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Information Seeking Behavior of Health Professionals Encountering COVID-19 Crisis and Analyzing the Content of Messages Sent on Social Media

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ABSTRACT

Objective: Social media today is one of the important media for informing epidemics. This study identifies the information-seeking behavior of health professionals and analyzes the content of messages sent on the WhatsApp social network.

Materials and Methods: This is a case study and content analysis research done using the descriptive-analytical method. Its statistical population was all the messages exchanged in WhatsApp groups of health professionals of Golestan University of Medical Sciences during the coronavirus crisis. The content analysis method of the exchanged messages in the studied groups was used to collect the data. During the analysis, 1339 messages were entered into the study. The data were then clustered, coded, and classified based on the available messages.

Results: More than 20% of the messages presented were in the COVID-19 prevention category. Also, among the presented sub-topics, the COVID vaccine, with 4.93% of the total messages, had attracted the most attention from subject experts. Only 14.71% of the messages were provided with reference to a specific source, and the other messages were personal comments or non-source topics.

Conclusion: Methods of preventing COVID-19 infection continue to be at the forefront of the attention of health professionals, and the focus of these experts

is on the topics presented in this area. Web-based platforms such as websites and social networks also play a very important role in meeting the information needs of researchers, especially in the field of COVID-19, and therefore, attention to the provision of scientific and approved content on the Web is very important.

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Introduction

Epidemics are one of the global health challenges. In the 21st century, the world has seen four viral epidemics, and many have lost their lives (Ghanbari et al., 2019; Velavan & Meyer, 2020). Epidemics require rapid and effective communication strategies so that health professionals and the public can be aware of the dangers of the epidemic and the appropriate behavioral response to the risks and actions required to deal with it. Lack of effective communication in such situations can be very serious (Andreadakis et al., 2020; McNeill et al., 2016). To deal with this problem, access to the latest medical information in this area will increase knowledge, reduce anxiety in the face of new health issues or stressful situations, increase the ability to overcome risk factors, and improve faster and participate effectively in decision makings related to health (Nasrollahzadeh, 2015). In addition, following reliable information and official guidelines can be very important during an epidemic; and information and recommendations published by health professionals can be reviewed (McNeill et al., 2016; Springer et al., 2020). But controlling health messages during an epidemic is never entirely in the hands of health professionals.

Informal information channels and grounds have always been important, and it has been shown that information disseminated in the press and news media in various forms has played an effective role in influencing decision-making and behavior during previous epidemics such as SARS (McNeill et al., 2016; Raynor et al., 2004). In this matter, social media is now one of the most important media for informing about epidemics. These media have increased the speed of dissemination of information, and due to the continuous increase of its users, they are very influential on health groups as well as the decisions of health professionals. Social media provide inimitable access to the data used in clinical decision-making (Braun et al., 2019; Cameron et al., 2014; Kim et al., 2010).

Social media encompasses a variety of technologies, including online forums, blogs, microblogs, wikis, video blogs, social networks, and podcasts. The use of social media has

increased exponentially (Timimi, 2012). In medical education, too, social media has become a tool for disseminating new research findings in real time to online audiences around the world (Jaremko et al., 2019).

The widespread use of online social media platforms has led researchers to see how social media can promote better health outcomes. Public health researchers now use data from websites such as Google, Twitter, and Facebook to more closely monitor health trends, diagnose diseases, and even more (Jaremko et al., 2019; Saenger et al., 2018). In this regard, the analysis and study of experiences and information-seeking behaviors of experts is proposed by the World Health Organization (14). This is important in that social media has been used to communicate, raise awareness about epidemics and how to deal with them (Lie & Boker, 2006; Mabera, 2021; Terrasse et al., 2019). On the other hand, the research team's observations indicate the use of WhatsApp social network in the exchange of scientific information, research, and treatment in the event of a crisis and outbreak of coronavirus. This situation is probably due to restrictions on access to other social networks as well as facilitating the exchange of messages among Iranian health professionals. Therefore, considering the important role of social networks in scientific and communication interactions of health professionals, especially in confronting with coronavirus crisis, and the need to analyze the content produced by this important spectrum of the health system, this study identifies the information-seeking behavior of health professionals and analyzes the content of messages sent on the WhatsApp social network.

Materials and Methods

This is a case study and content analysis research done using the descriptive-analytical method. Its statistical population was all the messages exchanged in WhatsApp groups of health professionals of Golestan University of Medical Sciences on the WhatsApp social network during the COVID-19 crisis. By health professionals, we mean faculty members and health care professionals. The research period from the beginning of the COVID-19 epidemic was from March 10, 2020, to September 26, 2021.

The content analysis method of the exchanged messages in the studied groups was used to collect the data. A total of 2154 messages were reviewed. First, the content of the messages was analyzed, and the main messages with content were extracted. Other messages that had irrelevant content or did not contain specific content were deleted, and a total of 1339 messages were entered into the study. Then the main message and the type of source used were extracted. The data were then clustered, coded, and classified based on the available messages. Data analysis, classification, and coding were performed by two subject matter experts. Finally, after resolving the contradictions, the information was finalized and integrated. This research used descriptive statistics methods and Microsoft Excel software to collect data and present findings related to the presented contents.

Results

The findings showed that the content of the messages presented in the groups of health professionals on the WhatsApp social network were classified into 13 thematic categories. These categories include social issues related to COVID-19, transmission and prevalence of COVID-19, specific cases and diseases, prevention of COVID-19, affairs related to foreign nationals, social distancing plan, treatment of COVID-19, epidemiology of COVID-19, diagnosis of COVID-19, issues related to jobs in pandemics, COVID-19 mortality, drugs effective in COVID-19 treatment, and information retrieval behaviors. The highest number of messages was in the category of prevention of COVID-19 with 278 messages (20.76%), and the lowest number of messages in the field of foreign national affairs with 33 messages (2.46%) (Figure 1).

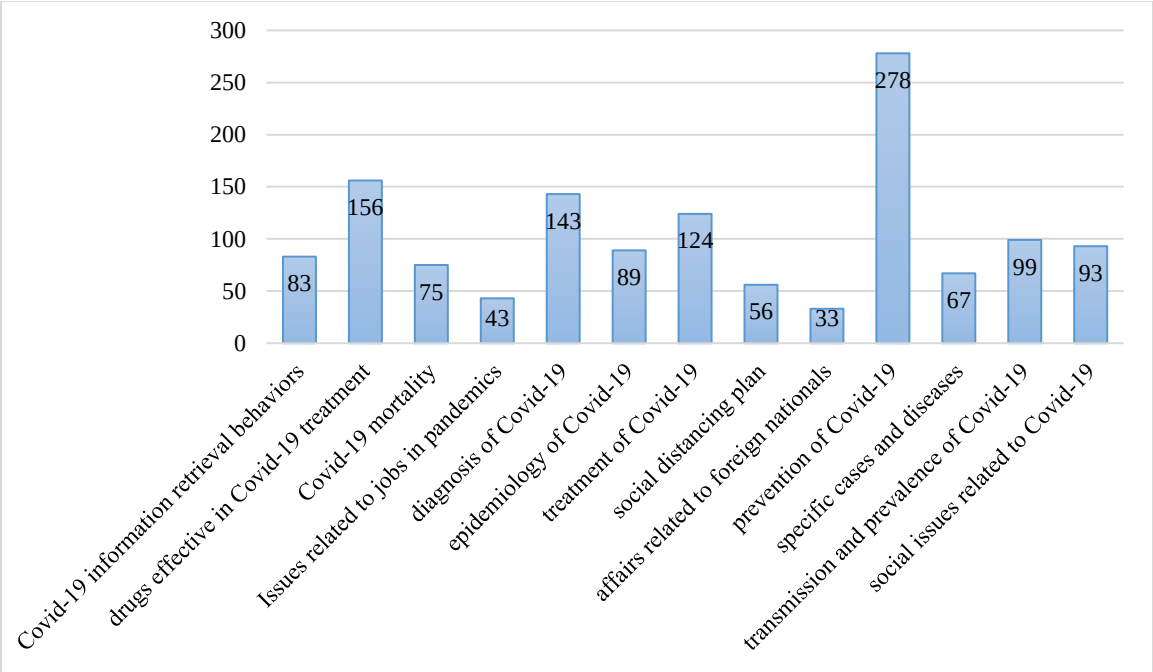

Figure 1. Frequency distribution of messages presented in groups of health professionals based on thematic classes

Each of the thematic categories presented consisted of a subset of the questions related to that category that the description of each of which is presented in Table 1. Based on Table 1, the results show that in the thematic category of social issues, most topics were related to religious ceremonies and COVID-19, with 33.33% of messages (31 messages). Transmission and prevalence of the disease with 43.43% of messages (43 messages) in the subject category of transmission and prevalence, included the largest volume of messages. In the subject category of specific cases and diseases, diabetes with 50.75% of messages (34 messages) has attracted the most attention. The need to strengthen the public health system with 20.86 percent of messages (58 messages) had the highest percentage in the subject category of prevention. Also in the subject category of foreign nationals, the consequences of not screening foreign nationals without

identity card with 57.58% of messages (19 messages) were the most concentrated. How to implement the social distance plan in the country with 55.36% (31 messages), had the most messages of the thematic class of the social distance plan. In the thematic category of COVID-19 treatments, improvements in positive cases and possible COVID-19 treatments had the highest rate with 26.61% of messages (33 messages). The epidemiological report of the development of COVID-19 in Iran and the region with 61.02% of messages (36 messages) in the subject category of COVID-19 epidemiology, had the highest concentration. The symptoms of COVID disease accounted for 22.38% (32 messages) of the total messages in the subject class of COVID-19 diagnosis. In the thematic category of jobs, 27.91% (12 messages) of the total messages were related to the protection of the medical staff. The mortality rate of medical personnel exposed to COVID-19 attracted the most attention with 32.00% of messages (24 messages) in the subject area of mortality. In the subject category of drugs effective in the treatment of COVID-19, COVID vaccine had the highest number of messages with 42.86% of messages (66 messages). Also in the subject area of information retrieval behavior, 45.78 messages (38 messages) were related to access to COVID databases (Table 1).

According to the research findings, among the presented sub-topics, the COVID vaccine with 4.93% of the total messages (66 messages), had attracted the most attention from subject matter experts. Then, the need to strengthen public health systems with 4.33% (58 messages), the effect of REMDESEVIER, FAVIPIRAVIR drugs with 3.96% (53 messages), and the need to use a mask with 3.81% (51 messages) topped the topics of exchanged messages (Table 1).

Presentation of the 67th report of the World Health Organization on the COVID-19 with 0.15% of messages (2 messages), presentation of assisted reproductive therapies during SARS-CoV-2 pandemic with 0.22% (3 messages), and issues of infection and improvement Patients with X-linked agammaglobulinemia, death of young athletes, the association between renin-angiotensin system inhibitors and risk of death in patients with hypertension with COVIDium and inhibition of COVIDitis using lidocaine and IVIG with 0.3% of total messages (4 messages) received the least amount of attention among the exchanged messages (Table 1).

Table 1. Frequency distribution of messages presented in groups of health professionals based on thematic subsets of main classes

Category	Sub-category	Frequency	% in the category	% of total
Social Issues	Social factors related to the COVID-19 vaccine	29	31.18	2.17
	Holding religious ceremonies and COVID-19	21	33.33	2.32
	Physical activity during quarantine or social distance	12	12.90	0.90
	Quarantine rules	21	22.58	1.57
Transmission and prevalence	Probability of recurrence of COVID-19	25	25.25	1.87
	Transmission and prevalence of COVID-19	43	43.43	3.21
	Release of COVID-19 in asymptomatic individuals	8	8.08	0.60
	Virus persistence on surfaces (food)	23	23.23	1.72

Special cases and patients	Infection of pregnant women and its consequences on the fetus	18	26.87	1.34
	Presence of endothelial infection and endothelial inflammation in COVID-19 patients	5	7.46	0.37
	Infection and recovery of XLA-dependent agammaglobulinemia (XLA) patients with COVID-19 disease	4	5.97	0.30
	COVID-19 and diabetes	34	50.75	2.54
	Infection of animals with COVID-19	6	8.96	0.45
Prevention	The need not to waste time on pandemic prevention measures	14	5.04	1.05
	Lack of protective equipment in the world during COVID-19	15	5.40	1.12
	The need to strengthen public health and vaccination systems	58	20.86	4.33
	Use the N95 mask	36	12.95	2.69
	The positive effects of the holiday on preventing the outbreak of COVID-19	34	12.23	2.54
	The need to use personal protective equipment	14	5.04	1.05
	COVID-19 exposure protocols	41	14.75	3.06
	The effect of baking soda on disinfection	15	5.40	1.12
	The need to use a mask	51	18.35	3.81
foreigners	The need to provide services to foreign nationals without a national card	8	24.24	0.60
	Consequences of not screening foreign nationals without a national card	19	57.58	1.42
	Impact of coronavirus outbreak on foreign nationals without a national card	6	18.18	0.45
Social distancing plan	Implementation of social distancing plan	31	55.36	2.32
	Necessity and importance of implementing a social distancing plan	25	44.64	1.87
COVID-19 treatment	Issues related to patient admission to hospitals	11	8.87	0.82
	Resuscitation of COVID patients	7	5.65	0.52
	Improvements in positive COVID-19 cases	33	26.61	2.46
	Provide assisted reproductive therapies during the SARS-CoV-2 pandemic	3	2.42	0.22
	Clinical images of the lung in COVID disease 19	11	8.87	0.82
	COVID-19 management and treatment guides	26	20.97	1.94
	Possible treatments of COVID-19	33	26.61	2.46
Epidemiology of COVID-19	Presentation of the 67th World Health Organization report on COVID-19	2	3.39	0.15
	Epidemiological report of COVID-19 spread in Iran	36	61.02	2.69
	Outbreaks in other countries	21	35.59	1.57
COVID-19 diagnosis	Clinical images of the lung in COVID-19 disease	25	17.48	1.87
	Symptoms of COVID disease	32	22.38	2.39
	Cytokine Storm	21	14.69	1.57
	New CDC guidelines for COVID-19 tests	12	8.39	0.90
	Ineffectiveness of serological testing and reliability of PCR test	6	4.20	0.45

	Antibody levels of COVID-19 patients	27	18.88	2.02
	Interpretation of PCR test results	20	13.99	1.49
Jobs	Comparison of different occupations in terms of risk of COVID-19	11	25.58	0.82
	Risks of returning to work after infection	9	20.93	0.67
	Protect the medical staff	12	27.91	0.90
	Risk factors for COVID-19 by type of occupation	11	25.58	0.82
Death and mortality	Death of young athletes	4	5.33	0.30
	Relationship between viral load and COVID-19 mortality	21	28.00	1.57
	Death of COVID-19 patients with hypertension	4	5.33	0.30
	Higher mortality in COVID patients under mechanical ventilation	6	8.00	0.45
	Mortality statistics of exposed medical staff	24	32.00	1.79
	Failure to record and provide accurate death statistics	16	21.33	1.19
Drugs effective in the treatment of COVID-19	Effect of Remdesevier, Favipiravir	53	34.42	3.96
	Vitamin D in the treatment of hospitalized patients with COVID-19	11	7.14	0.82
	COVID-19 vaccine	66	42.86	4.93
	Use of prophylactic anticoagulants in the recovery of COVID-19 patients	5	3.25	0.37
	The effect of chloroquine and hydroxychloroquine in COVID-19 patients	8	5.19	0.60
	The effectiveness of the new drug hrsACE2	7	4.55	0.52
	Inhibition of inflammation using lidocaine and IVIG in COVID-19 patients	4	2.60	0.30
Information seeking behavior	Access to COVID-19 databases	38	45.78	2.84
	Access to online learning resources about COVID-19	25	30.12	1.87
	Social networks related to COVID-19	14	16.87	1.05
	Information-seeking behavior in the face of COVID-19	6	7.23	0.45

The analysis of the sources used in the exchanged messages is presented in Figure 2. Based on Figure 2, the results show that out of 1339 messages exchanged, only 197 messages (14.71%) were provided with reference to a specific source, and other messages were personal comments or topics without a source. In this regard, the findings showed that websites with 67 messages (31%) were the most used source in published messages, followed by social networks with 42 messages (20%), scientific articles with 38 messages (18%), news agencies with 32 messages (15%), newspapers with 23 messages (11%) and guidelines with 11 messages (5%).

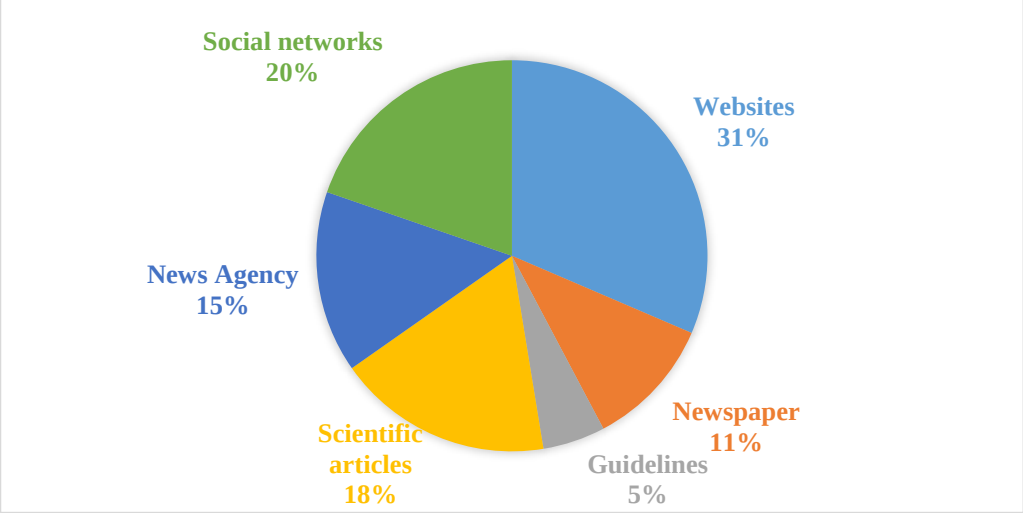

Figure 1. The sources used in the exchanged messages presented in groups of health professionals based on thematic classes

Discussion

The purpose of this study was to review and analyze the messages published on the WhatsApp social network by health professionals at Golestan University of Medical Sciences. These analyzes were performed in two parts: message content analysis and message source analysis. According to the research findings, more than 20% of the messages presented were in the COVID-19 prevention category. In addition, among the presented sub-topics, the COVID vaccine with 4.93% of the total messages, had attracted the most attention of subject experts, which shows the importance, necessity, and concern of subject experts to vaccination as a way to prevent COVID infection. In other words, due to the doubts about the treatment methods of COVID-19 and the uncertainty in this field, prevention and its different methods, such as vaccination have been the most important concerns of health system researchers. Of course, a comparison of these results with the scientific outcomes of COVID-19 shows that although the researchers' concern, at least in this study, was to prevent the spread of COVID-19; but research in the fields of virology, epidemiology, and infectious diseases has made significant progress, and there are gaps in public health research (Allington et al., 2021).

Analysis of the sources used in the exchanged messages shows that only 14.71% of the messages were provided with a reference to a specific source, and the other messages were personal comments or non-source topics. These results are similar to the results of a similar study on the information-seeking behavior of professors, assistants, and interns of Ahwaz University of Medical Sciences. The results of this study also showed that these specialists also obtain information from unofficial sources to keep up with the latest medical science (Kazemi, 2004). Another study on the analysis of Twitter messages in the field of biomedicine showed that only less than 10% of tweets were based on PubMed articles (Haustein et al., 2014). Another study

found that citations to official scientific sources such as books are declining, and citations to sources such as websites are increasing (Reycraft & Whiteman, 2020). What is important is the fact that web-based platforms such as websites and social networks play a very important role in meeting the information needs of researchers, especially in the field of COVID-19, and therefore, attention to the provision of scientific and approved content on the Web is very important.

Another very important point is the very low citation of guidelines. Since guidelines are the most authoritative scientific sources in the clinical evidence pyramid, they are expected to be widely used in specialized scientific discussions. What may have led to this situation and the very low use of guidelines in messages exchanged by health professionals is the lack of sufficient guidelines due to the emergence of COVID-19 research.

Conclusion

Methods of preventing COVID-19 infection continue to be at the forefront of the attention of health professionals, and the focus of these experts is on the topics presented in this area. Web-based platforms such as websites and social networks also play a very important role in meeting the information needs of researchers, especially in the field of COVID-19, and therefore, attention to the provision of scientific and approved content on the Web is very important.

Author Contributions

Conceptualization, M.M. and M.A.V.; methodology, M.M. and M.A.V.; Data collection, Z.P., M.A. and R.T.; writing—original draft preparation, M.M. and M.A.V.; writing—review and editing, M.A.V..; project administration, M.M; funding acquisition, M.M. All authors have read and agreed to the published version of the manuscript

Data Availability Statement

Not applicable

Acknowledgments

Not applicable

Ethical considerations

This research is the result of a research project with ethics code IR.GOUMS.REC.1399.409, which has been done in Golestan University of Medical Sciences in Iran. The authors avoided from data fabrication and falsification.

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Conflict of interest

The authors declare no conflict of interest

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