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The role of virtual social networks in shaping people's attitudes toward COVID-19 in Iran

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Abstract:

BACKGROUND: The widespread occurrence of COVID-19 has caused people to seek information from various sources such as virtual social networks, which can positively or negatively affect one's mental status. In this article, we present the role of virtual social networks in shaping people's attitudes toward COVID-19 in Iran.

MATERIALS AND METHODS: This is an applied descriptive study, in which 1010 users of virtual social networks were surveyed through an electronic questionnaire. Data were analyzed with SPSS, Excel, and Rapid Miner software. The FP-growth technique was used to investigate the concurrence of choices in multiple-choice questions, and the Mann-Whitney and the Kruskal-Wallis tests were used to determine the correlation of the mean of each dimension with demographic data. Moreover, the Wilcoxon signed-rank, the Shapiro-Wilk, and the Kolmogorov-Smirnov tests were used.

RESULTS: Virtual social networks use increased significantly (40%) after the COVID-19 outbreak. According to users, the greatest psychological impact of virtual social networks was the induction of anxiety (46.43%) and the most common use was to learn about COVID-19 prevention and treatment (69.3%). Based on the findings, there were no significant differences between the "awareness," "behavior intention," and "attitude and trust" and the users' marital status, age group, educational degree, and gender.

CONCLUSION: Although social networks have enriched the public knowledge, they increased the individuals' anxiety mostly because of controversial news and disperse of misinformation which in turn misled the users. The social networks play an important role in directing the behavioral inclinations. Accordingly, it is recommended that the authorities in healthcare system establish authentic and formal webpage in these social networks to manage controversial and voluminous information.

Keywords:

Attitude, COVID-19, virtual social network

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Introduction

As a consequence of the COVID-19 global outbreak, initial cases of infection in Iran were reported on February 18, 2020.^[1] By April 11, 2020, there were 70,029 cases of COVID-19 in this country, of which 41,947 of the patients recovered and were discharged from the hospitals, and the total death rate reached 4357.^[2] Based on the evidence, COVID-19 is following an

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ascending trend and it has been estimated that its peak will be 45 days after its initial outbreak.^[1] The widespread occurrence of COVID-19, its long-term resistance on surfaces, its serious health effects, and lack of sufficient public awareness and knowledge are causing panic and anxiety among individuals.^[3] As a result, people are referring to a variety of information sources to gain information about the disease to help better cope with anxiety and fear. Cyberspace and virtual social

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networks are among the richest sources of information in this regard.

Virtual social networks are essential parts of internet-based communities and tools for dissemination of information.^[4] A social network is a social structure consisting of individuals who are connected by one or more interdependencies.^[5] The number of virtual social network users worldwide has been estimated at 3.48 billion, and the average time spent on these networks has been about 62 min per day in 2019. In addition, Facebook, YouTube, and WhatsApp have the largest number of users worldwide, respectively. In Iran, by the late 2019, 47 million people are using virtual social networks.^[6] According to the Iranian Students Polling Agency (ISPA) 2019 report, WhatsApp, Telegram, and Instagram have the largest number of users nationwide.^[7]

Through virtual social networks, people can share their ideas and information as well as discuss about healthcare. These apps also enhance patients' autonomy and independence by making health information readily available. In addition, they provide patients with psychosocial and emotional support, allow for expressing of their emotions, social comparison, and better decision making, and enhance their self-esteem, physical and mental well-being, self-discipline, and self-control.^[4]

Virtual social networks also have a major effect on risk perception, acceptance of new behaviors, and disease prevention.^[8] Behrman *et al.* have studied the impact of virtual social networks on AIDS and found that virtual social network interactions help individuals and society in understanding AIDS and reduce doubts about expert and mass media messages.^[9]

Virtual social networks have some negative aspects as well including decreased self-esteem, nutritional disorders, increased anger, feelings of absurd, and decreased focus on tasks. In some cases, it can lead to reduced trust of the public to healthcare staff and negatively impact these relationships by broadcasting inaccurate information and initiatives. Consequently, patients may be directed to unapproved and unscientific treatments. In addition, at times, the status of a disease may be magnified unrealistically, creating increased fear and anxiety in patients and the public.^[10]

The results of Vošner *et al.*'s study showed that age, gender, and education are the most important influencing factors for the use of online social networking among adult people over 50.^[11]

Rasoulzadeh Aghdam *et al.*'s study showed that there is a significant relationship between intention of use of

social networks and emotional, cognitive, and social needs among Iranian's young people.^[12]

Moreover, Abdizadeh and Ahmadi Balootaki declared that with the increase in the use of virtual social networks, it decreases the quality of all aspects of the lifestyle of social science students of Islamic Azad University, Tehran Research Sciences Branch.^[13] Nyhan *et al.*'s study revealed that perceptions' attitude of health discussants about flu vaccine is related strongly with students' intention and beliefs vaccination.^[14]

Nowadays, because of the COVID-19 global pandemic that has also affected Iran, general fear and anxiety in the country regarding the disease are being exasperated by the spread of false news and misinformation in the media, cyberspace, and virtual social networks. Hence, given the importance of controlling the disease and the impact of virtual social networks on people's attitudes, awareness, and behavior, and a lack of understanding of the role and impact of these networks on people's attitudes toward COVID-19, the authors have investigated the attitudes of people toward the role of virtual social networks in relation to the novel coronavirus.

Materials and Methods

In this descriptive cross-sectional applied study, 1010 virtual social network users from Iran were solicited through an electronic questionnaire in March 2020. The questionnaire was distributed in most of the available virtual channels and groups throughout the country. The invitation to participate in the survey was seen by 2758 people completely voluntarily. Data analysis was started after the response rate reached zero.

The questionnaire was developed according to the specialized articles and expert's ideas. This questionnaire consists of the following three parts:

- Part 1: Participants' demographic data, consisting of six questions
- Part 2: Status of virtual social network use before and after the COVID-19 outbreak, consisting of two short-answer questions
- Part 3: Participants' attitudes toward virtual social networks regarding COVID-19, consisting of 19 questions (one-item priority determination, two-item descriptive multiple-choice, and 16-item 5-point Likert scale [very high, high, medium, low, and very low]).

Fourteen of the questions were related to "awareness," "behavior intention," and "attitude and trust" dimensions and the two other questions were independent. In addition, we requested the participants to give us their contact number or e-mail to encourage them to voluntarily submitting the results to us. Content and

constructive validity and reliability of the questionnaire were confirmed by the Cronbach’s alpha equaling to 0.86.

Obtained data were analyzed with the software IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp. and Microsoft Excel 2017. For descriptive data analysis, we used the more common measures such as mean, standard deviation, frequency, and percentage. The FP-growth technique was used to investigate the concurrence of choices in multiple-choice questions using the software Rapid Miner Corp. Released 2019. Rapid Miner Studio v7.1.

Differences in usage rates of virtual social networks before and after the COVID-19 outbreak were statistically analyzed by the Wilcoxon signed-rank test, considering the abnormal distribution of values based on the Shapiro–Wilk and Kolmogorov–Smirnov tests. Mean differences between the questionnaire’s dimensions and “sex” were tested by the Mann–Whitney test. The Kruskal–Wallis test was used to determine whether the mean of the questionnaire’s dimensions and “age,” “marital status,” and “education degree” differed. In all tests, a significance level of $P < 0.05$ was considered.

Results

The study questionnaire was filled out by 1010 people. The average age of the participants was 36.9 with 10.94 of a standard deviation. Of the 1010 participants, 578 (57.2%) were female and 716 (70.9%) were married [Table 1].

As shown in Figure 1, more than 74% of the participants were postgraduates and more than 42% of them were civil servants.

The participants were from 29 provinces across the country, of which 29.1%, 21.08%, and 15.74% of them were from Isfahan, Khorasan Razavi, and Fars provinces, respectively. The findings showed that participants in average used virtual social networks 3.04 h per day before the COVID-19

outbreak and 4.31 h per day after the outbreak. According to the findings of the Wilcoxon test, there is a significant difference in the amount of virtual social network use before and after the COVID-19 outbreak.

As shown in Table 2, the most used virtual social networks by the participants were WhatsApp (21.1%), Telegram (18.8%), and Instagram (15.51%), respectively. Concerning “psychological impacts of virtual social networks on users regarding COVID-19,” the most influential factor for users was “inducing anxiety” (46.4%).

Since there was more than one choice available, inducing anxiety along with confusion was 10.9%, inducing anxiety along with excessive fear was 9.6%, and confusion along with excessive fear was 6.9%.

According to Table 3, concerning “most cases of using virtual social networks regarding COVID-19,” 69.3% of the participants used virtual social networks to learn how to prevent and treat the disease.

Considering the possibility of choosing more than one choice, participants used virtual social networks to learn how to prevent and treat the disease along with obtaining informing on incidence and death statistics in Iran in 34.8% of cases, learning how to prevent and treat along with being informed about COVID-19 municipal news in 32.8% of cases, and being informed on incidence and death statistics in Iran along with being informed about COVID-19 municipal news in 29.9% of cases.

A majority of participants (66.3%) experienced “contradictory content regarding COVID-19” on virtual social networks. Further, 69.3% of them believed that these apps were spreading false information regarding COVID-19 among the public. Their behavior intention to use virtual social networks for receiving information concerning COVID-19 and their attitude and trust of virtual social networks in this regard are 76.7% and 59.2%, respectively. In addition, the role of virtual social networks in developing their awareness of COVID-19 is 72.2%.

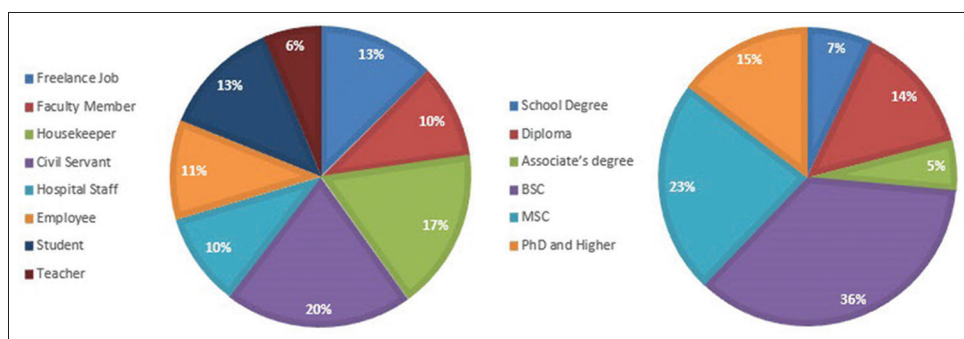


Figure 1: Participants' occupation and education degree

The Kruskal–Wallis test was used to determine the correlation between the means of each of the dimensions of “awareness,” “attitude and trust,” and “behavior intention” with “marital status,” “age group,” and “education degree,” considering the abnormal distribution of values based on the Shapiro–Wilk test. According to the Kruskal–Wallis test, some of the findings are as follows [Table 4]:

- In terms of gaining increasing awareness about COVID-19 on virtual social networks, there is no significant difference between different marital statuses, between different age groups, and between different education degrees
- In terms of users’ attitude and trust on virtual social networks, there is no significant difference between different marital statuses, between different age groups, and between different education degrees
- In terms of users’ behavior intention on social networks, there is no significant difference between

different marital statuses, between different age groups, and between different education degrees.

Mann–Whitney test was used to determine the correlation between the means of each of “awareness,” “attitude and trust,” and “behavior intention” dimensions with “sex,” considering the abnormal distribution of values based on the Shapiro–Wilk test. According to the Mann–Whitney test, some of the findings are as follows [Table 5]:

- In terms of gaining increased awareness about COVID-19 on virtual social networks, there is no significant difference between male and female users.
- In terms of users’ attitude and trust of virtual social networks, there is no significant difference between male and female users.
- In terms of users’ behavior intention on virtual social networks, there is no significant difference between male and female users.

Table 1: Demographic data of participants

Frequency (%)									
Age group (years)					Marital status			Sex	
≤25	26-35	36-45	46-55	≥56	Married	Single	Others	Female	Male
145 (14.35)	349 (34.55)	321 (31.78)	129 (12.77)	66 (6.53)	716 (70.9)	281 (27.8)	13 (1.28)	578 (57.2)	432 (42.8)

Table 2: Psychological effects of virtual social networks on participants regarding COVID-19*

Effect	Inducing anxiety	Confusion	Excessive fear	Inducing relaxation	Ineffective
Frequency (%)	469 (46.43)	332 (32.87)	192 (19)	174 (17.22)	162 (16.03)

*There was more than one choice available

Table 3: Most used areas of virtual social networks regarding COVID-19

Most used areas	Prevention and treatment learning	Statistics of incidence and death in Iran	COVID-19 municipal news	Statistics of incidence and death in other countries	Search for health-related products
Frequency (%)	700 (69.3)	569 (56.33)	452 (44.75)	199 (19.7)	83 (8.21)

Table 4: Mean differences test between the questionnaire’s dimensions and “marital status,” “age group” and “education degree” with the Kruskal-Wallis test

Hypothesis	Kruskal-Wallis H-test	df	Asymptotic significant
Equality/difference of mean awareness in different marital statuses	0.334	2	0.846
Equality/difference of mean “behavior intention” in different marital statuses	0.256	2	0.880
Equality/difference of mean “attitude” and “trust” in different marital statuses	3.250	2	0.197
Equality/difference of mean awareness in different age group	4.165	7	0.761
Equality/difference of mean behavior intention in different age group	4.662	7	0.701
Equality/difference of mean attitude and trust in different age group	7.617	7	0.368
Equality/difference of mean awareness in different education degree	5.537	5	0.354
Equality/difference of mean behavior intention in different education degree	5.144	5	0.399
Equality/difference of mean attitude and trust in different education degree	2.604	5	0.761

Table 5: Mean differences test between the questionnaire’s dimensions and “sex” with the Mann-Whitney test

Hypothesis	Mann-Whitney U-test	Wilcoxon W	Z	Asymptotic significant
Equality/difference of mean awareness in different sex groups	124,811.000	218,339.000	-0.058	0.954
Equality/difference of mean behavior intention in different sex groups	122,787.500	216,315.500	-0.527	0.598
Equality/difference of mean attitude and trust in different sex groups	120,491.000	214,019.000	-1.045	0.296

Discussion

The findings show that on an average, participants used virtual social networks about 3 h a day before the COVID 19 outbreak. In 2012, the use of virtual social networks among the people around the world averaged 90 min per day, which, in 2019, increased to 144 min.^[15] However, according to a report by the KhabarOnline News Agency, in 2017, Iranians spent 64 min a day on the internet, on an average.^[16] Based on Alanzi and Al-Yami's findings, in Saudi Arabia, 90.5% of physicians use social media 1–3 h a day.^[17] However, our findings reveal that social media usage has reached more than 4 h among participants after COVID-19 occurrence, and this difference was statistically significant according to the result of the Wilcoxon test. Increased use of virtual social networks after the spread of COVID-19 among Iranians confirms the prominent role of these networks in providing information for the public and can explain the users' attention to the information available on social media.

A study in Italy mentioned that the use of digital media has increased in coronavirus and quarantine.^[18] Moreover, in this time, long staying at home and lack of face-to-face relationships result in increasing use of social media, especially Facebook and Twitter in a quarter of American and the UK.^[19] Virtual social networks are most commonly used by people aged 25–34 years, married, with higher education, and who are employed.^[20] The participants in the current study were mostly 26–35 years old, married, and have a higher education. Perrin and Villanti *et al.*'s study mentioned that those who have a higher education are more likely to use using virtual social networks more.^[21,22]

Among the 12 virtual social networks, WhatsApp, Telegram, and Instagram were identified as the most popular virtual social networks for gaining information related to COVID-19. In Iran, by the end of 2019, 47 million people were using virtual social networks.^[23]

According to an ISPA Report done in 2019, WhatsApp, Telegram, and Instagram had the most users in Iran.^[24] Our findings suggest that obtaining information about COVID-19 by people on virtual social networks is consistent with the pattern of using these networks before the pandemic of COVID-19. This may be due to the filtering of Telegram in Iran and thus the people's tendency toward WhatsApp. The important point in this regard is the lack of Iranians inclination toward native virtual social networks. Based on the users' preferences in Iran, the Ministry of Health can use this information to effectively use popular networks to improve the flow of information across the country.

Virtual social networks and mental health of users during the COVID-19 outbreak

According to the findings, the use of virtual social networks to make people more aware of COVID-19 increases anxiety and confusion. Amedie's findings revealed a direct correlation between the use of social media and mental health problems. In fact, the use of social media increases social anxiety by 42% (23). Vannucci *et al.* have believed that the spread of virtual social networks leads to a direct correlation between their use and anxiety.^[24] The 23 meta-analyses conducted on Facebook also show a correlation between the use of this social media and psychological distress in adults. Other studies have shown a significant relationship between social media use and depression. Indeed, despite the benefits of disseminating information through social media, overuse of them increases the risk of anxiety, stress, and depression.^[25]

Virtual social networks and behavior intentions of users during the COVID-19 outbreak

According to the participants, the most common use of virtual social networks in COVID-19 was to learn how to prevent and treat it. Therefore, by knowing this fact, health managers can efficiently design useful educational materials for various crises, such as epidemics, and put them on virtual social networks in the time of crisis. Tavousi *et al.* have also believed that due to the significant use of virtual social networks by people, health managers should pay special attention to the health information provided in this context.^[20] Furthermore, according to Deng and Liu, people often seek health information on social media because they value their health, and health information can help them make decisions about proper medical treatments. The purpose of people searching for information on virtual social networks is to gain useful information concerning preventing or improving one's health, which indicates a kind of self-protective behavior.^[26]

Virtual social networks and attitude and trust of users during the COVID-19 outbreak

Levula *et al.* have believed that social trust is an important feature of social interactions.^[27] Trust is a key factor in the success of any technology, including virtual social networks. Trust in technology refers to user beliefs about the use of technology and it is different from interpersonal trust.^[28] Grabner-Kräuter *et al.* have believed that trust-based beliefs lead to trust-based attitudes and ultimately lead to trust-based behaviors. Although there is a directional correlation between virtual social networks and trust, it has reciprocal effects on individuals.^[29] According to Sherchan *et al.*, a comprehensive solution has not yet been developed to build social trust in virtual social networks.^[30] On

the bases of Alanzi and Al-Yami's findings, in Saudi Arabia, 44.3% of physicians stated that patients do not trust social media to make use of the services.^[17] Smith's findings showed that younger people with higher education rely more on internet content.^[31] According to our findings, although people trust virtual social networks' educational materials, these materials are not free of misinformation. More than half of the participants believed that virtual social networks spread false information regarding COVID-19. Most of them consider informative materials on COVID-19 on virtual social networks to be contradictory and considered it as a factor behind the confusion.

In general, based on the findings of the study, it seems that virtual social networks play a more dominant role in people's behavior intention in the prevention and treatment than their awareness of COVID-19, but they play a minor role in their attitudes and trust in information than other areas of the study.

The main findings include the following:

- More than half of the participants believed that they had received conflicting information about COVID-19
- The tendency to use social network to get information about COVID-19 has been high although the attitude and trust toward social networks are not aligned
- It seems that gender, age, marital status, and level of education did not affect the behavioral tendency to use social networks to obtain information and news.

Conclusion

Despite the development of social networks, capitalizing on the potentials in healthcare systems seems to be a challenge. The prevalence of COVID-19 has significantly increased the use of social networks. On the other hand, although these networks have promoted the public knowledge, they increased the individuals' anxiety mostly because of controversial news and disperse of misinformation which in turn misled the users. The findings revealed that social networks play an important role in directing the behavioral inclinations; however, they do not play the same role as far as attitudes and reliance on the information are concerned. Accordingly, it is recommended that the authorities in healthcare system develop authentic and formal webpage in these social networks to manage controversial and voluminous information.

Limitations

Due to coincidence of conducting this study with the outbreak of COVID-19, physical access to the users for gathering data was impossible. Reliance on the virtual questionnaire may result in excluding the users who do not use popular social networks (e.g., Telegram). Thus,

the distribution of samples throughout the country will be inappropriate which in turn undermines the generalizability

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Conflicts of interest

There are no conflicts of interest.

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