There were 47.14 million Facebook users in Pakistan in February 2021, which accounted for 20.3% of its entire population. This substantial user base highlights the potential of Facebook as a key platform for public health communication initiatives in Pakistan.

Previous health communication research has consistently and definitively demonstrated the increasing proliferation of social media among both patients and healthcare personnel, thereby presenting a significant chance for academics to develop social media-based health promotion campaigns with the potential to mitigate health inequities (Huo et al., 2019a). Recognizing this potential, the Ministry of National Health Services Regulation and Coordination (MoNHSRC) utilized Facebook to address the audience's fears and provided vaccine-related information.

During the COVID-19 pandemic, the Ministry of National Health Services Regulation and Coordination (MoNHSRC) Pakistan faced the critical challenge of communicating effectively about COVID-19 vaccination to the public. While social media platforms like Facebook offered a valuable channel for disseminating information and addressing public's concerns related to vaccine, it is essential to understand the specific nature of the Ministry of National Health Services Regulation and Coordination (MoNHSRC) communication strategies. Therefore, this research seeks to analyze the most frequent themes present in the Government of Pakistan health organization's Facebook posts concerning the COVID-19 vaccine and how frequently these posts targeted different audiences, to provide insights into their communication approach during this public health crisis.

Research Objectives

- ▶ To identify and analyze the most frequently occurring themes in the Ministry of National Health's Facebook posts related to the COVID-19 vaccine.
- ▶ To determine the frequency with which the Ministry of National Health's Facebook posts about the COVID-19 vaccine addressed different target audiences.



Research Questions

- ▶ **RQ1.** What were the most frequently occurring themes within Ministry of Health's Facebook posts concerning the COVID-19 vaccine?
- ▶ **RQ2.** How often did Ministry of Health's Facebook posts about the COVID-19 vaccine address various target audiences?

Literature Review

Crisis Communication in Health Emergencies

Before the COVID-19 pandemic, public health authorities progressively utilized social media for crisis communication throughout significant health catastrophes, like the Ebola outbreak (2014–2016), the Zika virus epidemic (2015–2016), and the H1N1 influenza pandemic (2009–2010). During the Ebola epidemic, the U.S. Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) utilized platforms such as Twitter and Instagram to debunk falsehoods, disseminate preventive measures, and inform global audiences about the spread of the disease (Guidry et al., 2017). During the Zika outbreak, the American Health Organization utilized social media to convey risk to pregnant women and advocate for vector control efforts, although encountering difficulties in addressing disinformation (Sharma et al., 2017). The H1N1 pandemic represented a crucial juncture when health organizations recognized the extensive influence of digital platforms social media facilitated swifter responses than conventional media, allowing for immediate engagement and rectification of misinformation (Chew & Eysenbach, 2010). These incidents pointed out that social media serves as a double-edged sword both as a medium for connecting and education, and a channel for disinformation, panic, and doubt if not effectively managed (Denecke & Atique, 2016). Insights from these occurrences shaped subsequent frameworks for COVID-19 communications, wherein principles of transparency, empathy, and responsiveness were essential for fostering public trust and adherence during global health emergencies (Gesser-Edelsburg et al., 2018).

The COVID-19 pandemic marked an age of extraordinary worldwide disruption, prompting governments and health organizations to reevaluate how they communicated with the public. Crisis communication in health emergencies is defined as the strategic transmission of information to control public attitudes, promote adherence to health guidelines, and mitigate disinformation (Seeger, 2006). According to Seeger (2006), good crisis communication helps create trust, decreases panic, and promotes preventative behavior outcomes that are particularly crucial during a pandemic when the stakes are high. As COVID-19 spread globally, the pressure to produce and deliver vaccinations intersected with the need to explain and persuade populations to adopt them. Governments worldwide must concurrently address the health crisis and its concomitant infodemic an oversupply of information, including misinformation. Social media platforms, particularly Facebook, played an important role in both the transmission of misleading information and the purposeful distribution of verified public health messages.

The Role of Social Media in Health Communication

Social media platforms have transformed how health information is shared. With the rising digital footprint, especially in low- and middle-income nations, platforms like Facebook offer enormous reach and interaction. In Pakistan, for instance, Facebook had over 47 million users in February 2021 making it a significant avenue for health communication efforts (NapoleonCat, 2019). According to Moorhead (Moorhead et al., 2013), social media enhances quick information distribution, permits two-way communication, and allows health organizations to monitor public attitude. These capabilities make it an ideal platform for real-time public health communication during disasters. However, this potential is double-edged. While social media allows health authorities to communicate with huge audiences, it also becomes a battleground for misinformation and conspiracy theories that might weaken vaccine confidence (Loomba et al., 2021).

Vaccination Communication through Social Media and Public Trust

Trust is a crucial foundation of vaccination acceptance. As Dube (2013) remark, vaccine reluctance is caused by various reasons including fear, disinformation, distrust in government, and societal pressures. During the COVID-19 pandemic, misconceptions about vaccination safety, speed of development, and side effects circulated on digital channels. Studies



like Larson (Larson et al., 2014), have stressed that vaccine trust is driven more by emotional tales than by statistical data. Public faith in health authorities, and their capacity to communicate effectively, therefore became vital. Karafillakis and Larson (2017), propose that honest, consistent, and compassionate communication promotes public trust and vaccine uptake. In Pakistan, trust in governmental institutions has historically been fragile (Ali, 2022), which placed further pressure on the Ministry of National Health Services Regulation and Coordination (MoNHSRC) to design compelling and trustworthy communication strategies.

Facebook as a Platform for Health Messaging

Facebook's algorithmic architecture and multimedia capabilities present a unique opportunity for public health authorities to communicate information. Basch (2021), investigated health department posts in the U.S. and found that posts with infographics, videos, and positive messaging had more engagement. Similarly, Huo (2019) underline the value of visual content in boosting message clarity and retention, especially in low-literacy populations.

Facebook posts allow for direct audience targeting be it healthcare personnel, the elderly, or the public. Paek (et al., 2010), argue that adapting communications based on audience segmentation (age, gender, area, occupation) improves message reception. In Pakistan, MoNHSRC employed Urdu and regional languages to widen exposure, occasionally integrating testimonies from celebrities, healthcare experts, and religious leaders.

Themes in Vaccine-Related Communication

A substantial body of scholarship has explored thematic trends in COVID-19 vaccine-related communication. Ahmed et al.,(Ahmed et al., 2020), identified the following frequent themes in government social media campaigns (i)Vaccine safety and efficacy, (ii) Eligibility and rollout information, (iii) Countering myths and misinformation, (iv) Moral duty and national solidarity and (v) community. Informed by the Health Belief Model (Glanz et al., 2002), these themes are connected with psychological determinants of health behavior, such as perceived severity and susceptibility, perceived benefits, and cues to action. Studies demonstrate that messages promoting communal responsibility, national pride, or family safety have increased engagement and persuasive strength (Puri et al., 2020).

Audience Segmentation and Targeting

Target audience identification is a basic component of effective health communication. According to the national public health agency of the United States (CDC, 2020), messaging should be adapted for distinct target groups based on age, health status, occupation, and region. For example, healthcare workers require technical updates and efficacy data, whereas the public reacts better to relatable narratives and emotional appeals (Krebs et al., 2010). MoNHSRC, throughout the pandemic, routinely adjusted its content to, (i) Frontline workers, to urge participation in the vaccine effort and honor their contributions. (ii) Elderly and vulnerable populations, highlighting danger of infection and need for protection. (iii) General public, using plain language, myth-busting, and reminders to register via digital platforms. (iv) Youth and students, employing influencers and engaging language to overcome complacency. This method coincides with behavior change communication (BCC) concepts, which emphasize the customization of messaging according to audience behavior, attitudes, and media habits (Snyder, 2007).

Challenges in Social Media Communication

Despite the apparent advantages, health communication via social media poses serious hurdles. The speed of misinformation, algorithmic echo chambers, and popular skepticism can weaken the impact of official messaging. Chou and Budenz (2020), propose that social media engagement tactics must be linked with proactive misinformation management to be effective. A study by Cinelli et al. (2020), demonstrated that vaccine disinformation spreads more rapidly than confirmed material on platforms like Facebook, especially when passionate or conspiratorial in tone. This needs a dual strategy of both information dissemination and real-time disinformation correction a substantial burden for understaffed health ministries in nations like Pakistan. Another difficulty is message fatigue, as viewers become desensitized due to repetitive messages. To overcome this, dynamic content formats such as live sessions, Q&A films,

and infographics were used by MoNHSRC. The usefulness of such various content forms has been supported by studies in social marketing and health promotion (Evans et al., 2012).

While various research studies have studied the use of social media in vaccination communication, several crucial gaps remain particularly in the context of developing countries like Pakistan. Existing study has mainly concentrated on industrialized nations, where communication infrastructures, digital literacy, and institutional trust are generally better. There is limited empirical work that explores how government agencies in Pakistan, such as Ministry of National Health Services Regulation and Coordination (MoNHSRC), utilized Facebook specifically during the vaccine deployment phase of the COVID-19 epidemic. Moreover, relatively few research applies a systematic thematic analysis to social media content from official government pages in Pakistan. Studies tend to highlight either public perception or disinformation trends, leaving a gap in the analysis of government led message campaigns and audience segmentation attempts. There is also limited analysis of how frequently various audience groups were addressed, and how message framing changed across them. These dimensions are critical for analyzing the inclusion and efficacy of public health communication. Additionally, the contextual difficulties strange to Pakistan, such as ethnic diversity, political instability, variable literacy levels, and deep-rooted vaccine hesitancy, necessitate detailed study. No comprehensive analysis has yet been completed that combine both topic frequency and audience targeting in studying Ministry of National Health Services Regulation and Coordination (MoNHSRC)'s Facebook communication strategy, specifically focused on COVID-19 vaccination messages. This study attempts to fill these gaps by offering a focused content analysis of vaccine-related Facebook posts from the Ministry of National Health Services Regulation and Coordination (MoNHSRC). By examining both topics material and target audience portions, this research contributes to a comprehensive understanding of Pakistan's digital health communication landscape amid a significant public health crisis.

Methodology

To study the Ministry of National Health Services Regulation and Coordination (MoNHSRC)'s Covid-19 vaccination efforts this research uses a quantitative content analysis approach, because it is useful for the analysis of large dataset of social media posts. This method structures a systematic and objective analysis of the frequency with which specific themes and target audiences are mentioned in the Ministry of National Health Services Regulation and Coordination (MoNHSRC)'s posts. This approach directly aligns with the study's research questions of measuring the frequencies of the specific themes and targeted audience.

Data Collection

The data for this study was collected from the official Facebook page of the Ministry of National Health Services Regulation and Coordination (MoNHSRC). The timeframe for data collection spans from February 1st, 2021, to September 23rd, 2022. This period was chosen because February 1st, 2021, marks the date Pakistan received its first dose of the COVID-19 vaccine from China as a gift, and September 23rd, 2022, represents the date of the Ministry of National Health Services Regulation and Coordination (MoNHSRC)'s last Facebook post related to the COVID-19 vaccine within the scope of this research.

All posts within the timeframe were collected, totaling 375 posts, comprising 270 visuals and 105 videos. The data was collected manually. The manual data collection process involved systematic scrolling through the official Facebook page of Ministry of National Health Services Regulation and Coordination (MoNHSRC) latest to oldest post. The first post that became part of study was the last post related to COVID-19 vaccine published by Ministry of Health on 23 September 2022. All posts within the timeline that contained information about the vaccine, including text, images, and video messages, were included in the analysis. The dataset involved the posts that mentioned Corona vaccines, COVID-19 vaccines, Vaccination Campaign, Get vaccinated, vaccine doses etc. The analysis aimed to determine the frequency with which specific themes and target audiences are mentioned in the COVID-19 vaccine-related posts.

Unit of Analysis

Given the study's central focus on how organizations leverage social media platforms, each distinct Facebook post published by the Ministry of National Health Services Regulations & Coordination (MoNHSRC) related to COVID-19



vaccine was treated as a unit of analysis. The unit of analysis for this study was the individual Facebook post. This includes all textual, visual, and video elements contained within each post. This research focuses on the frequency with which different themes and target audiences were mentioned in Ministry of National Health Services Regulations & Coordination (MoNHSRC) Facebook posts related to COVID-19 vaccination. Every theme was developed based on earlier works of literature that were "Vaccine supportive", (Elkin LE, 2020) "Availability of vaccine", "up to date information", "call for vaccine" (Park et al., 2011) "Addressing concerns and side effects" and other themes. In addition, the Ministry of National Health Services Regulations & Coordination (MoNHSRC) Pakistan's Facebook posts were examined to identify the primary target audiences for the COVID-19 vaccination campaign. These audiences, established in prior research, were assessed. "Older Person", (Huo, 2019) "Pregnant Women", (Martin et al., 2020) "Children", (Loades, 2020) "General Public", and other audience.

Sampling

Social media platforms have emerged as essential instruments in public health communication, especially during health crises, facilitating swift information transmission, public interaction, and the mitigation of disinformation. During emergencies like pandemics, natural disasters, and disease outbreaks, social media helps health authorities to reach broad audiences with timely updates, urge preventive habits, and answer to public's problems in real time (Grajales Iii et al., 2014). Platforms like Twitter, Facebook, and Instagram have been effectively utilized by health organizations to enhance risk awareness, clarify safety protocols, and counteract health-related misinformation (Wang et al., 2019). These digital platforms offer interactive, low-cost, and accessible tools for government organizations and healthcare experts to communicate with the public during important moments.

Among these platforms, Facebook is the most extensively utilized worldwide, providing significant reach and multimedia functionalities that accommodate many content formats, including text, photographs, videos, and live streams. Because Facebook is the most widely used social media platform in the world, this research analyzed it to understand how the Ministry of National Health Services Regulation and Coordination (MoNHSRC) Pakistan used this platform for its COVID-19 vaccination campaigns. According to Statista (Dixon, 2024), Facebook's substantial user base, with 2,853 million users in the first quarter of 2021, underscores its potential as a significant communication platform. As mentioned above Pakistan had 47.14 million active Facebook users in February 2021. The Ministry of National Health Services Regulation and Coordination (MoNHSRC) Pakistan, the cabinet-level ministry responsible for national public health, has 2 million followers on Facebook.

Coding

To address the first research question, "What were the most frequently occurring themes within the Ministry of Health's Facebook posts concerning the COVID-19 vaccine?" a deductive coding methodology was employed, guided by prior literature on health communication and vaccine messaging (AHMED et al., 2020; Anyiwe et al., 2020) Every post in the dataset was reviewed and manually coded for themes occurring in the content. The following core themes were established as categories: (1) Vaccine Supportive (2) Availability of Vaccine, (3) Up to Date Information, (4) Call to Action (Get Vaccinated), (5) Addressing concerns and side effects, and (6) Other themes. Posts encompassing more than one theme were coded under multiple categories. Textual captions, visual elements (e.g., posters, infographics), and spoken content in videos were all analyzed to determine the frequency of different themes. This coding enabled quantification of recurring themes and helped identify the Ministry's primary message priorities during the COVID-19 vaccine campaign on Facebook.

For research question 2 to examine the extent to which distinct target audiences were addressed in the Ministry of National Health Services Regulation and Coordination (MoNHSRC)'s Facebook posts, a coding scheme was devised based on prior studies in vaccination communication and public health segmentation. Each post in which Ministry of National Health Services Regulation and Coordination (MoNHSRC) has asked people to get vaccinated was coded according to the explicitly or implicitly specified audience category. The predetermined audience categories included: (1) General Public, (2) Healthcare Workers, (3) Adults, (4) Pregnant Women, (5) Children, (6) Specific Patients and (7)



Old Citizens. Posts that did not clearly target any one group were not taken in this question, only if they explicitly named or visually represented the audience and included a directive such as “get vaccinated,” “register now,” or “visit your nearest center.” Posts that mentioned these groups but did not contain a vaccine-specific call were excluded from this coding category. Where a post targeted more than one audience, all relevant categories were coded. Coding was done manually, analyzing the textual content, photo, and video components of each post for clues such as specific phrases (“mothers-to-be,” “frontline heroes”), visuals (e.g., an elderly person getting vaccinated), or hashtags that denoted a target category. This coding strategy was used to discover the frequency with which audiences were most and least targeted in the Ministry of Health’s vaccination campaign, so offering insight into the diversity and strategic emphasis of their communication efforts.

Data Analysis

This research aims to conduct a broad set of statistical analysis after completing the coding process to answer the research questions (RQs) selected in the study. Research Question 1 focuses on identifying the most frequent and recurring themes in COVID-19 vaccination-related communications, while Research Question 2 identifies the target audience that is highlighted in the Ministry of National Health Services Regulation and Coordination (MoNHSRC)’s Facebook posts about the Covid-19 vaccines. Both research questions rely on analyzing the nature of vaccine messaging and their intended audience.

To answer these questions, descriptive statistics were applied to calculate and establish the frequency with which specific themes and audience groups were addressed in the MoNHSRC’s Facebook posts relating to the COVID-19 vaccination messages. Descriptive analyses, including frequency distributions and percentage calculations, were done to identify and analyze the prominent themes (e.g., vaccine safety, availability, and calls to action) and target audience groups (e.g., healthcare workers, older individuals, pregnant women etc.). This analysis provided insights into how Ministry of National Health Services Regulation and Coordination (MoNHSRC) delivered crucial vaccination messages, and which populations were most commonly addressed in their Facebook communication.

Findings

The first question of this research study analyses the themes that were most frequently featured in the Ministry of National Health Services Regulation and Coordination (MoNHSRC)’s Facebook posts addressing the COVID-19 vaccine. Table 1 offers a summary of the distribution, and the most frequent themes discovered among the 375 Facebook posts studied.

Table 1

Frequency of the Themes Present in Ministry of National Health Services Regulation and Coordination (MONHSRC) Posts

Themes	Number of Times Occurred	Percentage %
Vaccine Supportive	122	32.53%
Vaccine Availability	35	9.33%
Up to Date Information	183	48.8%
Call for Vaccine	157	41.87%
Addressing concerns and side effects	62	16.53%
Other Themes	25	6.66%

According to the statistics shown in Table 1, the most dominating subject noticed was “Up to Date Information,” which featured in 183 postings, accounting for 48.8% of the total material. This demonstrates the Ministry’s significant focus on delivering updated statistics, new vaccine discoveries, booster shot notifications, and general updates regarding the immunization process. The second most prominent subject was “Call for Vaccine,” occurring in 157 posts (41.87%), suggesting a persistent effort to persuade the public to get vaccinated, typically through compelling messaging and urgent

requests. The “Vaccine Supportive” category, featuring encouraging and comforting text about vaccine benefits and safety and effectiveness of vaccine was identified in 122 posts, representing 32.53% of all posts. “Addressing concerns related to vaccine and side effects” of vaccine occurred 62 times (16.53%). Meanwhile “Vaccine Availability,” which was referenced in just 35 postings (9.33%), The least represented theme was “Other Themes” (e.g., vaccination certificates, mobile vaccination campaign, restrictions on non-vaccinated people) appeared in 25 postings (6.66%), suggesting low emphasis on logistical details or access-related messaging throughout the investigated time.

Research Question 2: How often did Ministry of Health's Facebook posts about the COVID-19 vaccine address various target audiences?

This research's second question (RQ2) explores how frequently certain target groups were addressed in vaccine-related Facebook posts by the Ministry of National Health Services Regulation and Coordination (MoNHSRC), specifically within posts including a direct call to action. Out of 375 total posts, 157 posts included a vaccine-related message clearly encouraging audiences to be vaccinated. These posts were subsequently evaluated to discover which population segments were directly addressed.

Table 2

Number of Times an Audience Mentioned in Get Vaccinated Posts

Target Audience	Number of Times Mentioned	Percentage%
General Public	95	60.51%
Children 5-11	7	4.46%
Adults 12+	19	12.1%
Pregnant and Breastfeeding Women	14	8.92%
Old Citizens	29	18.47%
Health Workers	13	8.28%
Specific Patients	5	3.18%

As indicated in Table 2, the General Public emerged as the most often mentioned audience, appearing in 95 posts—accounting for 60.51% of all call-to-action messages. These posts often employed inclusive language like “everyone,” “all eligible citizens,” or generic appeals without targeting a specific demographic group. The second most commonly targeted demographic was Older Citizens, addressed in 29 posts (18.47%), perhaps because to their categorization as a high-risk population during the pandemic.

Other audiences featured less frequently. Adults aged 12 and above were targeted in 19 posts (12.1%), while Pregnant and Breastfeeding Women were highlighted in 14 posts (8.92%), showing efforts to address vaccine reluctance in more susceptible or cautious groups. Health Workers, despite their frontline duty, were referenced in only 13 postings (8.28%). Children aged 5–11 appeared in 7 posts (4.46%), often towards the final stages of the campaign. Finally, Specific Patients (e.g., immunocompromised people or those with chronic illnesses) were least represented, referenced in just 5 postings (3.18%).

Discussion

This study aimed to investigate how the Ministry of National Health Services Regulation and Coordination (MoNHSRC) utilized Facebook as a crisis communication medium during the COVID-19 pandemic, specifically in relation to vaccine messaging. In instances of public health emergencies, such as the COVID-19 issue, strategic communication becomes vital not only to inform but also to alleviate uncertainty, challenge misinformation, and promote health behaviors like vaccination. The findings of this research provide insight into the subject focus and audience-targeting tactics adopted by the Ministry in its social media outreach.

The first research question (RQ1) focused on identifying the most often occurring themes in MoNHSRC's Facebook posts connected to COVID-19 vaccination. Among the 375 posts evaluated, “Up to Date Information” was the most

common theme, occurring in 48.8% of the posts. This emphasis on current updates, including statistics, vaccine brand approvals, doses administered, how many people have been vaccinated till today, and new adverse effects reflects the Ministry's desire to preserve transparency and prevent disinformation, a common difficulty in crisis communication.

The second most popular subject was "Call for Vaccine" (41.87%), where the Ministry employed directive messaging to push the public to get vaccinated. These posts performed a motivational function and were vital in driving behavioral change amid a national crisis typified by public anxiety, vaccine hesitation, and widespread uncertainty. The prominence of these calls to action reflects the Ministry's intention to change from passive information sharing to active involvement.

"Vaccine Supportive" posts, appearing in 32.53% of cases, portrayed vaccination as a safe, effective and necessary step for individual and community protection. These communications often comforted the public regarding vaccination efficacy and the benefits of inoculation. However, the comparatively limited abundance of such communications compared to factual updates implies that MoNHSRC prioritized informational accuracy and public guidance over emotionally evocative storytelling or reassurance.

"Addressing concerns related to vaccine and side effects" posts, which featured in 16.53% of the total Facebook posts, focused on explaining public uncertainties and soothing worries associated with the COVID-19 vaccine. These messages attempted to comfort individuals by addressing frequent concerns about side effects, safety during pregnancy, and the immune response triggered by vaccination. Such content had a key role in alleviating vaccination hesitancy, particularly in a culture like Pakistan where misinformation and rumors regarding vaccine hazards were common. By clearly facing uncertainty and emphasizing that side effects were typical and transient, MoNHSRC aimed to develop public trust in the immunization process. However, the relatively moderate frequency of these posts compared to wider informational topics implies that the Ministry may have underused the chance to provide deeper reassurance and address vaccine anxiety through more proactive myth-busting and health education content.

Notably, "Vaccine Availability" was the least prevalent theme, appearing in only 9.33% of the posts. This shows a potential communication gap regarding vaccine access and logistics, critical issues in a developing country like Pakistan, where barriers to access (e.g., distance, infrastructure, digital literacy) are important. In crisis circumstances, clarity regarding where and how to access medical services is crucial, and the underrepresentation of this issue may have reduced the Ministry's overall influence.

The second research question (RQ2) assessed the frequency with which specific target groups were addressed in postings that featured a call to action. Of the 157 such posts, the General Public was the most often targeted category (60.51%), showing a policy of broad, non-specific outreach. This broad approach resonates with the urgency of crisis messages, where simplicity and mass reach are generally stressed.

However, some demographic groups particularly those classed as high-risk were much less represented. Older residents were targeted in (18.47%) of the call-to-action messages, persons aged 12+ in (12.1%), and pregnant and breastfeeding mothers in 8.92%. Meanwhile, health personnel were referred in only (8.28%) of posts, despite their frontline status and significance in influencing public behavior. Children (ages 5–11) and specific patients with underlying diseases were the least targeted, appearing in 4.46% and 3.18% of posts respectively.

These results imply that, during the COVID-19 crisis, MoNHSRC relied mainly on broad communication rather than personalized messaging for at-risk or priority groups. While this may have been beneficial in presenting a united national message, it certainly missed opportunities to address unique concerns or access challenges encountered by distinct communities. Tailored messaging is particularly crucial in a crisis scenario because certain groups may seek comfort, specialized knowledge, or practical guidance.

Overall, the results suggest that MoNHSRC's Facebook strategy was aligned with basic principles of crisis communication: providing timely information, advocating protective behavior, and keeping a visible online presence. However, the Ministry of Health's crisis reaction was limited in its target segmentation and strategic communication. While the use of Facebook facilitated fast outreach to a wide audience, a more sophisticated approach with

individualized, community-sensitive messaging could have boosted engagement and vaccine uptake especially among vulnerable or hesitant groups.

In conclusion, the Ministry of National Health Services Regulation and Coordination (MoNHSRC) displayed a great commitment to digital crisis communication throughout the COVID-19 pandemic. Its Facebook campaign effectively stressed transparency and vaccine promotion. However, future crisis communication efforts might benefit from a more balanced blend of emotional resonance, access-focused material, and audience-specific messaging to ensure that all sectors of the community receive appropriate, actionable information during public health crisis.

Conclusion

This study sought to investigate the utilization of Facebook by the Ministry of National Health Services Regulation and Coordination (MoNHSRC) in Pakistan for crisis communication during the COVID-19 pandemic, particularly with vaccine-related information. This research conducted a quantitative content analysis of 375 Facebook posts published from February 1, 2021, to September 23, 2022, aiming to identify the predominant themes (RQ1) and to ascertain the frequency of direct address to various target audiences in vaccine-related call-to-action posts (RQ2).

The data suggests that MoNHSRC focused mostly on themes of up-to-date information and appeals for vaccination to inform and encourage the public throughout the public health crisis. While "Vaccine Supportive" messages were prevalent and reiterated the benefits of immunization, the Ministry emphasized real-time updates and general encouragement more than comprehensive information on vaccine availability or emotionally engaging material. This approach indicates a strategy centered on sustaining informational credibility amid a moment of considerable uncertainty and misinformation.

In terms of audience targeting, the general public was the major focus of vaccine-related calls to action. While older residents, healthcare workers, and pregnant women were occasionally addressed, specialized communication toward more vulnerable or hesitant groups was uncommon. This implies a need for more inclusive, segmented communication tactics, especially in a crisis situation where diverse populations may confront varying levels of risk, access, and trust.

Overall, the research reveals both the merits and limits of MoNHSRC's social media-based crisis communication during the COVID-19 epidemic. The Ministry successfully maintained a strong digital presence, distributed timely information, and supported public health behavior using Facebook. However, the relatively modest emphasis on access logistics and audience-specific messaging points to places for development. Future health crisis communication strategies, whether during health emergencies or other national challenges, would benefit from a more balanced strategy that combines transparency, accessibility, emotional resonance, and focused outreach.

This effort contributes to the greater and better understanding of digital public health communication in developing countries, particularly during emergencies. It highlights the growing relevance of social media platforms like Facebook in shaping public behavior and perceptions in times of crisis. The findings serve as a framework for policymakers, health communicators, and scholars attempting to build more effective digital engagement techniques in future public health campaigns.

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