



COVID-19 Crisis Communication: The Strategic Use of Instagram Messages by the Bahraini Ministry of Health in Light of the Crisis and Emergency Risk Communication Model (CERC)

Naglaa Elgammal*

Abstract

While social media is being increasingly used for health crisis communication, few studies, especially in the Arab region, have examined how it can improve strategic communication during various phases of any health crisis. The Crisis and Emergency Risk Communication (CERC) model is one of the frameworks that focus on strategic communication of health crises through social media. Considering the limited number of Arab studies investigating the application of the CERC model during health crisis management, this study seeks to identify how social media can be utilized to implement the CERC model, by examining the uses of Instagram by the Bahraini Ministry of Health (MOH) in managing the COVID-19 pandemic. The results suggest that the MOH's Instagram account was used strategically in this case. Results also provide information on how the MOH closely followed the actions recommended in the CERC model, implementing the different crisis stages: risk messages, warnings, preparations, uncertainty reduction, and efficacy.

Introduction

The role of governments in communicating with the public and transferring information is essential to a community's understanding, preparation, and response to health emergencies such as the COVID-19 pandemic. According to Burton-Jeangors (2019), early and intensive communication is needed to counter rumors, anti-government views, and potential panic during any health crisis. Governments usually transfer messages to the public during any health crisis to help them respond appropriately and thus reduce any potential harmful impacts. Therefore, government crisis messages should be constructed in an up-to-date, informative, and effective manner. As the Bahraini government worked to slow the spread of

* Associate Professor and Head of Media and Public Relations Department, Gulf University, Bahrain
mc.hod@gulfuniversity.edu.bh



COVID-19 among citizens and residents, sending effective mass messages through social media was considered an essential tool in encouraging individuals to comply with the Ministry of Health's (MOH) recommendations.

The Crisis and Emergency Risk Communication (CERC) model has been widely adopted for strategic communication in crises. It is a model that "outlines the five common stages of the crisis lifecycle, from risk, to eruption, to clean-up and recovery, and on into evaluation" (Lwin, Lu, Sheldenkar, and Schulz 2018, 3). It recommends best practices during each stage of any crisis to reduce uncertainty.

This research investigates the use of the CERC model for COVID-19 communication by analyzing the content of Instagram messages posted by the Bahraini MOH. It examines how official communicators use social media to contact the public during the pandemic.

COVID-19 in the Kingdom of Bahrain

In 2020, the world faced one of the worst worldwide health crises caused by the spread of the COVID-19 virus. Its first appearance was in China on 31 December 2019. The World Health Organization (WHO) declared COVID-19 to be a global pandemic in March 2020. From then on, the race to combat the virus increased worldwide (Iglesias-Sánchez, Gustavo, Witt, Francisco, and Carmen 2020). The Bahraini MOH confirmed the first case of infection on 24 February 2020, when a Bahraini citizen arriving from Iran exhibited symptoms (BNA 2020).

As reflected by the Bahraini MOH, the measures to combat the virus through crisis communication messages were as follows: establishing an operations room to follow up on the latest developments at all levels; implementing the public awareness plan prepared in advance for expected health crises; training the operating room staff on procedures for dealing with various epidemics; and activating a hotline (444). In addition, there was electronic scheduling for examination dates, places were allocated for examination, quarantine, and isolation, and working on raising the capacity of medical examination and treatment centers. The measures also focused on reviewing data from medical establishments and laboratories, directing emergency teams to handle cases in all hospitals, and following up on the protocols established for those coming from affected countries, including citizens and residents. Precautionary measures were also reviewed and applied to prevent the spread of the virus, and plans were announced to deal with any suspected cases. Finally, informing the public of recent developments in the Kingdom was crucial. Among the measures taken to limit the spread of COVID-19 in Bahrain was the mandatory wearing of face masks outside the home except while driving cars. This decision took effect on 3 June 2020, as announced on the MOH's Instagram page.

A few months before the spread of COVID-19 in Bahrain, the "Bahraini National Team" slogan appeared, an exhortation for everyone to work in his/her sector for the sake of Bahrain. This concept spread to the medical field and



appeared widely during the management of the pandemic. The hashtag "We are all the Bahrain team" was in use on the MOH's Instagram site during the study period. At the same time, in response to the spread of COVID-19, Bahrain set up the "National Medical Team to tackle Covid-19". It took the required measures to ensure that quarantine and testing facilities were set up without delay. The kingdom provided free treatment and mobile medical units to both citizens and residents in their homes. It also had one of the highest COVID-19 testing rates per capita in the world. In addition, it was one of the first countries to launch a digital COVID-19 "vaccine passport" (Bahrainedb 2021). Bahrain was also ready to provide the required funding to increase the capacity of quarantine, hospitals, isolation, and laboratory testing sites (BNA 2021).

Health crisis messages over social media

The impact of information sources is particularly important during health crises, because of the potentially dramatic consequences that may emerge from the public's understanding and interpretation of the crisis (Meer and Tony 2018). Well-coordinated and efficient messages can help communicators define risks, assess weaknesses, and promote strength factors, thereby increasing the capacity to overcome any difficulties. At the same time, it seems that the credibility of the messaging source has a significant influence on target audiences (Elgammal 2020).

Social media is increasingly being used during health crises (Fraustino, Liu, and Jin 2017, 283). For example, with social gatherings on pause in the coronavirus, total use across Facebook services increased in April 2020 by more than 50% in the regions most affected countries. Facebook Messenger, WhatsApp, and voice and video calling increased in the same period (Morgan 2020). Accordingly, online media is a critical factor in the transfer of information during health crises. In this context, Edelman's research (2020), conducted in 12 countries during March 2020, confirmed the crucial role played by traditional mass media during the COVID-19 crisis. However, few studies in the Arab region have examined how crisis messages, shared through social media, encouraged members of the public to take protective action.

During any health crisis, it is insufficient to inform the public only through traditional or new media. According to Zhang et al. (2021), the public should receive the government's message, understand it, know that it is related to them directly, recognize the risks they may face if they do not follow the protective action provided in the message, decide that they should act in accordance with the message, fully understand the actions they should take, and finally be able to take the required actions. In a similar sequence, Moreno, Fuentes-Lara, and Navarro (2020) studied the synchronous use of government social media during the COVID-19 pandemic. They found that people who relied more on social media were generally most likely to hold positive opinions about the government's crisis communication strategies.



Theoretical framework

This research is grounded on the CERC model, which incorporated social media into health crisis communication (Ow Yong et al. 2020). Veil, Buehner, and Palenchar (2011) summarized the best ways to use social media in crisis and risk communication, including providing messages on self-efficacy and communicating with honesty. While most theoretical frameworks focused on the best practices of social media use in risk and crisis communication, "they did not specify in which stage of the crisis the practices should be utilized by health authorities" (Lwin et al. 2018, 5). Houston et al. (2015) developed a theoretical framework by identifying social media users, such as governments, individuals, and communities; and describing efficient practices at different stages of the crisis. However, this framework did not focus on strategic communication of health authorities via social media during health crises (Lwin et al. 2018). Therefore, there was a need for a model to guide health authorities' strategic communication via social media across different phases of the crisis. The CERC model can fill this gap. It has been widely used for strategic crisis communication, especially concerning health.

Although crises are equivocal, uncertain, and often chaotic situations (Jankelová et al. 2021), the CERC model is considered as a useful tool for communicators in managing these crises. However, "the CERC model has yet to be fully tested and adapted ... in social media contexts during a disease epidemic" (Lwin et al. 2018, 5). According to Meadows et al. (2019), little research has been done on how health authorities follow the CERC model on social media during health disease outbreaks. Therefore, this study aims to fill the research gap by analyzing how the Bahraini MOH's Instagram may be utilized to implement and adapt the CERC model for managing the COVID-19 pandemic. It also aims to demonstrate strategic uses of Instagram for communications about COVID-19 in Bahrain.

CERC is a strategic communication model that outlines the stages of the crisis lifecycle (Lwin et al. 2018). It was developed in 2005 by the US Centers for Disease Control (CDC) to recommend best practice in response to a public health emergency (Veil, Reynolds, Sellnow, and Seeger 2008). It has been used to analyze traditional and new media reporting on many outbreaks of disease (Mark, Cho, and Myles 2017). According to the model, public health crises tend to follow expected patterns: "pre-crisis, initial, maintenance, resolution, and evaluation" (Lin, Spence, Sellnow, and Lachlan 2016, 601-605). Lundgren and McMackin (2018) classified the CERC model stages as follows: (1) risk messages: social media posts containing information about symptoms; (2) warnings: posts highlighting risk factors and dangers associated with the outbreak; (3) preparation: posts mentioning first responders and providing response recommendations; (4) uncertainty reduction: posts summarizing case reports and other information sources; (5) efficacy: posts highlighting specific personal prevention measures and highlighting common responsibility; and (6) reassurance: posts that calmed the public with mentions of



government interventions, and expressed thanks for the public's efforts. For each of these stages, specific types of information need to be delivered to the public.

The CDC developed a six-principal framework of CERC for the dissemination of information during a crisis (Tang, Bie, Park, and Zhi 2018). Sobowale et al. (2020) condensed these basic principles as follows: be first, be right, be credible, express empathy, promote action, and show respect. Being the first source of information is important as it often becomes the preferred source; being right gives accurate facts regarding the crisis; being credible means telling the truth; expressing empathy addresses the emotional level and the challenges faced by individuals; promoting action gives people things to do; and showing respect usually promotes cooperation.

Using the CERC model helps to "prevent further illness, injury, or death; restore or maintain calm; and engender confidence in the operational response" (Lwin et al. 2018, 249). It also allows health authorities to be strategic, responsive, and highly contingent (Meltzer, Ștefănescu, and Ozunu, 2018). By applying CERC principles, the health communicators "can learn what to say, when to say it, and how to say it to win the public's trust. Most importantly, it can save lives". (Manuel 2014, 216).

Generally, this model provides governments with the best strategic practice, and strategic communication activities to be taken during each stage of the crisis to reduce uncertainty. The model also considers the most-used mass communication channels and social media platforms in every community to transfer crisis messages.

Literature Review

Regarding the use of social media messages in the health context, empirical research demonstrated that social media should be used for communicating with the audience during health crisis management to improve awareness and response. Melovic, Stojanovic, Vulic, and Benova (2020) suggested that government decision makers should consider modern online communication forms and social media platforms for persuading the public through health campaign messages during crises. Shawky et al. (2019) indicated that both health professionals and a sample of members of the public believed that social media were effective channels for sharing health-related messages during health crises. Masip et al. (2020) suggested that communicators need to professionally incorporate social media platforms into their crisis communication plans. Similarly, Westberg et al. (2018) found that audiences perceived health-related messages on social media in a trusted and serious manner. They also proved that social media were more persuasive than traditional media, given the decreasing popularity of the latter among target audiences. Goshayeshi et al. (2019) found that people use smartphones and social media more than traditional media during health crises to seek health information. Tengku, Budiman, and Purwaningsih (2021) concluded that the use of two-way communication on social media during the COVID-19 pandemic allowed the



government to attract participation and absorb the aspirations of the community. Limaye et al. (2020) found that social media allows the public to have timely access to a wide range of COVID-19 topics with dynamic interaction beyond traditional media. Generally, we can state that social media platforms can be used to enhance health crisis strategic communication in several ways: online discussions can improve awareness, the information can circulate quickly among the public in real time; and they can be used to rapidly convey recommendations and warnings among the public.

Regarding the application of the CERC model to health crisis management, Reynolds (2010, 18) concluded that applying its six basic principles through social media during the 2009 H1N1 pandemic increased public trust in the government's recommendations. Another study concluded that the CERC model was partially followed during the early days of the MERS-CoV epidemic in Qatar; it also found that the adoption of CERC principles can help restore and maintain the credibility of public health authorities (Nour et al. 2017). Meadows et al. (2019) applied CERC to examine a sample of tweets posted during the different stages of the California measles outbreak of 2015. They found that the audience showed great interest in the official messages broadcast through social media in the first stage of the crisis, but that their interest declined in the later stages. In addition, the expression of reassurance increased significantly in the maintenance and resolution stages. Lwin et al. (2018) investigated how the CERC model was used through social media during the Zika epidemic in Singapore. Results suggest that social media was used effectively during the crisis. They also found that the main CERC stages were applied and that the most-used CERC stages were "promoting public common responsibility" and "expressing thanks to the audience for cooperation". Similarly, a systematic review of CERC-related studies between 2002 and 2017 indicated that "although a robust body of research has cited and applied the CERC model in case studies, few projects have empirically tested CERC" (Miller et al. 2021, 19).

Scope of the Study

This study measures the application of the CERC model in the Bahraini MOH's Instagram messages in managing the COVID-19 pandemic. Considering the limited number of Arab studies investigating the application of CERC during health crisis management, this research analyzes the COVID-19 crisis communication messages on the Bahraini MOH's Instagram account and their alignment with the CERC phases and six principles. Generally, examining the MOH's strategic communication via social media in the context of the COVID-19 pandemic should offer valuable insights into the CERC model.

Research Questions

This study focuses on three research questions derived from the literature, all related to the MOH's Instagram messages regarding COVID-19 during the study period.



- RQ1.** To what extent was the CERC model applied to the MOH's Instagram crisis management messages?
- RQ2.** To what extent do the MOH's Instagram posts on COVID-19 match the CERC principles?
- RQ3.** What is the degree of public engagement with the MOH's Instagram messages during the COVID-19 crisis, and what are the most important forms of this engagement?

Methodology

To understand how the COVID-19 crisis was managed by the Bahraini MOH, a content analysis was conducted on 648 posts on the Ministry's Instagram account from 24 February to 15 July 2020. The researcher divided this period into two stages. Stage 1 started at the beginning of the outbreak on 24 February and continued until the end of May 2020. The total number of analyzed posts in this stage was 412. Stage 2 started at the beginning of June and ended on 15 July 2020. The total number of analyzed posts was 236. Of the 648 analyzed posts, 198 included photos, 123 reports, 173 texts, 89 videos, 65 static images, and 33 infographics. According to Rival IQ, the social media analytics application used by the researcher to analyze the Instagram messages, MOH's posting frequency is usually above average, with 57 per week during the study period.

This research aims for a more intensive content analysis through a mixed perspective that adds the qualitative component to the quantitative examination. "Instagram posts are qualitative in nature, yet content analysis relies on counting and comparing frequencies of coded characteristics of interest, reporting quantitative analysis statistics" (Picardo, McKenzie, Collings, and Jenkin 2020, 8). Generally, content analysis is particularly useful for evaluating social media posts. It allows for drawing inferences from text or visual information (Azungah 2018).

The MOH is the main government source of health information in Bahrain. It is also responsible for communicating information about large-scale health crises in the Kingdom. Public responses to the MOH posts, such as likes and comments, were also analyzed, using Rival IQ, to understand the effectiveness of the MOH's messages. The number of people following the MOH's Instagram was 169,200 during the study period. The MOH has other social media platforms including Facebook (37,720 followers) and Twitter (74,600 followers), and usually used the same posts on all its social media websites. So, it seems that Instagram is used more by the audiences than the other platforms. For this reason, the researcher chose to analyze the MOH's Instagram account. It was selected based on the percentage of total interactions, and the researcher prioritized this variable as interactivity reflects potential influence, indicating involvement in the communication process. At the same time, Instagram was selected as the platform for analysis because it is considered "the fastest growing social media platform" that allows for sharing photos and videos, and be used as a resource for archiving images (Vriesa, Möllerb, Wieringab, Eigenraamb, and Hamelink 2018, 222-223).



Instagram is also an essential medium for sharing health content and is the most popular social medium in the Kingdom (Byrne, Kearney, and MacEvilly, 2017). According to the latest survey of the Telecommunication Regulatory Authority (TRA) in Bahrain (2019), 99% of the population uses the Internet. Ninety nine percent of respondents said they use WhatsApp and YouTube, 95% Instagram, and 90% Facebook and Snapchat. According to the Statcounter GlobalStats website (2020), Instagram usage ranks first among Bahraini people compared to other social media platforms.

The six main phases of the CERC model were followed to analyze the MOH's Instagram posts. Then, the researcher read the posts and classified them according to the main stages of the CERC model by using an open coding process. According to Williams and Moser (2019, 46), "an open coding is a process of naming and categorizing phenomena through close examination of the data". The researcher identified the emerging topics and keywords for each theme from the collected data. Table 1 shows the final topics and keywords, from which the definitive codebook was generated. This codebook was then used methodically to categorize the MOH's Instagram posts.

Table (1) Identified post categories.

Theme Category According to CERC	Definition	Keywords
1. Risk Messages		
Mechanisms	Posts highlighting COVID-19 mechanisms.	Touch, close contact, groups, cough, or sneeze.
Symptoms	Instagram posts containing information about COVID-19 symptoms	Symptoms: fever, cough, difficulty breathing, body aches, headache, loss of taste or smell, sore throat, runny nose, nausea, vomiting, diarrhea.
2. Warnings		
Risk Factors	Statements highlighting risk factors of COVID-19.	Elderly, travel, poor immunity, smoking, pregnancy, type 2 diabetes, cancer, heart conditions, cardiomyopathies, immunocompromised state, obesity.
Dangers	Statements that highlight the risk of COVID-19 in Bahrain	Death, risk, threat.
3. Preparations		
Responders	Persons or organizations who are responsible for handling the emergency.	MOH, Bahrain National Team, doctors, nurses, WHO.
Recommendations	Statements that request and advise on taking specific actions to prevent COVID-19.	Wearing mask, social distancing, advise, urge, recommend, precaution, take specific action, quarantine, cleaning hands, cough or sneeze in elbow, avoiding crowded places, clean touched objects.
4. Uncertainty Reduction		
Case Report	Reports and updates of daily case numbers	Number of tests, new cases, additional recoveries, today's deaths, active cases, recoveries, deaths, daily report.
Information Resources	Information resources (e.g., infographic or websites ...) that allow people to learn more about COVID-19.	http, www., for more, read, refer to, health advisory, FAQ, update, information,
5. Efficacy		
Personal Prevention Measures	Posts highlighting specific personal prevention actions people can take.	Avoid, medical attention, prevent, protect, we can, call 444.



Theme Category According to CERC	Definition	Keywords
Common Responsibility	Posts highlighting expression of common responsibility.	Let us, each of us, all of us, Bahraini National Team, working together, we all, for Bahrain's sake.
6. Reassurance		
Calming	Posts calming the public with mention of government interventions.	We will, MOH has, MOH is, MOH will.
Thanking and Regards	Posts highlighting expression of thanks for efforts, approval and regards.	Appreciation, well done, thank.

Note: Keywords were used for the MOH's Instagram post categorization. So, if Instagram posts contain one of these keywords, they were directly categorized in that theme.

Findings

RQ1. To what extent was the CERC model applied to the MOH's Instagram crisis management messages?

Based on the content analysis of the MOH's Instagram account during the period of study, it became clear that managing the crisis during the study period took place in two basic stages:

Stage 1

This started at the beginning of the outbreak on 24 February 2020 and continued until the end of May 2020. 412 posts were analyzed at this stage. Several communication activities were implemented, and "Stay home" was adopted as a slogan. The Information and e-Government Authority in Bahrain, in cooperation with the National Medical Team, launched a "Conscious Society" software application on 3 March which aimed to strengthen the following up of home quarantine cases, monitoring contacts, and alerting and protecting citizens and residents in the case of contact with existing or suspected cases. All community members were invited to take the initiative to download this application on their mobile phones by visiting the e-government applications store: apps.bahrain.bh, to keep themselves safe. It was noticed that the MOH's Instagram messages concerning COVID-19 in this first period did not prepare citizens for the worst scenario. This led to further spreading of the virus among the public, as recorded in the formal reports.

Stage 2

This started at the beginning of June 2020 and continued into the period of analysis which ended on 15 July 2020. 236 posts were analyzed. The crisis management messages indicated that there was no longer any need to stay at home, and malls and gymnasiums were opened. At the same time, it was obligatory to wear face masks and maintain social distance. At this stage, the MOH announced on its Instagram account that it had the highest standards of contact tracing, increased capacity of hospitals, precautionary quarantine, isolation centers, and an increasing number of laboratory tests and intensive care equipment. It was also announced that Bahrain was the first country in the Arab world to join the trial of



the first vaccine against COVID-19. Clinical trials were started to treat new patients with the plasma of recovered persons.

As mentioned above, the CERC model lists six stages of communication during crises and emergencies (Lwin et al. 2018). From studying the messages on the MOH website to manage the COVID-19 crisis, the researcher found that the distribution of the CERC model stages on crisis management was as represented in Table 2.

Table (2) Post categories by crisis management stages.

Theme Categories (CERC)	Overall (N=648)	Stage 1 (N= 412)	Stage 2 (N=236)	(χ^2)
<i>1-Risk Messages</i>				
Disease Mechanisms.	305 (47%)	315 (76.5%)	178 (75.4%)	7.12
Symptoms.	265 (40.9%)	168 (40.7%)	79 (33.5%)	8.19
<i>2-Warning</i>				
Risk Factors.	421 (64.9%)	225 (54.6%)	196 (83%)	13.21
Dangers.	352 (54.3%)	201 (48.7%)	151 (63.9%)	12.52
<i>3-Preparations</i>				
Responders.	203 (31.3%)	75 (18.2%)	128 (54.2%)	12.45*
Recommendations.	408 (63%)	275 (66.7%)	133 (56.4%)	7.32
<i>4-Uncertainty Reduction</i>				
Case Report.	359 (55.4%)	239 (58.0%)	120 (50.8%)	6.52
Information Resources.	355 (54.8%)	249 (60.4%)	106 (44.9%)	7.21
<i>5-Efficacy</i>				
Personal Prevention Measures.	232 (35.8%)	107 (26.0%)	125 (52.9%)	8.35
Common Responsibility.	288 (49.0%)	102 (24.8%)	186 (78.8%)	13.62*
<i>6-Reassurance</i>				
Calming.	365 (56.3%)	201(48.8%)	164 (69.5%)	12.56*
Thanking and Regards.	89 (13.7%)	37 (8.9%)	52 (22.0%)	9.35*

Note: Every post can be classified more than once within the major CERC categories. * $p < 0.05$ (statistically significant difference).

The first step of the CERC model is *risk* messages. As seen in Table 2, 47% of posts mentioned the COVID-19 mechanisms, and 40.9% provided information on its symptoms. The first communications delivered on the MOH's Instagram account included information on the nature of the virus, its main symptoms, causes of its spread, and the extent of the danger it presented, especially for those with serious health conditions. Accordingly, these messages communicated the seriousness of the situation to the public.

The second stage of managing the crisis focused on *warnings*, highlighting the risk factors associated with the spread of COVID-19. Based on Table 2, 64.9% of the MOH's Instagram posts mentioned risk factors associated with a COVID-19 infection, and 54.3% emphasized the dangers of spreading COVID-19. At this stage, videos from the Bahrain News Centre were re-broadcast, focusing on the importance of social distancing, especially during holidays and social events. There were also messages from members of the National Medical Team. The use of persuasive videos was followed by static images which included persuasive written messages warning of the danger of not following security and safety measures. There was emphasis on the fact that not following the precautionary measures would harm the elderly.



The third stage of the CERC model, reflected in the MOH's Instagram account, was *preparation*, mentioning responders and providing response recommendations. According to Table 2, 31.3% of posts mentioned first responders. The messages at this stage were designed to encourage responses to the warnings already presented. Most messages (63%) offered recommendations, such as calling the emergency number on the first sign of symptoms, adhering to all precautionary measures, and downloading the "awareness society" app on cellphones.

The fourth stage of the CERC model, as reflected in the crisis messages of the MOH's Instagram page, focused on *reducing uncertainty* through the daily report on COVID-19 in the Kingdom of Bahrain (55.4% of total posts). This report was published in both Arabic and English and included the daily numbers of tests, new cases, additional recoveries, deaths, stable and critical cases, active cases receiving treatment, and the total numbers of active cases, recovery, and death. This stage also relied on MOH press conferences responding to the rumors and inaccurate figures and clarifying the precautionary measures. Live broadcasts of all these conferences were available on the official MOH website and on YouTube, in several languages including Arabic, English, Hindi, Urdu, and Bengali. This stage also included the release of news confirming that medical examinations were being expanded, later known as "random examination", to increase the chances of early detection of COVID-19 infections. Tracking people who had been in contact with infected cases was applied to set dates for their examination (contact tracing). Measures to limit the spread of the virus included closing cafes, cinemas, places of worship, and other precautionary steps aimed at reducing uncertainty for the public. The MOH's Instagram page also had "Question and Answer" posts for the public such as How is the presence of COVID-19 detected in testing? Can COVID-19 be spread through raw food? And can asymptomatic patients transmit COVID-19? Overall, information resources were prevalent topics on MOH's Instagram (54.8%).

The fifth stage of the CERC model deals with *efficacy*. It appeared through the Instagram messages in the form of publications highlighting specific personal prevention measures, in addition to other messages confirming joint responsibility to prevent the spread of the virus through the community. According to Table 2, 35.8% of posts emphasized personal prevention measures against the spread of COVID-19, while 49% emphasized common responsibility. At this stage, many slogans were used in videos or texts, such as: "Be responsible", "Every new confirmed case is the responsibility of every individual", "Everyone is responsible for protecting himself and his community", and "To everyone who shares the responsibility Thank you". In several videos, children were presented emphasizing the prevention measures, addressing children of the same age. This persuasive approach relied on the similarity of the source and the recipient in delivering a convincing message.



The last stage of the CERC model, *reassurance*, was evident in many posts on the MOH Instagram account, intended to calm the public by referring to the precautionary measures that the government had already taken to limit the spread of the virus. The MOH also expressed thanks and appreciation for the public's efforts. Many videos focused on doctors and nurses who worked long hours, putting their own lives at risk. Other videos carried messages of thanks to everyone who volunteered to join in service of those infected with COVID-19, under the slogan: "Volunteers of the homeland ... we are proud of you". As seen in Table 2, 56.3% of reassurance posts were aiming at calming the public, while 13.7% highlighted expressions of thanks for effort, approval, and regards.

To understand how the MOH strategically uses Instagram for COVID-19 communications, the researcher used cross-tabulation analysis to examine the relationships between Instagram post themes in the two crisis stages, as shown in Table 2. Posts about responders (18.2%) were mentioned less in stage 1, but significantly increased (54.2%) in stage 2 of crisis management ($\chi^2=12.45$, $P < 0.05$). Posts mentioning common responsibility peaked (78.8%) in stage 2 ($\chi^2=13.62$, $P < 0.05$). Posts concerning calming significantly increased from 48.8% in stage 1 to 69.5% in stage 2 ($\chi^2=12.56$, $P < 0.05$). Finally, a low proportion of thanks and appreciation posts in stage 1 (8.9%) significantly increased (22.0%) in stage 2 ($\chi^2=9.35$, $P < 0.05$). Overall, the different crisis phases of the CERC communication model were applied by the MOH through its Instagram messages in managing the pandemic.

RQ2. To what extent do the MOH's Instagram posts on COVID-19 match the CERC principles?

The analysis of the MOH's Instagram posts on COVID-19 during the study period revealed the following answers regarding the CERC principles:

Be First:

This principle was achieved during managing the COVID-19 crisis as the MOH was the first and only health authority that has the right to announce the final status of the virus in Bahrain. Daily MOH Instagram reports regarding the final status of COVID-19 made communicating with the public very quick. As already noted, the first source of information, especially in health crisis communication, tends to become the preferred source.

Be Right:

The second principle *be right* was achieved by announcing through its Instagram account what the MOH was doing to tackle COVID-19 (30.6% of total posts as seen in Table 3). As mentioned above, many procedures were followed in an attempt to prevent or at least reduce the rapid spread of the virus in Bahrain.



Table (3) Classifying MOH's Instagram Posts according to the CERC principles.

Kinds of post in relation to the CERC principles	Frequency in Total (N=648)		Rank
	No.	Percentage	
Call for action/promote action	209	32.3%	1
What was being done (be right)	198	30.6%	2
Actions show the government's adherence to the community (be credible)	135	20.8%	3
Show respect	102	15.7%	4
Express empathy	72	11.1%	5

Note: Every Instagram post can be classified more than one time within the major CERC principles categories.

Be Credible:

The third principle of CERC (*be credible*) was achieved through 20.8% of the analyzed Instagram posts, as shown in Table 3. The Bahraini MOH was successful in reassuring the public of all actions that were being taken to tackle the pandemic. It clarified facts with the assistance of famous medical experts, and it was active in stating the government's adherence to standards. In the same context, both Dr. Manaf Al-Qahtani, Infectious Diseases Consultant, and Dr. Jameela Al-Salman, the Consultant of Infectious and Internal Diseases, ranked first as the most popular of MOH's Instagram to explain the procedures taken to tackle COVID-19. They held many conferences during the study period to explain many facts about COVID-19 in Bahrain. All these actions were planned to provide overall reassurance and promote credibility.

Express Empathy:

Regarding this principle, Sauer et al. (2021) explained that "The CERC manual suggests that empathy should be expressed early in any messaging because empathy is critical to creating support". While analyzing the Bahraini MOH's Instagram posts during the study period, 11.1% showed Bahrain's brave doctors, nurses, and healthcare professionals who work for long hours on the front line to tackle COVID-19; see Table 3. The MOH acknowledged the services of medical and nursing staff through many videos on its Instagram account during the study period. Other posts showed that many of frontline healthcare workers died in Bahrain during fighting COVID-19.

Promote Action:

The fifth principle of the CERC model is *promoting action* by targeting the behavioral level of influence, which means giving people meaningful activities to reduce anxiety. As per the analyzed sample of the MOH's Instagram messages during the study period, and as seen in Table 4, the MOH's Instagram messages targeted three levels to influence the public: cognitive, emotional, and behavioral.



At the beginning of the outbreak (stage 1 of COVID-19 crisis management), messages targeted the cognitive level of influence (36.9%), introducing the main information about COVID-19 and the reasons for its spread. Later in stage 2, the messages moved towards the behavioral level (46.2%), promoting specific action, and creating actual behavioral change, such as not leaving home except for necessity, handwashing, and other behaviors required to avoid the further spread of infection. The behavioral level of influence significantly increased from 24.3% in stage 1 to 46.2% in the second stage of crisis management through providing clear and concise actions for the public to tackle COVID-19.

Table (4) Level of influence categories by crisis management stages

Level of influence	Overall (N=648)	Stage 1 (N= 412)	Stage 2 (N=236)	(X ²)
<i>Cognitive</i>	202 (31.2%)	152 (36.9%)	50 (21.2%)	7.86*
<i>Emotional</i>	117 (18.0%)	75 (18.2%)	42 (17.8%)	8.65
<i>Behavioral</i>	209 (32.3%)	100 (24.3%)	109 (46.2%)	6.73*
<i>Mixed</i>	120 (18.5%)	85 (20.6%)	35 (14.8%)	6.85

Note: * $p < 0.05$ (statistically significant difference).

Show Respect:

Due to the high level of uncertainty about COVID-19, respectful communication was substantial. With many unknown facts about COVID-19 when it first emerged, the public experienced high levels of anxiety. In this regard, and as shown in Table 3, 15.7% of the total MOH Instagram posts analyzed showed respect for both citizens and residents. These posts reflected the high level of medical care for infected cases, support for small business owners, and electricity support, along with posts about enabling people to comply with other COVID-19 restrictions. Many Instagram posts also confirmed that everyone could access essential healthcare. In addition, they explained targeting relief to assist all affected low-wage workers, and protecting workers in government and private institutions by applying the policy of working at home to maintain social distancing. At the same time, on 12 March 2020, during the study period, one of the MOH's Instagram posts revealed that Bahrain's King Hamad bin Isa Al-Khalifa had pardoned 901 detainees for humanitarian reasons because of the COVID-19 outbreak. In this regard, Manuel (2014) confirms that respectful communication promotes cooperation, which is essential in promoting adherence to the recommendations of health authorities in any country.

Overall, Table 3 indicates that the CERC model's principles were applied by the Bahraini MOH's Instagram page in addressing the outbreak, with the following ranking: call for action (32.3%), be right (30.6%), be credible (20.8%), show respect (15.7%), and show empathy (11.1%). This means that all CERC's main principles were reflected on Bahrain's Instagram messages managing the COVID-19 pandemic during the study period.



RQ3. What is the degree of public engagement with the MOH's Instagram messages during the COVID-19 crisis, and what are the most important forms of this engagement?

No one can deny that engagement with social media can be beneficial to both audiences and organizations. The MOH's Instagram posts were examined by the Rival IQ application, which revealed the audience engagement with these posts during the study period. It showed that the number of posts averaged 6-8 a day during the study period. 39% of viewers reacted with likes, comments, or both. The top posts with which the public engaged were the daily COVID-19 reports (67.6%), followed by the photos (42.3%). The highest engagement hour was at 10:00 pm. The engagement rate increased in the second stage (at 55.7% from 51.8% in the first stage). The highest number of views of a single MOH video (9,000) was of its employees on the Bahrain TV Channel discussing COVID-19 issues. Regarding using the hashtag, the most widely used hashtags and their engagement rate by followers were as follows: #COVID19 (95.0%), #TeamBahrain (66.0%), #UnitedAgainstCOVID19 (60.0%), and #Bahrain (55.0%) (a single post can contain more than one hashtag).

The content of the comments was also examined to understand public opinions of the MOH's posts. The awareness stage was achieved early, as shown by the widespread viewing of the Instagram videos regarding safety measures, which the public engaged with intensively. Watching these videos was boosted by celebrities, such as famous artists and footballers, who spread awareness messages to the public. While awareness was promoted through videos, infographics, posts, and reports, most of the public's comments came in the form of questions or thanks for the efforts of the MOH in dealing with the pandemic. However, there was no dialogue as the audience's questions could not be answered in real time. Thus, communication was one-way, lacking the element of interaction with the audience, which is one of the features of this communication via social media.

Discussion

This paper examined the effectiveness of health crisis communication management through the Bahraini MOH's Instagram. The target audience comes from different cultural backgrounds and has a variety of opinions. As a result, social media specialists must be cautious when creating and choosing their messages. The communication activities used on the MOH's Instagram account during the study period included daily reports, with new and existing cases of COVID-19 infection; daily recoveries; the number of deaths; and the total daily number of examinations. In addition, there were awareness-raising videos highlighting the prevention measures, household disinfection, personal hygiene measures, and the importance of social distancing. Static images were also used, containing slogans such as "We continue with determination" or "For their sake". Infographics explained essential steps such as examination times and voluntary home isolation procedures. Finally, several television interviews from the Bahrain



TV Channel were delivered, in which official doctors talked about recent developments.

The nature of the content of the Instagram messages reflected the way of managing the health crisis in two main stages during the period under study. The first phase began with the emergence of COVID-19 in Bahrain on 24 February 2020 and continued until the end of May 2020, led by the slogan "Stay home". In the second phase, from the beginning of June and recorded until the end of the study on 15 July 2020, the crisis management communications largely dropped the "Stay home" slogan, and began planning for a return to normal life, step by step, but with the obligatory wearing of face masks and social distancing. Overall, the nature of the content of the messages in these two stages was consistent with the objectives of each stage of crisis management. Generally, the prompt and obvious relaying of information via social media platforms is essential to achieve effective crisis management. The average number of daily Instagram posts from the MOH was 6-8. Park, Boatwright, and Johnson-Avery (2019) stated that approximately five posts represent the maximum number of times to upload posts on social media to receive good viewing and engagement from the target audience in normal cases. But, during the fast spread of the COVID-19 pandemic, it seems that posting from 6-8 times a day may increase the audience engagement, who are already motivated to follow up the latest news regarding COVID-19.

As strategic communication during any crisis is continuous, messages to earn public trust, with planned communication based on a clear crisis framework like the CERC model, is vital to manage the situation successfully and effectively. This study also tested the CERC model of crisis management by examining whether the MOH's Instagram messages reflected the main phases of the model. It became clear through the content analysis of these messages that the management steps did follow the same sequence as in the CERC model. First, the "risk messages" explained the seriousness of COVID-19. Next, the "warnings stage" explained the consequences of not following the precautionary measures to avoid infection. "Risk factors" messages were used intensively (54.6%) in the first stage of the crisis, preparing the public for responding to the required action. The "preparations stage" consisted of posts mentioning first responders and providing response recommendations. At this stage, the technique of focusing on the positive experiences of others that changed their lives for the better was used. This encouraged the public to pay attention and respond to the communication, instead of relying only on "risk" messages that might be ignored or could be less effective over time.

The fourth stage of the CERC model is "uncertainty reduction". This was achieved through many messages that focused on the number of daily cases of infection and recovery, reported on the MOH Instagram. This stage also relied on many press conferences responding to rumors and misinformation about the situation of COVID-19 in Bahrain. The fifth stage of the CERC model was the "efficacy" of the communication, evident in numerous posts that highlighted the



specific personal prevention measures, and those which involved joint responsibility. Several slogans were used, the most frequent being "Commit responsibly". The last stage of the CERC model was the "reassurance" stage, intended to calm the public by referring to the precautionary measures that the government had already taken against COVID-19. The MOH also expressed thanks and appreciation for the public efforts through many videos under the same slogan: "Volunteers of the homeland ... we are proud of you". Posts about "responders", "common responsibility", "calming", and "thanks and appreciation" significantly increased from the first stage to the second stage of the crisis management, which had an effective impact on improving the strategic communication during the study period. In summary, each stage of the CERC model was followed to prevent the spread of COVID-19 in Bahrain, which suggests that social media can be used intensively to apply the CERC model for strategic communication. We believe that these findings not only explain how social media can be used in order to implement the CERC model but also help communicators to adapt the CERC model in different social media contexts during crisis management.

This study also aimed to analyze the crisis communication delivered through the Bahraini MOH's Instagram account during the pandemic in alignment with the main principles of the CERC model. All the CERC principles were reflected in the MOH's Instagram posts during the study period. "Call for action" (32.3% of total Instagram posts) ranked as the first reflected CERC principle during the study period, aimed at preventing COVID-19 from becoming a lasting crisis. Overall, examining the Bahraini MOH's strategic communication on COVID-19 through social media offered valuable insights of the CERC model.

The findings demonstrated that the MOH's Instagram posts received different audience response levels, indicated by likes and comments. The highest percentage of the public were more responsive to the daily COVID-19 reports than to other forms of communication, which suggests that these daily reports were valuable in providing the public with the current status of COVID-19 in Bahrain. The total engagement rate with the MOH's posts increased in the second stage of crisis management, indicating that the messages succeeded in increasingly engaging the public in following up the latest COVID-19 news. The largest number of views (9,000) of a single MOH video was of the appearance of its employees on the Bahrain TV Channel to discuss COVID-19 issues; this can be considered as the greatest audience involvement, as the total population of Bahrain is 1,718,533 (Information and Government Authority, 2020). However, the MOH did not make use of Instagram's interactive features to answer the public's questions, which made it a one-way platform instead of offering a dialogue with the target audience's inquiries.



Conclusion

Effective health crisis management requires strategic communication across different stages of the outbreak. As government authorities are increasingly using social media websites to communicate with target audiences during any health crisis outbreak, it is essential to adapt crisis communication models and frameworks in a social media context to guide their strategic communication. This study aimed to identify the methods used by the Bahraini MOH in managing the COVID-19 pandemic as reflected in the crisis communication messages on its Instagram site during the period of study, from 24 February to 15 July 2020. The implementation of the CERC model was demonstrated at different stages of managing this crisis, from *risk messages*, *warnings*, *preparations*, and *uncertainty reduction* to *efficacy*. Official representatives of the Bahrain National Team were used intensively, with a mixture of informal sources such as celebrities. In addition, all the CERC principles were reflected in the MOH's Instagram posts during the study period. Clearly, incorporating CERC principles in crisis communication can help health authorities facilitate the process of understanding and managing anxiety and uncertainty.

This is one of the few Arab studies to investigate the implementation of the CERC model in social media contexts during the spread of COVID-19. As no one can predict when this pandemic will end, there is a need for more studies to further investigate implementing the CERC model via social media. More research is also required to assess the effectiveness of crisis communication messages across both traditional media and new platforms. This study points to a future research field to identify the most appropriate techniques and methods for the various stages of crisis management. This field of research also needs to be considered in the context of Arab studies.

While this study focused on Instagram, future Arab research should consider investigating the same topic, health crisis management, on Facebook and Twitter, the platforms most used by Arab audiences and governments. Further research is also needed to empirically test how messages on social media can be used in promoting appropriate public thinking, attitudes, and behaviors in the healthcare field. Finally, further work is needed to develop more comprehensive research strategies to assess the impact of CERC during the COVID-19 pandemic or any other health crisis. The impact of information sharing through social media on emergency risk communication effectiveness during similar crises should be the focus of future research activities.

Crisis communication is a growing field, with several questions remaining regarding how the public is exposed to, processes, and evaluates information during any health crisis, and which factors, techniques, and strategies can affect their response to the crisis messages. At the same time, there is a need to compare the different crisis messages delivered through traditional official media and new media within the same health crisis.



References

- Azungah, T. 2018. "Qualitative research: deductive and inductive approaches to data analysis". *Qualitative Research Journal* 18, no. 4 (November): 383–400.
- Bahrainedb. "Bahrain Coronavirus Updates". Accessed May 1, 2020. <https://www.bahrainedb.com/key-updates-on-covid-19/>.
- BNA. 2020. "Bahrain's efforts to combat COVID-19 highlighted at WHO virtual session". Accessed May 18, 2020. <https://www.bna.bh/en/BahrainseffortstocombatCOVID19highlightedatWHOvirtualseession.aspx>
- BNA. 2020. "Ministry of Health confirms first case of Coronavirus disease (COVID-19) in Bahrain". Accessed May 1, 2020. <https://www.bna.bh/en/MinistryofHealthconfirmsfirstcaseofCoronavirusdiseaseCOVID19inBahrain.aspx?cms=q8FmFJgiscL2fwIzON1%2BDgdRwjYzx8yqJfGfSBhU4yI%3D>.
- Burton-Jeangros, Claudine. 2019. "Epidemics and risk communication: Why are lessons not learned?" In: *Managing the global health response to epidemics*, edited by Burton-Jeangros, Claudine. 167–95. New York: Routledge.
- Byrne, E, J. Kearney, and C. MacEvilly. 2017. "The Role of Influencer Marketing and Social Influencers in Public Health". *Proceedings of the Nutrition Society* 76, no. 1 (June): 79- 98.
- Edelman. 2020. "Special report: Trust and the coronavirus". Accessed July 5, 2020. <https://bit.ly/2TERtFx>.
- Elgammal, Naglaa. 2020. "Recent Trends in the Effects of Traditional and New Media Research on the Social and Political Values among Youth". *International Journal of Media and Mass Communication (IJMMC)*. 2, no. 1. (January): 22 – 73. DOI: 10.46988/IJMMC.02.02.2020.002.
- Fraustino, Julia-Daisy, Brooke-Fisher Liu, and Yan Jin. 2017. "Social media during disasters: A research synthesis and road map". In: *Austin, Lucinda; Jin, Yan (eds.)*. Social media and crisis communication. New York, NY: Routledge.
- Goshayeshi, L, A Pourahmadi, M Ghayour-Mobarhan, et al. 2019. "Colorectal cancer risk factors in north-eastern Iran: a retrospective cross-sectional study based on geographical information systems, spatial autocorrelation and regression analysis". *Geospat Health* 14, no. 2 (November). DOI: 10.4081/gh.2019.793
- Houston, J.B., J. Hawthorne, M.F. Perreault, E.H. Park, M.G. Hode, M.R. Halliwell, S.E.T. McGowen, R. Davis, S. Vaid, J.A. McElderry, et al. 2015. "Social media and disasters: A functional framework for social media use in disaster planning, response, and research". *Disasters* 39, no.1 (September): 1–22. DOI: 10.1111/disa.12092.
- Iglesias-Sánchez, Patricia P, Fabián Vaccaro Gustavo, Cabrera Witt, E Francisco, and Jambrino-Maldonado Carmen. 2020. "The Contagion of Sentiments during the COVID-19 Pandemic Crisis: The Case of Isolation in Spain". *International Journal of Environmental Research and Public Health* 17 (16): 5918- 5937.
- Information and Government Authority. 2020. "Statistics and Population" Accessed April 5, 2020. <https://www.iga.gov.bh/article/statistics-and-population>.
- Jankelová, N., Z. Joniaková, J. Blštáková, K. Procházková, Z. Skorková, and L. Abuladze. 2021. "How companies overcome crisis through the sharing of information and teamwork performance during the COVID-19 pandemic". *Entrepreneurship and Sustainability Issues* 8, no. 4 (June): 757-772. doi: [http://dx.doi.org/10.9770/jesi.2021.8.4\(47\)](http://dx.doi.org/10.9770/jesi.2021.8.4(47)).



- Limaye, RJ, Sauer M, Ali J, Bernstein J, Wahl B, Barnhill A, et al. 2020. "Building trust while influencing online COVID-19 content in the social media world". *Lancet Digit Health* 2, no. 6 (Jun): 277-278.
- Lin, X., P. R. Spence, T. L. Sellnow, and K. A. Lachlan. 2016. "Crisis communication, learning and responding: Best practices in social media". *Computers in Human Behavior* 65, no.1 (June): 1-5. DOI: 10.1016/j.chb.2016.05.080.
- Lundgren, Regina E. and Andrea H. McMackin. 2018. "Risk communication: A handbook for communicating environmental, safety, and health risks". Hoboken, NJ: Wiley IEEE Press.
- Lwin, May, Jiahui Lu, Anita Sheldenkar, and Peter J. Schulz. 2018. "Strategic Uses of Facebook in Zika Outbreak Communication: Implications for the Crisis and Emergency Risk Communication Model". *International journal of Environmental Research and Public Health* 15, no. 9 (September): 1974.
- Manuel, J. 2014. "Crisis and emergency risk communication: Lessons from the elk river spill". *Environmental Health Perspectives* (Online) 122, no. 8 (August): 214-219. Doi: <http://dx.doi.org/10.1289/ehp.122-A214>.
- Mark, D, Elim M. Cho, and Ian A. Myles. 2017. "Contrasting academic and lay press print coverage of the 2013-2016 Ebola Virus Disease outbreak". *PLoS One; San Francisco* 12, no. 6 (Jun): 210- 27. DOI: 10.1371/journal.pone.0179356.
- Masip, Pere; Sue Aran-Ramspott, Carlos Ruiz-Caballero, Jaume Suau, Ester Almenar, and David Puertas-Graell. 2020. "News consumption and media coverage during the confinement by Covid-19: information overload, ideological bias and sensationalism". *El profesional de la información* 3(29): 1-12.
- Meadows, Charles W., Cui Zhang Meadows, Lu Tang, and Wenlin Liu. 2019. "Unraveling Public Health Crises Across Stages: Understanding Twitter Emotions and Message Types During the California Measles Outbreak". *Communication Studies* 70 (4): 453–469. Doi: <http://dx.doi.org/10.1080/10510974.2019.1582546>.
- Meer, Van-der and Tony G. L. A. 2018. "Public frame building: The role of source usage in times of crisis". *Communication research* 45, no. 6 (April): 956-981.
- Melovic, Boban; Andjela Jaksic Stojanovic, Tamara Backovic Vulic, Eleonora Benova. 2020. "The Impact of Online Media on Parents' Attitudes toward Vaccination of Children—Social Marketing and Public Health". *International Journal of Environmental Research and Public Health* 17, no. 16 (August). <https://doi.org/10.3390/ijerph17165816>.
- Meltzer, M., Ștefănescu, L., and Ozunu, A. 2018. "Keep them engaged: Romanian county inspectorates for emergency situations' Facebook usage for disaster risk communication and beyond". *Sustainability* 10, no. 5 (May). doi: <http://dx.doi.org/10.3390/su10051411>
- Miller, Ann Neville, Chad Collins, Lindsay Neuberger, Andrew Todd, Timothy L. Sellnow, and Laura Boutemen. 2021. "Being First, Being Right, and Being Credible Since 2002: A Systematic Review of Crisis and Emergency Risk Communication (CERC) Research". *Journal of International Crisis and Risk Communication Research*. 4, no. 1 (December): 1–28. <https://doi.org/10.30658/jicrcr.4.1.1>.
- Moreno, Angeles, Cristina Fuentes-Lara, and Cristina Navarro. 2020. "COVID-19 communication management in Spain: Exploring the effect of information-seeking behavior and message reception in public's evaluation". *El Profesional de la Información ; Barcelona* 29 (4). <https://doi.org/10.3145/epi.2020.jul.02>.



- Morgan, J.P. 2020. "Media consumption in the age of Covid-19. Against the backdrop of the Coronavirus pandemic, increased media consumption is helping to fill the time". Accessed May 15, 2020. <https://www.jpmorgan.com/global/research/media-consumption>.
- Nour, M., M. Alhajri, A. B. A. Elmoubasher, H. Al-Romaihi, M. Al-Thani, S. Al-Marri and E. Savoia. 2017. "How do the first day's count? A case study of Qatar experience in emergency risk communication during the MERS-CoV outbreak". *International Journal of Environmental Research and Public Health*, 14, no. 12 (December): 1597. Doi: <http://dx.doi.org/10.3390/ijerph14121597>.
- Ow Yong, Lai Meng, X. Xin, J. M. L. Wee, Poopalalingam Ruban S.O., K. Y. Chiang Kwek, and J. Thumboo. 2020. "Perception survey of crisis and emergency risk communication in an acute hospital in the management of COVID-19 pandemic in Singapore". *Durham: Research Square* 20 (December): 17- 35. Doi: <http://dx.doi.org/10.21203/rs.3.rs-23558/v2>.
- Park, Sejin, Brandon Boatwright, and Elizabeth Johnson-Avery. 2019. "Information channel preference in health crisis: Exploring the roles of perceived risk, preparedness, knowledge, and intent to follow directives". *Public relations review* 45, no. 5 (December). Doi: 10.1016/j.pubrev.2019.05.015.
- Picardo, J., S. K McKenzie, S., Collings, and G. Jenkin. 2020. "Suicide and self-harm content on Instagram: A systematic scoping review". *PLoS One* 15, no.9 (September): 1-16. <https://doi.org/10.1371/journal.pone.0238603>.
- Reynolds, B. J. 2010. "Building trust through social media. *Marketing Health Services*" 30 (2): 18-21. Accessed May 15, 2020. <https://www.proquest.com/scholarly-journals/building-trust-through-social-media/docview/232359993/se-2?accountid=192811>.
- Shawky, Sara, Krzysztof Kubacki, Timo Dietrich, and Scott Weaven. 2019. "Using social media to create engagement: a social marketing review". *Journal of Social Marketing; Bingley* 9, no. 2 (June): 204-224.
- Sobowale, K., H. Hilliard, M. J. Ignaszewski, and L. Chokroverty. 2020. "Real-time communication: Creating a path to COVID-19 public health activism in adolescents using social media". *Journal of Medical Internet Research* 22, no. 12 (December): <http://dx.doi.org/10.2196/21886>.
- Statcounter GlobalStats, "Social Media Stats Bahrain, May 2019 – May 2020". Accessed June 5, 2020. <https://gs.statcounter.com/social-media-stats/all/bahrain>.
- Tang L, Bijie Bie, Sung-Eun Park, Degui Zhi. 2018. "Social media and outbreaks of emerging infectious diseases: a systematic review of literature". *Am J Infect Control* 46, no. 9 (Sep): 962-972 Doi: 10.1016/j.ajic.2018.02.010.
- Tengku, I. S., Budiman, and Purwaningsih, T. 2021. "Regional head communication patterns on social media in handling the covid-19 pandemic". *IOP Conference Series. Earth and Environmental Science* 717, no.1 (September) Doi: <http://dx.doi.org/10.1088/1755-1315/717/1/012020>
- TRA. 2020. "99% of individuals in Bahrain use the Internet According to TRA's latest survey". Accessed June 5, 2020. <https://www.tra.org.bh/en/article/99-of-individuals-in-bahrain-use-the-internet-according-to-tras-latest-survey>.
- Veil, S.R.; T. Buehner, M.J. Palenchar. 2011. "A work-in-process literature review: Incorporating social media in risk and crisis communication". *Journal of Contingencies and Crisis Management* 19, no.2(June):110–122. DOI: 10.1111/j.1468-5973.2011.00639.x.



- Shari Veil, Barbara Reynolds, Timothy L Sellnow, Matthew W Seeger. 2008. "CERC as a theoretical framework for research and practice". *Health Promotion Practice* 9, no. 4 (September): 26-34.
- Vriesa, Dian A., A. Marthe Möllerb, Marieke S. Wieringab, Anniek W. Eigenraamb, and Kirsten Hamelink. 2018. "Social Comparison as the Thief of Joy: Emotional Consequences of Viewing Strangers' Instagram Posts". *Media Psychology* 21 (2): 222–245. <https://doi.org/10.1080/15213269.2016.1267647>.
- Westberg, K., Smith Stavros, A.C.T. Munro, and K. Argus .2018. "An examination of how alcohol brands use sport to engage consumers on social media", *Drug and Alcohol Review* 37, no.1 (January): 28-35. DOI: 10.1111/dar.12493.
- Williams, M., and T. Moser. 2019. "The art of coding and thematic exploration in qualitative research". *International Management Review* 15(1): 45-55.
- Zhang, Y., J. Gao, X. Luo, X. Wu, and H. Bao. 2021. "Dynamic evolution of Public's positive emotions and risk perception for the COVID-19 pandemic: A case study of hubei province of China". *Mathematical Problems in Engineering* 2021(1). Doi: <http://dx.doi.org/10.1155/2021/6680303>