THE ROLE OF SOCIAL MEDIA IN SHAPING HEALTH BEHAVIORS OF THE GENERAL POPULATION DURING THE COVID-19 PANDEMIC

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ABSTRACT: Information from social media can have a strong influence on health behaviors in general population. The aim of this study is to explore the association between exposure to COVID-19 information gained through social media and health behaviors in line with public health recommendations, including COVID-19 vaccine intention and immunization. The study is based on a survey conducted online between 15 May and 30 June 2020 using a snowball sampling strategy. A total of 353 participants from the Republic of North Macedonia (67% female and 33% male) were included in the study. The measurements were developed by the University of Konstanz, as a part of a multi-county study design which comprised of a several scales including social media scale (e.g. Facebook, Twitter, Instagram) and health behaviors scale (including COVID-19 vaccine intention). The results suggest that there is a statistically significant correlation between information gathered from social media and particular health behaviors (e.g. purchase of disinfectant; avoidance of shaking hands; and

face touching). Additionally, statistically significant correlation is found between information on social media and the intention for vaccination in case of no complications. The findings highlight the important role that social media play in periods of pandemic. Furthermore, the results clearly support the conclusion that dissemination of information through social media during a pandemic can be essential for shaping the health behaviors of the general population.

KEY WORDS: *COVID-19, social media, health behaviors, vaccination.*

INTRODUCTION

During December 2019, in Wuhan, China a local outbreak of acute respiratory syndrome with unknown etiology later identified as COVID-19 quickly spread to other regions in China and in other parts of the world. In March 2020, the World Health Organization (WHO) declared a global pandemic of COVID-19 (WHO, 2020). Although governments across the globe took different measures to contain the spread of the virus, individual health behaviors play a major role in the prevention and downsizing of the burden of this disease (Oh et al., 2020). WHO, Centers for Disease Control and Prevention (CDC) and other centers of excellence with regards to health prevention, including national health authorities around the world, have recommended particular health behaviors as a standard in prevention of further spread of the disease. These actions include: washing hands properly; social distancing - not only from people who are already sick, but also avoiding close contacts with other individuals and staying at home when sick; wearing facemasks; and cleaning and disinfecting surfaces (Centers for Disease Control and Prevention, 2021; WHO, 2020). The measures were particularly recommended for individuals with chronic non-communicable diseases and for those at higher health risk.

During a pandemic crisis, individuals have a higher need for receiving accurate information in order to reduce the uncertainty and assume adequate health behaviors. Preventing personal contacts in cases of communicable diseases is vital to public health and safety (Toppenberg-Pejcic et al., 2019). However, the difficulty and fear of COVID-19 disease dispersal arise mostly from the uncertainty about the exact way of contamination, treatment, and recovery in the early stage of outbreak (Oh et al., 2020). Hence, the general population relies both on traditional and social media for obtaining reliable information. Traditional media are more passive in nature, while users of social media can act as active content producers, exchanging information with their family, friends, neighbors, and even unknown larger audience in real time. Moreover, throughout social media sites (e.g., Facebook), information-disseminating platforms (e.g., YouTube), and microblogging services (e.g., Twitter), individuals engage in intense discussions regarding the health behaviors and vaccine intention (Jang and Baek, 2019). In addition, social media served as an effective tool for providing information regarding the status of the disease, as well as to raise public awareness about the ways of avoiding possible infection. For instance, earlier study on the outbreak of the H1N1 flu found that the public was firstly informed about it through social media (Ding and Zhang, 2010).

Researchers have argued that social media health campaigns can contribute towards positive behavior changes and even prevent the negative ones. One such

model by Misra et al. (2018) investigated the awareness impact of social media campaigns on infectious disease prevalence; the model is based on the assumption that social media health campaigns lead to behavioral changes, causing individuals to isolate and protect themselves from infection. The findings of the study by Misra et al. (2018) indicate a decrease in the number of infected people when there was an increased spread of social media health campaigns. This model was further extended by assuming that people who are aware to be susceptible to a disease are less likely to be infected as compared to individuals who are unaware (Al-Dmour et al., 2020). Other authors found that individuals whose trust in media has increased are more likely to engage in health behaviors (Tokuda et al., 2009). The way information is processed through social media shapes public opinions regarding the health risks and, in turn, it has an impact on individual's behaviors and choices. Although there is a significant evidence revealing that social media use is associated with improvements in health behavior outcomes (Maher et al., 2014; Oh et al., 2020), the extent to which social media contribute to increased public health awareness during epidemic disease is still not sufficiently comprehended (Al-Dmour et al., 2020).

The theoretical model developed in the 1950s, known as Health Belief Model (HBM), which tries to explain the health-related behavior of individuals, would argue that when people perceive that they are in the face of an illness or at the risk of getting ill, they become motivated to engage in preventive behaviors. Another work has suggested that in situations of infectious disease outbreaks self-relevant emotions, especially fear and anger, are related to how social media use would affect personal-level risk perception and preventive behaviors (Oh et al., 2020). The original purpose of this theory was to explain that positive factors increase pro-health behaviors, while negative factors decrease or inhibit them (Costa, 2020). Therefore, "to adopt a health care behavior and/or avoid risks for diseases, the individuals must: (1) believe to be susceptible to the disease; (2) believe that the disease will negatively impact, at least moderately, their life; (3) believe that adopting certain behaviors is indeed beneficial to reduce their susceptibility or, if they already have it, its severity; (4) overlap important psychological barriers" (Costa, 2020, p. 2). From a cognitive point of view based on the HBM, individuals' behavior often depends on their rational expectations (Brug et al., 2009). The findings from the study by Durham et al. (2012) indicate that when people are convinced in the severity of the epidemic, their perception is that they are very susceptible to it, and then they are confident that the protective behavior is effective, thus they are willing to accept the recommended behavior. In line with that are the results of a study completed on 680 participants by Jose et al. (2021), where 80% of the participants felt that the activities recommended by the government had helped them to change their behaviors, while 94% of them changed their behavior by following the government's health care approach during the preparedness phase of the disease regardless of their age or education.

Nonetheless, literature also demonstrates that many people dismissed the seriousness of the COVID-19 pandemic and consequently did not change their behavior (Imhoff and Lamberty, 2020). In order to understand why many people failed to adopt recommended behaviors, the scientific community assumed that from the very first days of the outbreak misinformation and disinformation about COVID-19 spread across social media (Cinelli et al., 2020; Earnshaw et al., 2020). Furthermore, Dr. Tedros Adhanom Ghebreyesus, the Director General of the WHO, warned that the world is "not just fighting an epidemic; we're fighting an

infodemic". "Fake news spreads faster and more easily than this virus, and is just as dangerous" (WHO, 2020). Also, research findings by Frankovic (2020) showed that 49% of individuals claimed that the coronavirus is a man-made epidemic; 44% thought that the threat of the coronavirus is being exaggerated for political reasons; while 13% were convinced that the coronavirus is a hoax. Additionally, Cinelli et al. (2020) argue that users of social media have a tendency to form polarized groups around heated discussions and, consequently, misinformation might easily arise from those narratives. Imhoff and Lamberty (2020) noted that inaccurate information spread faster and wider than fact-based news, thus people are less likely to follow the official government recommendations to prevent the spread of the disease.

Regardless of the rapid growth of scientific publications on how media can influence people's health-related evaluations and emotions, less insight has been provided about the effects of social media communication regarding COVID-19 on health behaviors of individuals. To fill this gap, the aim of this study is to explore the association between exposure to COVID-19 information gained through social media and health behaviors in line with public health recommendations, including COVID-19 vaccine intention and immunization.

MATERIALS AND METHODS

STUDY DESIGN

Cross-sectional study design is applied in this quantitative research.

SAMPLE AND STUDY PARTICIPANTS

The study is based on a survey conducted online between 15 May and 30 June 2020 using a snowball sampling strategy. A total of 353 participants from the Republic of North Macedonia (67% female and 33% male) were included in the study, as presented in Table 1. Around 94% of the participants are Macedonian residents, while 6% are having another country of residence. Regarding employment status: 52.9% are employed; 6.4% are self-employed; 19.9% are unemployed; 2.4% are retired; 17% are students; and 1.3% are housewives/househusbands. More than half of the respondents are not married (55%) and 41.3% are married. The age range is from 18 to 89 years.

Table 1.

Socio-demographic data

Socio-demographic data	Percentage of respondents
Gender	
Male	32.6
Female	67.4
Marital status	
Unmarried	55
Married	41.3
Living apart/divorced	2.8
Widowed	0.9
Current occupational status	
Employed	52.9
Student/Internship	17.2
Unemployed	19.9
Pension	2.4
Housewife/ husehusband	1.3
Self-employed	6.4

MEASUREMENTS

The research instrument was developed by the University of Konstanz as a part of a multi-county study design. For the purposes of this paper, social media scale and health behaviors scale were included. The social media scale (a 5 point Likert scale ranging from 'several times per day' - 1 to 'never' - 5) was measuring how often in the last week participants

have been following social media (e.g. Facebook, Twitter, Instagram) in order to obtain information regarding COVID-19. The health behaviors scale is comprised of 14 items on a 5 point Likert scale (ranging from 'more frequently than before' – 1 to 'more rarely than before' – 5) measuring how often participants are applying health behaviors because of the coronavirus, such as: washing hands often or thoroughly; wearing a face mask; purchasing longer-lasting food; avoidance of shaking hands; purchasing disinfectant or hygiene products; avoidance of face touching; disinfecting their mobile phone; as well as items on COVID-19 vaccine intention. The results indicate that the health behaviors scale has a high internal consistency (Cronbach alpha is 0.77).

RESULTS

The results section has been organized to present descriptive statistics and the correlation between variables.

The results presented in Table 2 indicate that most of the participants hear about the coronavirus multiple times a day from social media. Around 69% of the respondents are following social media multiple times a day, while 11.5% do so daily.

Table 3 exhibits the results regarding the vaccine intention of the study participants. It has to be noted that when it comes to vaccination intentions around one third of the participants did not provide an answer. The results from those that answered the questions are shown in Table 3. According to these results, the participants are generally reluctant to get vaccinated. Although the percentage of those showing intentions to get vaccinated if there are no complications is slightly more than 30%, a large proportion of the population (around 40%) would not get vaccinated even when there are no complications. This means that more people would not like to get vaccinated than those who would. The numbers of those who would not get vaccinated is even higher if the vaccines

Table 2.

Observing social media

Social media observed	Never	Once	2-3 times	More than 3 times	Daily	Several times a day
Social media	2.6	3.3	2.2	12.9	11.1	67.9

Table 3.

Vaccination intentions

Vaccination intentions	Very unlikely	Unlikely	Moderately likely	Likely	Very likely
Get vaccinated if there are serious occasional complications	43.5	17.6	20.8	9.4	8.6
Get vaccinated if there are mild occasional complications	35.6	22	23.6	10.4	8.4
Get vaccinated if there are no complications	31.7	13.9	18.7	13.1	22.6

Table 4.

Association between information on social media and different health behaviors

In the last week: How often have you seen or heard the coronavirus mentioned in the following media outlets - social media (e.g. Facebook, Twitter, Instagram)?		
Correlations	Pearson Correlation	Significance
Have you changed your behavior because of the coronavirus?		
I wash my hands often or thoroughly.	0.02	0.79
I am wearing a face mask.	0.10	0.13
I have purchased longer-lasting food.	0.11	0.09
I have purchased disinfectant or hygiene products.	0.15	**0.02**
I avoid shaking hands.	0.07	0.30
I avoid touching my face.	0.16	**0.01**
I disinfect my mobile phone.	0.09	0.16
I follow the sneezing/coughing rules (e.g. turn away, sneeze into the crook of my arm).	0.03	0.60
I only leave home for essential shopping or medical needs.	0.08	0.23
I eat healthily.	0.08	0.19
I am physically active.	0.05	0.47
I drink alcohol.	0.00	0.99
I watch TV, shows, movies or series.	0.11	0.08
I help others.	0.16	0.01
Health Behaviors Scale (including all aspects)	0.17	**0.01**

Table 5.

Correlations between information on social media and intentions for vaccination

In the last week: How often have you seen or heard the coronavirus mentioned in the following media outlets - social media (e.g. Facebook, Twitter, Instagram)?		
Correlations	Pearson Correlation	Significance
Assuming there was a vaccine against the coronavirus...		
How likely would you be to get vaccinated if this had serious occasional complications?	0.04	0.52
How likely would you be to get vaccinated if this had minor occasional complications?	0.09	0.19
How likely would you be to get vaccinated if this had no complications?	0.14	**0.03**

cause occasional complications regardless of the consequences.

The next part of the analysis is focused on investigating the association between the information about the coronavirus that people obtain from social media and various health behaviors. Apart from testing different aspects, health behaviors are grouped into a scale to test the correlation.

The results presented in Table 4 show that there is a strong positive correlation between some specific aspects (purchase of disinfectants, avoidance of touching one's own face, and helping others) and information obtained from social media. Additionally, there is a positive correlation between information obtained on social media and health behaviors in total.

Another aspect that was analyzed and tested is the relationship between information obtained through social media and intention for vaccination in different case scenarios (serious occasional complications, minor occasional complication, and no complications); the results are presented in Table 5.

The results presented in Table 5 indicate that there is a correlation between information on social media and intention for vaccination only in case there are no complications. In the other two cases (with minor and/or serious complications) there is no correlation.

DISCUSSION

In the last two decades social media became an increasing source of information for all aspects of life including health, life style and health behaviors. Moreover, during the COVID-19 pandemic outbreak, social media have emerged as one of the most significant sources of information for risk and crisis communication. Literature on risk communication is yet to be understood, including the dynamics among social media use and behavioral outcomes (Ali et al., 2019; Jang and Baek, 2019; Jose et al. 2021). The aim of this study was to explore the relationship between exposure to coronavirus information gained through social media and health behaviors in the general population in the Republic of North Macedonia in line with public health recommendations, including COVID-19 vaccine intention and immunization. Additionally, this study's aim was to contribute towards evidence gathering related to the ways in which social media shape public health behaviors.

The results of the study indicate that the majority of respondents (nearly 80%) are using social media daily and several times a day to be informed about COVID-19. This implies that the general public relies on an extensive use of social media for obtaining information about the COVID-19 disease. These findings are in line with other studies confirming that through social media platforms people have engaged in quick and concentrated discussions regarding the recommendations on health behaviors and vaccine intention during the COVID-19 pandemic outbreak (Jang and Baek, 2019; Jose et al. 2021). Similar phenomenon was also observed, for example, during the outbreak of the H1N1 flu when the general public was firstly informed about it through social media (Ding and Zhang, 2010).

The study findings emphasize that a large portion of the participants (around 40%) would not get vaccinated even if there are no complications, whereas the percentage of those showing intentions to get vaccinated if there are no complications is only 30%. This implies a predominance of people who would not accept to get vaccinated over those who would. Further analysis confirmed a significant association between information gathered through social media and intention for vaccination, but only in case of no complications (no correlation was found in the other two scenarios with possibilities for minor or serious occasional complications). Additional relevant finding of this study is the confirmation of a positive correlation between information obtained on social media and health behaviors of respondents in total. When analyzed separately, an association was confirmed between specific health behaviors (purchase of disinfectants, avoidance of touching one's own face, and helping others) and information obtained from social media. These findings should advise policy makers and national health authorities to plan and anticipate how to use social media in translating information to the general public regarding the need for immunization and decreasing of the spread of the COVID-19 disease.

Social media as a source of rapid information outreach to vast audience should

be also adequately used by relevant international health agencies such as WHO and CDCs to recommend particular health behaviors as a standard in prevention of further spread of the COVID-19 disease. The study outcomes can also be relevant in the context of using social media in crisis communication and in situations of other communicable diseases outbreaks. Although national governments may take different measures to contain the spread of the virus, individual health behaviors – which are largely influenced by social media - play a major role in the prevention and reducing of the burden of the COVID-19 disease.

There are some limitations to this study that would make some confines to the generalization of the findings. The study has been implemented on a limited number of participants. Future studies may consider including a larger nationally representative sample. In terms of study implications, the findings suggest that public health communicators and policymakers should pay more attention to the role of social media and information spreading via social media during communicable disease outbreaks. Effective communication with the public by governments and national health agencies is among the most important components of successful pandemic responses.

CONCLUSION

The outcomes of the survey reveal that information obtained from social media can significantly affect the health behaviors in general population during pandemic outbreaks and crisis situations. Clearly, the information on social media contributed to changing health behaviors in reducing the risk of COVID-19 spreading in the Republic of North Macedonia. Health behaviors that have been implemented by the general public thanks to information from social media include: avoidance of touching of one's own face and purchasing more disinfectants. Still, the study findings emphasize that a large portion of the participants or a predominant majority of people would not accept to get vaccinated, whereas only a comparatively smaller part of the respondents would get vaccinated if there are no complications. The final results clearly support the importance of information sharing via social media during a pandemic and can contribute towards putting in place appropriate health policies that support crucial health behaviors leading to improved general public health.

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CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

AUTHOR CONTRIBUTIONS

Concept of the manuscript was made by D.J.P., A.T., Lj.E, K.T., T.M., and I.D.; additionally D.J.P., A.T., Lj.E, K.T., T.M. and I.D., contributed significantly towards data acquisition; D.J.P., A.T., Lj.E, conducted data cleaning and analysis. Draft of the manuscript was written by D.J.P, A.T., Lj.E, K.T., T.M., and I.D. All listed authors have read and agreed to the published version of the manuscript.

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