The Role of Mass Media Interventions on Promoting Public Health Knowledge and Behavioral Social Change Against COVID-19 Pandemic in Jordan

Hani Al-Dmour¹, Ra’ed Masa’deh¹, Amer Salman¹, Rand Al-Dmour¹, and Mohammad Abuhashesh²

Abstract
This study has attempted to determine the role of mass media interventions on promoting public health knowledge and behavioral social change against COVID-19 pandemic disease in Jordan. Based on communication theory and literature review in health communication, the study develops and examines four major hypotheses that link mass media channels, preferred message types and the senders of preferred message sources, the level of public health knowledge and behavioral social change against Corona virus pandemic disease in Jordan—based on demographic characteristics (gender, age, education, and territory location). To carry out this study; an online questionnaire was prepared and conducted in Jordan and a number of 2,555 social media platforms participants were reached. Content analysis method was mainly deployed for data analysis. The findings showed significant relationships between the preferred type of mass media channels ($R = .47$), preferred message types ($R = .58$), and preferred message sources ($R = .56$) and the level of public health knowledge and behavioral social change against COVID-19 pandemic in Jordan. The study also found that the preferred mass media channels, message types, and message sources differ among the respondents’ demographic characteristics (gender, age, and education). In contrast, no differences found attributed to territory locations.

Keywords
mass media channel, message types, message sources, Coronavirus (COVID-19) pandemic public health knowledge and behavioral social change Jordan

Introduction
Using a social marketing campaign could be an appropriate strategy to raise public health knowledge about pandemic diseases. In the first half of 2020, the whole world has been facing the rapid spread of the Corona virus pandemic disease that has had a dramatic effect on people’s daily lives and the world economy. The COVID-19 crisis is an example of a severe social problem where widespread awareness is crucial. Due to the unpredictable nature of the COVID-19 disease, it has been challenging to predict how many people will be infected and how many people will die? There is no exact measure that can be taken to reduce the transmission of the Coronavirus and therefore save people’s lives, but many governments and health service organizations have taken whatever possible measures considering the available resources to reduce losses. Many of these measures involve increasing the availability of isolation beds, providing transportation for those who need to be tested, setting an isolation procedure for people suspected of being infected, and creating resources for contact tracing. Besides, authorities have designed social marketing campaign intending to raise social awareness and change citizens’ behavior in matters such as improving handwashing and general hygiene, knowing when and how to self-isolate, social distancing, and teaching the correct etiquette for sneezing and coughing.

To tackle this threat, the Jordanian government health authorities, like other countries, launched a campaign to promote public health awareness about this disease using a range of mass media tools, including media literature (i.e., brochures), posters, articles and press ads, television, and radio messages. Social media sites such as Twitter, Facebook, and WhatsApp have also been utilized to reach a wider audience.

¹The University of Jordan, Amman, Jordan
²Princess Sumaya University for Technology, Amman, Jordan

Corresponding Author:
Hani Al-Dmour, School of Business, The University of Jordan, Amman 11942, Jordan.
Email: dmourh@ju.edu.jo
Controlling the prevalence of COVID-19 to reduce the effects of infection on the population is an essential public health mission. Media reports about the current COVID-19 pandemic can provide the public with vital information and promote healthy behavioral practices such as social distancing and more frequent hand washing to reduce the possibility of virus spreading. Moreover, some studies have revealed that mass media campaigns to urge the public to adopt healthy behaviors can positively influence people’s behaviors and prevent harmful practices in society (e.g., Giustini et al., 2018; Misra et al., 2018; Villar & Marsh, 2018). Furthermore, social media platforms can increase public awareness and individual participation in health care issues. There are some useful indications for the safe use of mass media in the communication and exchange of knowledge in medicine and broad applicability as well. According to Sadah et al. (2016), there are some challenges as to how mass media intervenes in a diverse society due to natural differences in concerns and interests. Furthermore, there are uncertainties about how mass media design and features can maintain participants’ engagement and then change their behaviors. Nonetheless, mass media campaigns can also play a vital role in informing the public about a social issue that needs to be changed. For example, the mass media campaign regarding Coronavirus has played an essential role in changing people’s behavior to stay safe and save others’ lives.

Advertising strategies have been used over the past few decades to affect various health habits in significant share of the population. These initiatives focused primarily on heart disease prevention and tobacco use, but also discussed illegal substance usage and alcohol, cancer screening process and prevention, sexual behavior, child survival rates, and other health-related concerns (Stead et al., 2019). Effective social campaigns can also increase audience awareness by communicating the desired message on a full scale via radio, television, poster, billboard, newspapers, and all social media platforms. Furthermore, the success of social marketing campaigns has generally been determined by the extent to which interventions have improved the overall level of a people’s health awareness or positive behavioral change with a lesser amount of prominence on the interventions’ effects on the distribution of well-being or effects within sub-population in terms of their demographic characteristics such as age, sex, gender, and educational qualification.

Despite the advanced technology, communicating the threats caused by Coronavirus effectively remains a challenge. These communications need to be carefully prepared and executed, and properly incorporated with emergency planning and operations. In order to effectively communicate through the media platform during an epidemic disease in public health awareness, public health agencies must prepare their plans of communication, incorporate communicators at the highest levels, listen to the needs of the public and send clear messages. In order to have an effective mass media communication, it requires understanding and trust between public health officials and media. Also, media reporting depends on public health officials for accurate information and timely matters. Stead et al. (2019) mentioned that evidence concerning mass media promotions differs significantly across different health behaviors issues. The most frequently studied behaviors were tobacco use, physical activity, and sexual health.

However, this study noted that there was little literature that discussed the effects of mass media interventions on social behaviors related to the COVID-19 pandemic. The critical questions for public health authorities in Jordan will be to which extent can promotional health campaigns using mass media channels raise public awareness, promote behavioral change, and increase public protection against this pandemic? and what are the message type and source that best help achieving these goals? Specifically, this paper attempts to answer the following research questions in the Jordanian environment:

1. Which mass media health channels are significantly associated with the level of public health knowledge and behavioral social change against the Coronavirus pandemic?
2. What is the preferred message design/type significantly associated with the level of public health knowledge and behavioral social change against the Coronavirus pandemic?
3. What is the preferred source of the message positively correlated with the level of public health knowledge and behavioral social change against the Coronavirus pandemic?
4. Does the relative importance of these mass media health channels, preferred message types and design, also preferred message source differ among the study’s respondents according to their demographic characteristics (sex, age, education, and territory locations) COVID-19 pandemic?

This study’s findings are expected to be vital and helpful for governments and public health policy-makers to understand who receives social media messages. Mass media channels, message type, and message sources worked and contributed effectively to public health awareness, behavioral change, public protection, and developing an effective promotional health plan based on the target audience’s demographic characteristics.

**Literature Review and Hypotheses Development**

Health communication researchers who review campaigns’ communication literature have tended to reach similar results and outcomes. The consensus is that mass media intervention alone, or in combination with other interventions, can positively affect the target audience’s health behaviors (Al-Dmour,
et al., 2020; Stead et al., 2019). Previous studies have revealed mixed evidence of a mass media campaign’s contribution to social, behavioral change. Effective campaigns typically have two essential qualities (Abroms, & Maibach, 2008; Bertrand et al., 2006): They contain well-designed health messages and are sent to the target audience with sample population scope and frequency to be heard, seen, and remembered (Noar, 2006). The study of public health communication focused on communicating health issues; however, it did not focus enough on the challenge of achieving adequate message visibility, such as reach and frequency among target audiences (Hornik, 2002).

Previous studies had revealed that mass media interventions can reach different segments in society and influence each segment in the population differently, for example, illicit drug and tobacco promotion programs showed that mass media seemed to be more active on younger generation. Particularly, it was more effective in younger children than older teenagers (Ellis et al., 2008). According to LaCroix et al. (2014), physical activity and sexual health was nor varied between genders, and no clear constant evidence was found for socioeconomic status or ethnicity. A previous study by Derzon and Lipsey (2002) mentioned that in a meta-analysis comprising of 72 previous researches of mass media substance used by promotion campaigns, these campaigns employed different types of media tools such as radio, video, television, or print as one of the groups of variables in their studies. The study results showed that reduced substance use behaviors were associated with audience exposure to all different types of media channels, but the study analysis found that radio communication was ranked as the most significant relative effects ($\Delta = 0.10$); however, printed media had the least relative effects ($\Delta = 0.04$). Furthermore, target audience attitude outcomes have more significant effects for those exposed to video and printed media than other media channels. However, a video was found to have a sizeable relative effect on substance use of knowledge.

Furthermore, evidence from previous studies regarding the effectiveness of message design is limited (Bertrand & Anhang, 2006). For example, Allen et al. (2015) discuss the use of mass media campaign related to tobacco use which indicated that in terms of the relative important of different types of message design, youth were more likely to think and recall about an advertising message that included a surprising narrative, personal testimonials, image, and intense sound. On the other hand, it found conflicting evidence concerning the use of health consequence messages in such issues as social norms or second-hand smoke. In a review of social marketing interventions promoting anti-smoking messages, Wilson et al. (2012) mentioned that message tone and content contributed to heterogeneity in effects, and he suggested that it is not clear which types work best. However, he discovered that adults are highly influenced by graphic depictions of smoking’s health concerns.

Effective message design can serve as a medium of communication in a social marketing campaign. The main goal of this interdisciplinary effort is to integrate design into a health communication plan. The strategy of healthcare message design is a new concept that should be defined theoretically and philosophically. It blends scientific disciplines to develop effective communication methods between disciplines by adopting a new scientific language and common frameworks. According to Niederdeppe et al. (2008), study in communication theory has scrutinized the message traits that improve person risk perceptions, behavior, and attitudes. Existing literature specifies that the way a message is designed affects attributions of responsibility for social circumstances. Research suggests logical extensions of message framing via the two promising strategies of narrative and visual imagery. Transmission of information through pictures and stories has been a vital tools of acquiring and exchanging information for the millennial segment of society (Gallagher & Updegraff, 2012). Additionally, studies linking message frames and narratives have shown that these means may be integrated to influence attributions of responsibility for social behavior issues (Churchill, 2019).

Furthermore, visual images are relying heavily on exemplification, a concept distinct from, but relevant to, narratives. However, visual images have been studied in less detail than narratives or framing. Lastly, many researchers have determined that decision-makers frequently use visuals and tales as primary sources of data for putting items on their agendas and making decisions (Brownson et al., 2006).

Infectious or contagious diseases are caused by various infectious microorganisms, such as germs, microbes, parasites, and viruses. These types of infections can be spread immediately or indirectly from one person to another (World Health Organization, 2020). On January 30th, 2020, the World Health Organization (WHO) determined the outbreak of COVID-19 to be a “public health emergency of international concern.” Researchers set out to explain the pandemic’s primary characteristics, such as its capacity to spread, emergence, and morbidity rate, as soon as possible. (Perlman, 2020). The WHO and the Centers for Disease Control and Prevention provide regular communication through the mass media, social media platforms, and websites. At this time of the public health crisis, it is vital to exchange information to the citizens promptly. Simultaneously, authorities need to temper media subjection since it can lead to traumatic stress reactions and other related diseases. Health care experts, as a change agents, also play an important part in disseminating fundamental information to society members and other sick people. The general public is mostly in need of useful guidance that can apply safely from infectious microbes and viruses. It is most beneficial to instruct people on the correct method for washing hands, the importance of utilizing and instantly disposing of tissues used to catch sneezes and coughs, and sterilizing surfaces, and practicing social distancing. It is also crucial to make people aware of the need to
avoid contracting other infections such as seasonal influenza (Garfin et al., 2020).

Bala et al. (2013) define a mass media campaign as the purposefulness utilize of media channels by a local, national, or regional organization to influence people's behavior and lifestyles through passive or incidental exposure to mass media campaigns being dependent on active help-seeking. However, a public awareness campaign is an organized communication aiming to create public awareness about a particular social issue such as environment, health, or education. Also, the campaign raises awareness to change behavior among the general population to bring about an improved outcome, such as greater environmental protection or better health (Masiulienė et al., 2016; Wakefield et al., 2010). A public awareness campaign often takes the form of a mass media campaign. Therefore, messages can be conveyed through many different channels, such as traditional mass media (television and radio) and more popular social media platforms such as Facebook, Twitter, Instagram, and WhatsApp. Public awareness campaigns can be recognized as the most efficient and effective means of communication that can reach a broad segment of the general public to inform them about a particular social issue. However, not all communication tools are useful in influencing people's beliefs and attitudes, consequently changing their behavior. These days, television and radio are more popular with older generations, whereas younger people tend to be more active on social media platforms. For example, Facebook and Twitter are among the most used social media platforms in Jordan, with participants generating content and sharing it with others. Social media users are becoming more interactive and dynamic, making social media more effective than other mass media or static websites.

Health communication campaigns are intended to generate positive outcomes for relatively large numbers of people in a particular society within a specified period and through an organized set of communication activities directed to the target audience (Cugelman et al., 2011; Linde-Feucht & Coulouris, 2012). According to Maher et al. (2014), a social marketing campaign has been viewed as an online campaign intended to influence people to change individual behavior and influence policymakers' decisions. Social marketers can assess the success rate for a campaign by how the target audience feels about the campaign and how far they trust the information provided to the public. In Canada, an evaluation of TV advertisements about health promotion targeting the elderly showed that recipients generally did not trust the information if they realized the “government had provided it.” Professionals like doctors or celebrities (like Olympic stars) were considered more trustworthy (Grilli et al., 2002).

Media strategies will act to influence the actions of the entire population in both direct and indirect mechanisms. Many strategies seek to specifically evoke cognitive or emotional responses to influence the individual recipients. These programs aim to influence decision-making processes at the individual level. Expected results include removing or reducing obstacles to change, helping people to adopt healthy social norms or identifying unhealthy social norms, and linking valuable emotions to achieving change. These changes reinforce intentions to change and increase the likelihood of new behaviors. For example, the Coronavirus campaign may highlight how diseases spread, the benefits of staying home, and keeping social distance.

Indirect approaches can alter behavior, too. First, media messages may set an agenda and increase the frequency, scope, or personal discussion of a particular health issue within an individual's social network, which may encourage (or undermine) particular behavioral changes along with individual exposure to messages. Second, because mass media campaigns reach a broad audience, behavioral changes that become commonplace within the social network of an individual can affect the actions of that person without being specifically influenced at first by the campaign. Finally, media campaigns can stimulate a public discussion of health issues and lead to policy changes, which lead to restrictions on individuals' behavior and, thus, a change. Most evidence was obtained from studies in high-income countries because the highest numbers of campaigns were conducted and there is considerable research capacity (Stead et al., 2019; Wakefield et al., 2010).

However, health communication, mainly when it is essential and urgent to spread vital information about the COVID-19 pandemic, requires a more abundant media that can be even more persuasive to the target audience, to ensure that the message reaches the goal. In this way, complex health messages that need more support to persuade behavioral change can be spread through all types of mass media. Combining the effectiveness of different types of mass media can create synergy with the potential to reach people that might not otherwise be reached (Metzler et al., 2012). For example, an increase in media richness in websites is seen on different social media platforms. Since the number of members of Facebook, Instagram, and Twitter is enormous, the main focuses of the published research lie on how to use this media for commercial and social marketing purposes (Kaplan & Haenlein, 2011). Several campaigns have already been described in the study (Korda, 2011). In theory, social media can improve the reach and promotion of campaign messages. Also, campaign activities should improve trust, loyalty, and confidence in the source of information (Cavallone et al., 2012). Based on the study carried out by Bull et al. (2012), the effects of health campaigns on changing people's behavior and attitudes have been tested to promote physical activities and condoms. For this campaign, no significant long-term effects were measured.

Based upon the above arguments, the following hypotheses were developed regarding the role of mass media interventions in raising public knowledge of Coronavirus (COVID-19) as a pandemic infection in Jordan:
H1. The type of mass media health channels directly relates to the level of public health knowledge and behavioral social change against Corona Virus disease.

H2. The preferred message type is significantly contributed to the level of public health knowledge and behavioral social change against Corona Virus disease.

H3. The preferred source of a message type is significantly contributed to the level of public health knowledge and behavioral social change against Corona Virus disease.

H4. The type of mass media, channel, the preferred message type, and the preferred message sources for public health awareness and behavioral change against Corona Virus disease have significantly differed among the respondents regarding their demographic characteristics (gender, age, education, and territory locations).

**Research Methodology**

The study uses an exploratory and descriptive approach, using a quantitative method. To validate the theoretical model of the research and test the hypotheses of the study, a survey questionnaire was carried out. All scales were primarily prepared in English. Then, these scales were translated into Arabic by a professor in the marketing area. Then, Arabic items were translated back into English by another professor in the marketing area. This research used a translation-back procedure to ensure accuracy (Sekaran & Bougie, 2013). Expert panel of six academic researchers in the fields of business and health reviewed the survey instrument to ensure face validity. As a result, some questions were updated and the revised pilot questionnaire was tested during the COVID-19 pandemic on people who live in Jordan. In reality, a pre-test was performed with 25 people to ensure that the questions were understandable. Some revisions have been performed, leading to an easily comprehensible survey questionnaire.

The target population of this study contained of all mass media users in Jordan. The researchers sent a web link for the online questionnaire to the potential Jordanians’ respondents between March 15th and April 30th in 2020. A convenience sample size of 2555 respondents was collected. The questionnaire consisted of two sections; the questionnaire’s first section provides general personal details about the level of a respondent, gender, age, and education. The second section addresses concern about the estimation of the study variables. The questionnaire’s content was developed based on prior studies (Al-Dmour, et al., 2020; Giustini et al., 2018; Laranjo, 2016; Laverack, 2017; Misra et al., 2018; Sharma & Yaday, 2017; Smailhodzic et al., 2016; Villar & Marsh, 2018) using—5-point Likert scale ranging from not important at all = 1 to very important = 5. Three independents variables were measured: the type of mass media, the preferred message type, and the preferred message sources. However, the dependent variables which consist of the level of public health knowledge and behavioral social change against Corona Virus disease were measured using 5-point Likert scale ranging from strongly disagree = 1 to strongly agree = 5.

**Data Analysis**

Reliability, validity, and descriptive analysis were conducted to explain the sample’s characteristics of the study target population and all variables. A multiple regression analysis, Independent samples T-test, and ANOVA tests were used to examine the hypotheses. To ensure precise measurement and avoid the ambiguity and complexity in the shaping of questions, a draft of the questionnaire was formulated, and reviewed by six knowledgeable and professional academic staff members who have sufficient experience in this field. Cronbach’s alpha coefficient was measured to reflect the reliability of the instrument. Some scholars (e.g., Bagozzi & Yi, 1988) recommended that all pointers or dimensional scales ought to be over the suggested value of .60. Table 1 explains the findings of Cronbach’s alpha for all variables. Cronbach’s alpha coefficients of all the tested variables were above .60, concluding that the composite scale was reliable.

**Participants Demographic Characteristics**

As shown in Table 2, 50.2% of the participants were females and 46.8% were in the age range between 18 and 34. Besides, 52.9% of the participants were undergraduate, and about 60.7% of them were in the middle territory.

**Descriptive Analysis Results**

To explain the participants’ attitudes toward each variable, the mean and standard deviation was examined for all the measurements items. The descriptive statistics summarized in Table 3 pointed to a positive mean toward the items measured. The rank of each item was examined by the follow method: (highest point in Likert scale−lowest point in Likert scale)/the number of the levels employed = (5−1)/5 = 0.80, where (1−1.80) was reflected by “very low,” (1.81−2.60) was reflected by “low,” (2.61−3.40) reflected by “moderate,” (3.41−4.20) reflected by “high,” and (4.21−5) reflected by “very high.” After that, the items were being ordered by their means (Pallant & Bailey, 2005; Sekaran & Bougie, 2013). Tables 4 to 6 show the results.

**Table 1. The Cronbach’s Alpha Coefficients of Study Variables.**

| Variables                     | Number of items | Cronbach α |
|-------------------------------|-----------------|------------|
| Mass media channels           | 4               | .86        |
| Type of message appeal        | 6               | .78        |
| Source of the message         | 5               | .84        |
| Public health knowledge       | 4               | .89        |
| and behavioral social change  |                 |            |
Table 2. Sample Profile (N = 2,555).

| Category            | Frequency | Percentage (%) |
|---------------------|-----------|----------------|
| Gender              |           |                |
| Male                | 1,272     | 49.8           |
| Female              | 1,283     | 50.2           |
| Total               | 2,555     | 100            |
| Age                 |           |                |
| 18 to less than 34 years | 1,196 | 46.8           |
| 34 to less than 54 years | 1,074 | 42.0           |
| 54 and over         | 285       | 11.2           |
| Total               | 2,555     | 100            |
| Educational level   |           |                |
| High school and Diploma | 262  | 10.2           |
| Undergraduate       | 1,352     | 52.9           |
| Graduate            | 941       | 36.9           |
| Total               | 2,555     | 100            |
| Governorate         |           |                |
| Northern territory  | 444       | 17.4           |
| Middle territory    | 1,552     | 60.7           |
| Southern territory  | 559       | 21.9           |
| Total               | 2,555     | 100            |

Table 3. Descriptive Analysis of the Study Variables.

| Code | Constructs                                      | SD   | M   | Order |
|------|-------------------------------------------------|------|-----|-------|
|      | Mass media channels                             |      |     |       |
| Ch1  | The Jordanian Ministry of Health media (website, Facebook . . .) | 1.14 | 4.08 | 2     |
| Ch2  | Jordanian public television                     | 1.09 | 4.22 | 1     |
| Ch3  | Jordanian public radio stations                 | 1.13 | 3.64 | 4     |
| Ch4  | Jordanian public News websites                  | 1.08 | 3.96 | 3     |
|      | Type of message appeal                          |      |     |       |
| MA1  | Conversational appeal                           | 0.98 | 4.04 | 1     |
| MA2  | Scientific descriptive appeal                   | 1.00 | 4.01 | 3     |
| MA3  | Anecdotal appeal                                | 1.10 | 4.16 | 4     |
| MA4  | Martyrdom appeal                                | 1.01 | 4.09 | 2     |
| MA5  | Cartoons panic appeal                           | 1.12 | 3.66 | 5     |
| MA6  | Humorous appeal                                 | 1.30 | 3.16 | 6     |
|      | Source of the message                           |      |     |       |
| SM1  | Physicians                                      | 0.92 | 4.52 | 1     |
| SM2  | Media professionals/reporters                   | 1.063| 3.82 | 5     |
| SM3  | Academics professors and experts                | 1.03 | 3.94 | 4     |
| SM4  | Public security agencies                        | 0.98 | 4.30 | 3     |
| SM5  | Senior state officials (the Ministers)           | 0.99 | 4.36 | 2     |

Table 2 explains the first study question and indicates that mass media channels are effective in identifying (COVID-19 pandemic) in Jordan. Specifically, Ch2 (Jordanian public television) is implanted to a large extent, with a mean of 4.22, followed by Ch1, Ch4, and Ch3. Table 4 also answers the second research question and illustrates that all mass media channels were influencing the level of public health knowledge and behavioral social change against COVID-19 pandemic in Jordan effectively. However, it is worthy of indicating that the Jordanian public television is the most effective channel, followed by The Jordanian Ministry of Health (website, Facebook . . .), the Jordanian public news websites, and then the Jordanian public radio stations. Also, Table 2 answers the third and fourth research questions. It shows that MA3 (Anecdotal appeal) is the highly associated preferred message with the rising public health knowledge and behavioral social change against COVID-19 in Jordan, followed by MA4, MA2, MA1, and MA5, whereas MA6 has ranked as a moderate level of importance. Also, Table 2 indicates that SM1 (Physician’s source) is the most important source of the preferred message that is highly related to the rising of public health knowledge and behavioral social change against COVID-19 pandemic in Jordan, followed by SM5, SM4; while SM3 and SM2 were applied to high levels of importance.
Table 4. Tolerance and VIF for the Independent Variables.

| Variables                        | Tolerance | VIF |
|----------------------------------|-----------|-----|
| Mass media channels              | 0.22      | 4.46|
| Massage type                     | 0.15      | 6.41|
| Message sources                  | 0.18      | 5.50|
| Public health knowledge and      | 0.34      | 2.89|
| behavioral social change         |           |     |

Table 5. Result for the Hypothesis (H01).

| Variables (mass media channels)  | R         | R²  | F     | Sig (f) | B     | T     | Sig (t) |
|----------------------------------|-----------|-----|-------|---------|-------|-------|---------|
| Ch1                              | .473      | .224| 184.019 | 0.000² | 0.121 | 3.27  | 0.001   |
| Ch2                              | 0.104     | 2.121| 0.034|
| Ch3                              | 0.106     | 2.58 | 0.010|
| Ch4                              | 0.228     | 7.68 | 0.000|

²Predictors: (Constant), Mass Media Channels: Ch1, Ch2, Ch3, and Ch4.
²Dependent variable: public health knowledge and behavioral social change.

Table 6. Result for Hypothesis (HO2).

| Variables (preferred message)    | R         | R²  | F     | Sig (f) | B     | T     | Sig (t) |
|----------------------------------|-----------|-----|-------|---------|-------|-------|---------|
| TAMA1                            | .580      | .364| 297.461 | 0.000³ | 0.192 | 3.687 | 0.000   |
| MA2                              | 0.121     | 2.689| 0.008|
| MA3                              | 0.244     | 7.141| 0.000|
| MA4                              | 0.211     | 6.533| 0.000|
| MA5                              | 0.132     | 73.548| 0.000|
| MA6                              | 0.103     | 2.112| 0.030|

³Predictors: (Constant), Preferred message: MA1, MA2, MA3, MA4, MA5, and MA6.
³Dependent variable: public health knowledge and behavioral social change.

Table 7. Result for Hypothesis (HO3).

| Variables (message source)       | R         | R²  | F     | Sig (f) | B     | T     | Sig (t) |
|----------------------------------|-----------|-----|-------|---------|-------|-------|---------|
| SM1                              | .560      | .314| 291.441 | 0.000⁴ | 0.144 | 4.141 | 0.000   |
| SM2                              | 0.111     | 2.669| 0.008|
| SM3                              | 0.142     | 3.687| 0.000|
| SM4                              | 0.131     | 3.533| 0.000|
| SM5                              | 0.211     | 7.558| 0.000|

⁴Predictors: (Constant), message source: SM1, SM2, SM3, SM4, and SM5.
⁴Dependent variable: public health knowledge and behavioral social change.

Hypotheses Testing Results

To examine the study hypotheses (H1, H2, and H3), a multiple correlation technique was applied. Besides, normality of the independent variables and the absence of multicollinearity problem were tested. Hair et al. (2006) suggested that the most of the Variance Inflation Factor (VIF) values should be less than 10. VIF is the reciprocal of the tolerance value; low VIF values indicates a little relationship among the variables. For this purpose, the (VIF) was tested; Table 4 summarized the results.

As can be seen from the Table 4, the VIF values have been much less than the critical value (10), which is most common among the many studies, suggesting no multicollinearity problem among the independent variables. However, testing the hypotheses is demonstrated in Tables 5 to 7.

Referring to Table 5, the multiple correlation coefficient, $R = .473$, shows positive relationship between the type of preferred mass media channels and the level of public health knowledge and behavioral social change against COVID-19. The $R^2$ indicated the study model could be generalized. This allows the respondents’ results to be generalized to the entire population. After the result, the value reached 0.224 and for F-ratio, the value reached 184.019, which is statistically significant at $p ≤ .05$. Thus, we conclude that the type of media channels as independent variables has a statistically significant effect on the dependent variables, the level of public health knowledge and behavioral social change against COVID-19. The $R^2$ indicated the study model could be generalized. This allows the respondents’ results to be generalized to the entire population. After the result, the value reached 0.224 and for F-ratio, the value reached 184.019, which is statistically significant at $p ≤ .05$. Thus, we conclude that the type of media channels as independent variables has a statistically significant effect on the dependent variables, the level of public health knowledge and behavioral social change against COVID-19.

Consequently, we infer that there is a statistically positive relationship between the independent variables (the type of preferred message sources) and the level of public health knowledge and behavioral social change against COVID-19. We can conclude from the values of beta that the variables with the highest contribution in the model were Ch4, Ch3, Ch1, and Ch2. Accordingly, H1 was accepted.

Table 6 indicates that the multiple correlation coefficient $R = .580$ shows a significant relationship between the preferred message type and the dependent variables. $R^2$ equals to .364. The results showed that F-ratio for these data is equal to 297.461, which is statistically significant at $p ≤ .05$. Consequently, we infer that there is a statistically positive relationship between the independent variables (the type of preferred message sources) and the level of public health knowledge and behavioral social change against COVID-19. We can conclude from the values of beta that the variables with the highest contribution in the model are MA3, MA4, and MA1, accordingly, H3 was accepted.

Table 7 shows that the multiple correlation coefficient $R = .560$ indicates a positive correlation between the preferred type of message source and dependent variables and the level of public health knowledge and behavioral social change against COVID-19. The results showed that F-ratio for these data is equal to 291.441, which is statistically significant at $p ≤ .05$. Consequently, we conclude that there is a statistically significant impact of the independent variables (the preferred type of message sources) on dependent variables. We can infer from the values of beta that the variables...
with the highest contribution in the model are SM4, SM1, and SM3. Accordingly, H3 was accepted.

Hypotheses H4 argued that mass media channels, preferred message types, and preferred message sources differ among the study’s respondents in terms of their demographic characteristics (gender, age, education, and territory locations) during COVID-19 pandemic in Jordan. Independent Samples T-test was employed to investigate whether differences among the study respondents in terms of gender.

Results of the T-test, shown in Table 8, indicated that there is a significant difference attributed to gender. Specifically, the mean scores for females are higher than males for all variables (i.e., mass media channels, message types, and message sources). Also, ANOVA tests were employed to investigate if mass media channels, message types, and message sources differ among the study’s respondents in terms of age and educational level. Results of ANOVA tests, shown in Tables 9 and 10, indicated that there are significant differences in favor of age and educational level and whereas Table 10 showed no differences attributed to territory locations. Table 9 shows that there is a difference in the scores for mass media channels, message types, and message sources due to the respondents’ age. To determine where the differences lie, Tukey posthoc test was performed and showed that results showed attitudes differences between the age groups 18 to less than 34, 34 to less than 54 years old, and 54 and over for mass media channels, message type, and message source. However, all age groups showed similar attitudes for public health protection.

Table 10 indicates that there is no difference in the scores of message types, and message sources attributed to the educational level. However, results show differences in mass media channels, scores attributed to the educational level. Furthermore, the Tukey posthoc test showed significant differences between the undergraduate attitudes and graduated educational levels.

Table 11 shows no differences in the scores of mass media channels, message types, and message sources attributed to the territory locations.

Discussions, Conclusions, and Future Research

Discussion

This study aimed to explore to which extent promotional health campaigns using public mass media channels help in promoting public health knowledge and behavioral social change against COVID-19 pandemic in Jordan. Based on communication theory and literature review the study develops four major hypotheses that link the type of mass media channels, preferred message types and preferred message sources with the level of public health knowledges and
behavioral social change against Coronavirus (COVID-19) pandemic based upon the respondents’ demographic characteristics (gender, age, education, and territory location). The results show that public awareness campaigns can be recognized as the most efficient and effective means of communication that can reach a broad segment of the general public to inform them about the Corona Virus Pandemic disease. However, marketing managers need to consider that not all communication tools are considered useful in either influencing people’s beliefs and attitudes or consequently changing their behavior. Hence, messages can be conveyed through many different channels, such as traditional mass media (television and radio) and more popular social media platforms such as Facebook, Twitter, Instagram, and WhatsApp. These days, television and radio are more popular with older generations, whereas younger people tend to be more active on social media platforms. For example, Facebook and Twitter are among the most used social media platforms in Jordan, with participants generating content and sharing it with others. Social media users are becoming more interactive and dynamic, making social media more effective than other mass media or static websites. Studies have shown that mass media campaigns (power of the video) urge the public to adopt healthy behaviors that can positively influence people’s behaviors and prevent harmful practices in society. Furthermore, mass media channels can increase public awareness and individual participation in health care issues (Mat Dawi et al., 2021).

Furthermore, all mass media channels which were used by public authorities have contributed effectively to raise public health knowledge and promoting behavioral social change against Coronavirus (COVID-19 pandemic) in Jordan. Based on the current study results, it is worthy to indicate that the Jordanian public television is the most effective channel, followed by The Jordanian Ministry of Health (website, Facebook page!), the Jordanian Public News websites, and then the Jordanian public radio stations. Furthermore, the study analysis found that Jordanian public radio was associated with the most significant relative effects; however, printed media had the least relative effects. Besides, the outcomes of target audience—who was exposed to video and printed media—have more significant effects on attitude compared to other media channels. However, a video was found to have a sizeable relative effect on substance use of knowledge. Transmission of information through pictures and stories has been a fundamental means of acquiring and exchanging information for the millennial segment of society. Moreover, visual images are very influential in exemplification, a concept distinct from, but closely related to, narratives (Lovari et al., 2021).

Also, the results helped to investigate whether the promotion health campaign components (public mass media channels, message types appeal, and message senders) and public health knowledge and behavioral social change against (COVID-19) varied among the study’s respondents in terms of their demographic characteristics (age, gender, education, and territory location). The analysis provided empirical evidence that the promotional campaign components (public mass media channels, message appeal, and message sender) and the level of public awareness and behavioral change against pandemic were found significantly different only in terms of respondents’ gender, age, and education as proposed in hypothesis H4. These results were supported by previous studies, such as Bertrand and Anhang (2006), Wilson et al. (2012), and Allen et al. (2015).

The study result also indicated that there is a significant difference attributed to gender. The study analysis showed that female’s response to mass media channels, message types, and message sources are higher than males for all variables during COVID-19 pandemic in Jordan. Besides, previous studies in public health communication supported these results, such as those Wilson et al. (2012), Allen et al. (2015), Laverack, (2017), Villar and Marsh (2018), and Stead et al. (2019). Therefore, campaign health managers need to understand the communication process and the target audience segments before formulating the desired message; it is crucial to recognize that communication requires a full understanding of the social behavior requiring change and how it will transfer from the sender to the receivers. One must also consider the possible barriers that may hinder the message interpretation (Friemel & Geber, 2021).

The results illustrated that the preferred public mass media channels were found important for the effective of public health promotional campaigns aimed at aimed at raising public health knowledge and behavioral social change against Coronavirus (COVID-19 pandemic) with considerations of audience targets’ demographic characteristics, particularly, age, gender, and education. Public television as a mass media channel was found the most preferred one, followed by the Jordanian Ministry of Health (Website: WWW.Cornoa.jo, Facebook. . .), the Jordanian public News websites, and then the Jordanian public radio stations. Regarding the preferred message type appeal, the results indicated that

### Table 11. ANOVA Analysis in Terms Territory Locations.

|                          | Sum of squares | df | Mean square | F     | Sig.  |
|--------------------------|----------------|----|------------|-------|-------|
| **Mass media channels**  |                |    |            |       |       |
| Between groups           | 0.850          | 2  | 0.425      | 0.486 | 0.615 |
| Within groups            | 2,234.713      | 2.552 | 0.876     |       |       |
| Total                    | 2,235.564      | 2.554 |           |       |       |
| **Message type**         |                |    |            |       |       |
| Between groups           | 3.145          | 2  | 1.572      | 2.743 | 0.065 |
| Within groups            | 1,462.960      | 2.552 | 0.573     |       |       |
| Total                    | 1,466.104      | 2.554 |           |       |       |
| **Message source**       |                |    |            |       |       |
| Between groups           | 0.207          | 2  | 0.104      | 0.166 | 0.847 |
| Within groups            | 1,591.747      | 2.552 | 0.624     |       |       |
| Total                    | 1,591.954      | 2.554 |           |       |       |
The study provides significant implications from its findings for health professionals and practitioners, government health officials, and other health administration decision-makers. First of all, the party in question should be aware of the significance of starting a public health awareness and behavioral health change campaign to appropriately defend their community and country against pandemic illness spread such as Corona Virus disease. Secondly, all interested party should consider the linkage between the health promotional components (public mass media channels, the sources of the message, and the type of message appeal), the intervention campaign objectives, and demographics of the target audience in any promotional health program in the future.

To conclude, public awareness campaigns can be recognized as the most efficient and effective means of communication that can reach a broad segment of the general public to inform them about the Corona Virus Pandemic disease. As a result, timely and effective health communication is always important, and it works as public health authorities employing social media platforms with the right message source and message type. Knowing the target’s media culture and habits is essential for effective promotional health campaign plans to raise awareness of public health and people behavioral change during Corona Virus disease. Social media users are becoming more interactive and dynamic, making social media more effective than other mass media or static websites. The study result showed that Facebook and Twitter are among the most used social media platforms in Jordan, furthermore; mass media channels can increase public awareness and individual participation in health care issues. Moreover, all mass media channels which were used by public authorities have contributed effectively to raise public health awareness and promote behavior change against Corona Virus disease in Jordan. Thus, the study analysis showed that female’s response to mass media channels, message types, and message sources are higher than males for all variables during COVID-19 pandemic in Jordan. Therefore, campaign health managers need to understand the communication process and the target audience segments before formulating the desired message; it is crucial to recognize that communication requires a full understanding of the social behavior requiring change and how it will transfer from the sender to the receivers. One must also consider the possible barriers that may hinder the message interpretation. Also, the health manager campaign needs to take into considerations the audience targets’ demographic characteristics in order to have the most effective communication. The success of some major health efforts may rely upon the involvement of the audience that cannot be accessed immediately via social media channels. More study is required to validate how public promotion campaigns can be created and released to progress health knowledge and adopt better healthy behaviors changes in the multicultural perspective.

Limitations and Future Research

Even with the remarkable importance of the study, it holds some considerations. The implications of the study may be limited by geographical location and time, some limitations must be considered. The sample was connivance, and the data were gathered from one country. To carry out this study, an online questionnaire was prepared and conducted in Jordan and the target population of this research composed of all users of mass media platforms in Jordan; however, a global survey should be done in more selected countries in the world in order to generalize the finding of this study to the rest of the world.
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ORCID iDs
Hani Al-Dmour https://orcid.org/0000-0002-2035-8494
Ra’ed Masa’deh https://orcid.org/0000-0002-9070-3732

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