Original Article

E-Health: The Impact of Social Network on Self Care Behavior in Heart Failure Patients toward COVID-19 Epidemic

Abstract

Background: Patients with heart failure are one of the high-risk groups for coronary artery. Distance education of self-care behaviors can be effective in preventing the disease. The aim of this study was to investigate the effect of social networks in explaining the awareness of cardiovascular patients' self-care behaviors toward COVID-19. **Materials and Methods:** In the present survey study, 227 patients with a history of heart failure were selected from Shahid Rajaei Hospital in Tehran by the available sampling method (May to July 2020). Data collection tools were the standard European Self-Care Behavior Questionnaire for heart failure and the Dorty Elizabeth Orem self-care model. Data were analyzed using SPSS Version 22. **Results:** The results of the Pearson correlation coefficient showed a positive and relatively strong linear relationship between the variable of the degree of persistence in the use of networks with the eight dimensions of self-care behavior except psychological emotion control ($r = -0.39$, $P = 0.315$). Furthermore, a significant weak inverse relationship between the dimension of "cooperation with physicians and treatment staff" ($r = -0.22$, $P = 0.129$). Moreover, psychological support ($r = -0/034$, $P = 0.446$) was observed with the use of networks. Multivariate regression analysis revealed that the type of activity and participation in networks has a greater share and effect in increasing the score of self-care behavior of 0.55. **Conclusions:** Since the use of networks has a positive effect on patients' self-care behavior, the use of these networks is recommended as a community-based approach in the health system and to improve health and health outcomes.

Keywords: *COVID-19, heart failure, patients, self care, social network*

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Introduction

Novel Coronavirus Disease 2019 (COVID-19) is an emerging infectious disease in the 21st Century, known as Severe acute respiratory syndrome coronavirus 2 and the COVID-19 pandemic is a serious global health threat.[1] According to the previous findings of the studies, the elderly and those with underlying diseases such as hypertension, cardiovascular disease (CVD), diabetes, chronic respiratory disease (CRD), etc., are more at risk of COVID-19.[2] Reports from Iran's health ministry also indicate that at least 40% of CVD-related deaths in Iran were related to people who had a noncommunicable disease, including CVD, CRD, diabetes, hypertension, etc.[3] Therefore, patients suffering from high blood pressure or patients with heart failure are more at risk of dying from coronavirus. Moreover,

the exacerbation of symptoms and the severity of COVID-19 disease are increasing in people who have heart palpitations and shortness of breath due to low oxygen levels in their blood, and lung involvement in the COVID-19. The self-care behaviors can play a significant role in preventing COVID-19 outbreak, promoting, and maintaining health, especially in patients with chronic disease, including those with heart failure.[4] The World Health Organization (WHO) defines self-care as learned, conscious and purposeful actions indicating the ability of individuals, families and communities to promote, maintain health, and prevent disease and to cope with illness with or without the support of a health care provider.[5] Self-care is considered as an active and practical process guided by the patient. This process includes activities monitoring behavior to promote health and well-being, prevent the diseases, interact with health-care providers in

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participatory decision-making, cope with negative emotions, treat illnesses and injuries, and managing patients with chronic diseases and their rehabilitation.[6] Self-care behaviors in patients with heart failure include a wide range of dimensions, including adherence to dietary regimen, healthy lifestyle, regular physical activity, control of risk factors (such as high blood pressure, smoking, and stress), consult a doctor if one has any side effects and performing medical tests.[7] One of the ways to improve self-care capacity is education and access of people, especially patients, to health information and health care, which can lead to behavior modification and health-promoting behaviors.[8] During the coronavirus epidemic, people are increasingly seeking information about their health from a variety of sources. Meanwhile, social networks are increasingly being used as an information source in the field of health education due to their unique benefits.[9] Social network, regardless of time and place, creates an interaction between users and health service providers. Social network platforms such as Facebook, Twitter, WhatsApp, Telegram, and Instagram provide a major avenue for people to connect with others and share their data for health care.[10] Social network sites help to connect to people in other countries, especially to countries that have highly skilled professionals and more advanced treatments available, resulting in increased health-seeking behavior.[11] Meanwhile, patients with heart failure are no exception to this rule. Several studies on the role of web-based technologies such as social network, in self-care activities among patients with CVDs have shown that the internet-based self-care program can improve the quality of life and cardiovascular self-efficacy in patients with heart failure. Therefore, Internet-based self-care program can be effective in promoting patients' health.[12] Some studies have also shown that patients with heart failure use social network such as Facebook, Instagram, WhatsApp, and Telegram and share their experiences with other users.[13] In their study, Antonicelli *et al*. found that most of elderly congestive heart failure patients use social networks to receive health information regarding their disease, nutrition, physical activity, and medication. Furthermore, the use of social networks resulted in reducing readmissions and increasing the regular use of drugs by the elderly.[14] The study of Woods *et al*. also showed that the design of an MHealth application to support heart failure self-management has enabled physicians, counselors, and all heart failure patients to share their information about medications, nutrition, diagnosis, and control of the possible complications in the form of video and text posts via social network and connect with each other and have better self-care behaviors.[15] Other studies demonstrated that the use of the social network (such as Instagram, WhatsApp,) etc., for education, could reduce anxiety and increase hope in heart failure patients, resulting in self-care behaviors such as adherence to dietary regimen and following a prescribed medication regimen, heart rate monitoring, implementing physical activity as part of the daily routine and identifying the symptoms.[16-18] To our knowledge, little attention has been paid to such an issue so far and a few studies have investigated the impact of social networks on improving self-care behaviors in heart failure patients during the COVID-19 epidemic. Given a few research studies conducted on such an issue and the official statistics issued by Iran's health ministry about the growing trend in the coronavirus cases and increasing coronavirus deaths in people with underlying diseases including heart failure patients in Iran;[19] therefore, research must be conducted in this regard. Furthermore, given the recent policies of the WHO based on self-care and increasing awareness as two important components in prevention of COVID-19 in the patients with underlying diseases,[20] it is vital to conduct such research. Improving self-care in patients, i.e., increasing patients' knowledge about their disease, and improving patients' access to health care information (especially through mass media and social networks) during the COVID-19 epidemic are considered as the most important strategies to consider.[21] Implementing these strategies would not have the expected consequences without achieving the results of studies conducted on the impact of social networks on improving the self-care behaviors in patients with heart failure during the COVID-19 epidemic. The present study can provide the necessary information to those involved in health information services during the COVID-19 epidemic to increase the self-care in heart failure patients and provide a basis for future research in other regions of the world.

Materials and Methods

This was applied quantitative research and survey method was used for collecting the data. Also, this was a cross-sectional and the data were collected at the Heart Clinic of Shahid Rajaei Cardiovascular Center in Tehran, Iran, during 2 months (May 2020–July 2020). The study population consisted of patients with heart failure. In this study, 227 patients with heart failure were selected using convenience sampling. The study inclusion criteria were the following: age between 40 and 60 years; those diagnosed with heart failure approved by a cardiologist; patients with heart failure of functional Class of I, II, or III; those with no history of underlying diseases such as hypertension, hyperlipidemia, and diabetes; being literate, having no communication problems; those who used at least one social network site (such as WhatsApp, Instagram, or Telegram), and willingness to participate in the study. Before collecting data, principles of research ethics such as informed written consent, anonymity, confidentiality, and discretion of the participants was observed to leave the research. In the present study, data were collected by

the European Heart Failure Self-Care Behaviour Scale and the Dorothea Elizabeth Orem's self-care model using the 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.[22,23] The questionnaire was divided into four parts: (1) demographic information (such as age, sex, marital status, educational level, employment status), (2) disease-related information (such as duration of disease, heart failure class, history of hospitalization for heart failure, and cause of heart failure, ejection fraction [EF] level), (3) social network-related information (such as the level of use, type of activity, duration of use, and type of social network used), and (4) 40 questions about heart failure self-care behaviors containing the eight dimensions (such as gaining the specific knowledge about the signs and symptoms of COVID-19 and modes of transmission, awareness of impacts and consequences of COVID-19 exacerbating the disease, adherence to dietary regimen to prevent COVID-19, performing daily physical activities, following a prescribed medication regimen, using effective drugs after incidence of COVID-19 symptoms, interaction among patients, physicians and medical staff after occurrence of COVID-19 symptoms, and coping with negative emotions after the COVID-19 symptoms. To ensure content validity, the questionnaire was sent to 5 cardiologists and 3 infectious disease specialists and the content validity ratio was reported as 0.81. The reliability of the questionnaire was calculated using Cranach's alpha coefficient (α = 0.87). Kolmogorov–Smirnov test was used to investigate the normality of data. Data were analyzed using SPSS version 22(Chicago: SPSS Inc. SPSS Inc.).

Results

The mean age of patients was 56.31% ± 9.8% years and 67.19% of them were male, 45.3% of participants were retired and 32.5% were literate, 44.8% of the patients had the heart failure of class II and 72.2% had a history of the previous hospitalization. In this study, heart valve disease 49.23% was the most common cause of heart failure. The mean disease duration was 32.12 months. The mean hospital admission number was 3.41 times and the mean EF was 31.55%. The results of this study demonstrated that 57.8% of patients received health-related information on social network like Instagram and majority of patients 67.13% tended to receive health-related information as audio-visual formats. Furthermore, 61.9% of patients spend 3–4 h per day on Instagram. Regarding the participation in a social network-based activity, 28.63% of patients sought out scientific, medical, nutritional information on COVID-19 on social network. The lowest social network-based activity 11.90% was related to downloading and forwarding audio, video and text files, etc., regarding COVID-19. Our results showed that the majority of patients participated in social media-based activity to get information on COVID-19.

There was a significant weak positive correlation between the use of different types of social networks and self-care

behavior of heart failure patients. Furthermore, the highest correlation was obtained between self-care dimensions and Instagram use with a correlation coefficient of 0.389 and the lowest correlation was found between self-care dimensions and using Telegram with a correlation coefficient of 0.125 [Table 1].

The results of one-way analysis of variance (ANOVA) that indicates a significant difference in the mean of self-care behavior by heart failure patients with respect to the type of activity and participation in the social network during the COVID-19 epidemic. The highest mean self-care behavior (28.63) was related to heart failure patients seeking out scientific, nutritional, and medical information regarding COVID-19 on social networks and patients seeking out issues and news of COVID-19 ranked second in terms of mean self-care behavior. The highest mean self-care behavior (11.90) was related to heart failure patients downloading and forwarding audio, video and text files, etc., regarding COVID-19 on the social network. The type of activity and participation in social networks had a significant effect on the self-care behaviors performed by heart failure patients [Table 2].

There was a strong positive linear relationship between the duration of social network use (daily, weekly, or monthly), the level of social network use, and the eight dimensions of self-care behavior except for coping with negative emotions after COVID-19 symptoms occurring (r = −0.39, *P* = 0.315). Therefore, the longer the duration of social network use, the higher the level of patients' self-care behavior in the seven dimensions out of the eight. Our results also revealed that there was a significant positive relationship between the level of social network use and six out of the eight self-care dimensions, including gaining specific knowledge on the signs and symptoms of COVID-19 and modes of transmission, awareness of impacts and outcomes of COVID-19 exacerbating the disease, adherence to the dietary regimen to prevent COVID-19, performing daily physical activities, following a prescribed medication regimen, and use of effective drugs after COVID-19 symptoms. In other words, with the increasing use of social networks by patients, the self-care dimensions improved in the patients. However, a weak negative correlation was observed between the self-care dimensions such as interaction among physicians and medical staff and patients (r = −0.022, *P* = 0.129) and

Table 1: The relationship between the type of social network used and the self-care behavior of patients with heart failure during COVID-19 Epidemic

Variables	Changing self-care behavior dimensions	
	Kendall rank correlation coefficient	*P*
Type of social network	WhatsApp: 0.256	>0.001
	Instagram: 0.389	>0.001
	Telegram: 0.125	>0.001

emotional support (r = −0. 034, *P* = 0.446) and the level of social network use [Table 3].

The results of multivariate regression analysis revealed that the independent variables had a greater effect in explaining and predicting changes in criterion variables. According to the ANOVA, the *F* = 2.295 and *P* = 0.007. Therefore, a regression model was significantly based on three variables of type of activity and participation in the social network, the duration of social network use (daily, weekly, or monthly), and the level of social network use. According to the adjusted R^2-value, the three variables of type of activity and participation in social network, the duration of social network use (daily, weekly, or monthly) and the level of social network use could predict 55% of the variance of self-care behavior performed by patients with heart failure during COVID-19 epidemic. According to the *P* value for a variable, the three variables of type of activity and participation in social media, the duration of social network use (daily, weekly, or monthly) and the level of social network use could significantly predict self-care behavior. Our findings also show that with increasing the standard deviation of the type of activity score and participation in the social network, the self-care behavior score increased by 0.45. Furthermore with increasing the standard deviation of the duration of social network use score (daily, weekly,

or monthly), the self-care behavior score increased by 0.38. In addition, the self-care behavior score increased by 0.35 with a higher standard deviation of the social network use score [Table 4].

Discussion

The aim of this study was to investigate the impact of social networks on improving the self-care behaviors in patients with heart failure during the COVID-19 epidemic. The results of the present study demonstrated that the study participants received health-related information and health care guidelines related to COVID-19 on Instagram, WhatsApp, and Telegram, respectively. Furthermore, there was a positive correlation between the type of social network users and the patients' self-care behavior. Moreover, the highest correlation was obtained between self-care dimensions and using Instagram and the lowest correlation was found between self-care dimensions and using Telegram. Considering that Instagram has emerged as a new platform and its features compared to WhatsApp and Telegram filtered in Iran, the result is not far from expectation. According to Kaplan and Haenlein's media richness theory, the higher the level of the media richness and social presence, the more attractive to users and the more time they spend on the specific social networking site.[24] Therefore, the higher the use of social networks by

Table 2: One-way analysis of variance results of self-care behavior performed by patients with heart failure with respect to type of activity and participation in social network during COVID-19 epidemic

Variable	*n*	Mean	*F*	Significance
Type of activity				
Downloading and forwarding audio, video and text files, etc., regarding COVID-19	27	11.90	0.119	0.002
Downloading audio, video and text files, etc., regarding COVID-19	33	14.53		
Seeking out scientific, nutritional, and medical information regarding COVID-19 on social network	65	28.63		
Reading the comments and discussed topics	30	13.21		
Often reading the comments and sometimes commenting on the discussed topics	28	12.33		
Seeking out issues and news of COVID-19 on social network	44	19.39		

Table 3: The Pearson's correlation coefficient results showing the relationship the duration of social network use, the level of social network use and the eight dimensions of self-care behavior performed by patients with heart failure during COVID-19 epidemic

Self-care ability	The duration of social network use (daily, weekly or monthly)		The level of social network use	
	r	*P*	*r*	*P*
Gaining the specific knowledge of the signs and symptoms of COVID-19 and modes of transmission for it	0.644	0.000	0.454	0.000
Awareness of impacts and outcomes of COVID-19 exacerbating the disease	0.588	0.000	0.458	0.001
Adherence to dietary regimen to prevent COVID-19	0.721	0.003	0.609	0.000
Performing daily physical activities	0.430	0.000	0.528	0.000
Following a prescribed medication regimen	0.621	0.000	0.735	0.000
Use of effective drugs after observing COVID-19 symptoms	0.551	0.001	0.328	0.003
Physicians, medical staff and patients interaction after observing COVID-19 symptoms in the patient	0.539	0.000	−0.022	0.129
Coping with negative emotions after observing COVID-19 symptoms	−0.039	0.315	−0.034	0.446

Table 4: Results of multivariate regression analysis predicting self-care behavior through the dimensions of social media usage

Predictor variables	B	SE	Beta	T	P-Value	ADJ.R²	R²	R	F	Sig
Constants	0.206	0.725	-	0.285	0.776					
Type of social media used	0.021	0.019	0.127	1.123	0.264					
Type of activity and participation in social media	0.071	0.040	0.455	3.156	0.012	0.557	0.196	0.443	2.295	0.007
The duration of social media use (daily, weekly or monthly)	0.051	0.022	0.384	2.299	0.024					
The level of social media use	0.041	0.020	0.354	2.129	0.034					

patients, the more health information sharing would be. Thus, further changes are expected to patterns of self-care behavior. In line with this finding, the results of the study of Medina *et al.* also showed that most patients with cardiovascular conditions used social networks such as Facebook, Instagram, WhatsApp, and Telegram and were willing to interact with physicians, counselors, and other patients through these networks to share their information and experiences.[13] Therefore, it is recommended that healthcare professionals be familiar with sites and channels providing valid information on COVID-19 prevention, or create social network channels or design online health information websites about gaining the knowledge of the signs and symptoms of COVID-19 and modes of transmission, awareness of impacts and outcomes of COVID-19 exacerbating the disease, performing daily physical activities, following a prescribed medication regimen, use of effective drugs after observing COVID-19 symptoms, etc., for their patients. Our results also showed that the type of activity and participation and in the social network had a significant effect on the self-care behavior of heart failure patients so that the highest mean self-care behavior was related to heart failure patients seeking out scientific, nutritional, and medical information regarding COVID-19 on social network and patients seeking out issues and news of COVID-19 ranked second in terms of mean self-care behavior. Uses and Gratifications theory developed by Katz suggests that the purposefulness or nonpurposefulness of media use depends on the type of program and the specific content of the media.[25] Accordingly, our results also showed patients seeking out scientific, nutritional, and medical information regarding COVID-19 on social networks seem to seek information purposefully, and consequently, their self-care ability is far greater than other patients who use other content on the social network. In their study, Woods *et al.* also showed that the design of a mHealth application to support heart failure self-management has enabled physicians, counselors, and all heart failure patients to share their information regarding medications, nutrition, diagnosis, and control of the possible complications in the form of video and text posts through social network and connect with each other and have better self-care behaviors.[15] Therefore, creating specialized channels on the social network providing medical information on the

signs and symptoms of COVID-19, medications, dietary regimen and physical activity for the treatment and care of patients with COVID-19 monitored by physicians and medical consultants can play an effective role in the self-care behavior of heart failure patients to prevent the disease and even assess their clinical condition. Our results indicated that there was a strong positive linear relationship between the duration of social network use (daily, weekly, or monthly), the level of social network use, and the eight self-care dimensions except for coping with negative emotions after COVID-19 symptoms ($r = -0.39$, $P = 0.315$). According to Waldhall and Clapper,[26] the longer the audience uses social networks, the greater the higher impact of the messages on the reader would be. The results of the present study also suggested that patients who used social networks daily had higher self-care in seven dimensions than those who relied less on social networks during the COVID-19 epidemic. Therefore, cardiologists can play an effective role in encouraging patients to use the content of channels providing health information on social networks, thus highlighting the effectiveness of health information. These results are consistent with the results of Antonicelli *et al.* and Woods *et al.* studies that most elderly patients with heart failure received health information related to their disease, dietary regimen, physical activity, and medication through the social network.[14,15] However, their results are not consistent with the results of Benincasa *et al.* and Scott *et al.* who reported that the use of social networks in education can be effective in reducing anxiety and increasing hope in patients with heart failure.[17,18] It can be inferred that since most participants were in the age range of 55–60 years, patients are feeling more stressed by watching images and videos from disturbing news and events of COVID-19 on social networks. Therefore, it is not unreasonable to expect that the continued use of social networks and the multiplicity of such news and information will not be effective in reducing negative emotions among the patients during the COVID-19 epidemic.

Our results also revealed that there was a significant positive relationship between the level of social network use and six out of the eight self-care dimensions, including gaining specific knowledge of the signs and symptoms of COVID-19 and modes of transmission, awareness of impacts and consequences of COVID-19 exacerbating the disease, adherence to the dietary regimen to prevent

COVID-19, performing daily physical activities, following a prescribed medication regimen, and use of effective drugs after COVID-19 symptoms. In other words, with the increasing use of social networks by patients, the self-care dimensions improved in the patients. However, a weak negative correlation was observed between the self-care dimensions such as patients, among physicians and medical staff and patients, and coping with negative emotions and the level of social network use. As mentioned previously, this may due to the age of patients with heart failure, and obtaining information on COVID-19 can increase stress and anxiety in the heart failure patients, leading to exacerbating the disease. Regarding the self-care dimension of interaction among physicians and medical staff and patients, it can be stated that medical staff and physicians need to communicate with patients to provide any health-care services and it is undeniable that physician-patient communication is based on the context of communication, the purpose of communication, the effectiveness of communication and their expectations. Therefore, the excessive workloads of physicians and medical staff caused by the coronavirus COVID-19 pandemic can affect the quality of physician-patient communication. The results of studies conducted by Jaarsma *et al*. and Vassilev *et al*. also showed that the use of social networks can control and prevent disease, increase health knowledge, achieve desirable psychological results, improve treatment decisions, control disease, and communicate with the medical staff.[27,28] The most important limitation that the researcher faced in the present study was the sample size. Due to the time interval of data collection (from May to July), which was the peak time of the corona epidemic, many patients refused to go to medical centers for fear of corona, so the sample size was not large enough. Doing similar research in other tissues will allow comparison with the findings of this study.

Conclusions

Findings confirmed the effective role of using virtual social networks on the self-care behavior of patients with heart failure. The results showed that the three subscales of type of activity and participation, rate of persistence, and rate of use of social networks could significantly predict their self-care behavior. So that this rate is higher in the variable of the type of activity and participation in virtual networks than the rate of persistence in the consumption of virtual networks and the rate of using virtual networks. Therefore, it is suggested that during the COVID 19 pandemic, health-care providers, using the facilities and potentials of social networks as a suitable and cost-effective hospital, prescribe distance education to patients on the use of medication. Diet, specialized knowledge about the symptoms and ways of getting COVID 19, cooperation with doctors and treatment team, etc., Furthermore, the results of this study serve as a starting point for

implementing the policies and strategies of the National Corona Policy Council to increase people's access to information (especially through digital media). The disease took over.

Conflicts of interest

There are no conflicts of interest.

References

1. Zhao S, Lin Q, Ran J, Musa SS, Yang G, Wang W, *et al*. Preliminary estimation of the basic reproduction number of novel coronavirus (2019-nCoV) in China, from 2019 to 2020: A data-driven analysis in the early phase of the outbreak. Int J Infect Dis 2020;92:214-7.

2. Liu C, Jiang ZC, Shao CX, Zhang HG, Yue HM, Chen ZH, *et al*. Preliminary study of the relationship between novel coronavirus pneumonia and liver function damage: A multicenter study. Zhonghua Gan Zang Bing Za Zhi 2020;28:148-52.

3. Ministry of Health and Medical Education. The Latest Corona Statistics in the Country Were Announced; 2020. Available from: https://behdasht.gov.ir/. [Last accessed on 2020 Jul 11].

4. Elkind MS, Harrington RA, Benjamin IJ. The Role of the American Heart Association in the Global COVID-19 Pandemic. Circulation 2020;141:e743-5.

5. World Health Organization. Noncommunicable Diseases Country Profiles; 2017. Available from: http://www.who.int/nmh/countries/irn_en.pdf?ua=1. [Last accessed on 2017 May].

6. Barnett JE, Cooper N. Creating a culture of self-care. Clin Psychol 2009;16:16-20.

7. Ahyana S, Kritpracha C, Thaniwattananon P. Cardiac rehabilitation enhancing programs in patients with myocardial infarction: A literature review. Nurse Media J Nurs 2013;3:541-56.

8. Ji Y, Ma Z, Peppelenbosch MP, Pan Q. Potential association between COVID-19 mortality and health-care resource availability. Lancet Glob Health 2020;8:e480.

9. Zigron S, Bronstein J. "Help is where you find it": The role of weak ties networks as sources of information and support in virtual health communities. J Assoc Inform Sci Technol 2019;70:130-9.

10. Tripathi M, Singh S, Ghimire S, Shukla S, Kumar S. Effect of social networkon human health. Virol Immunol J 2018;2:1-3.

11. Lau AY, Gabarron E, Fernandez-Luque L, Armayones M. Social networkin health – What are the safety concerns for health consumers? Health Inform Manag J 2012;41:30-5.

12. Aghamohammadi TA, Khaleghipour M, Dalvandi A. The impact of self-management program on selfefficacy of elderly patients with heart failure. J Urmia Nurs Midwifery Fac 2017;14:1013-23.

13. Medina EL, Loques Filho O, Mesquita CT. Health social networks as online life support groups for patients with cardiovascular diseases. Arq Bras Cardiol 2013;101:e39-45.

14. Antonicelli R, Testarmata P, Spazzafumo L, Gagliardi C, Bilo G, Valentini M, *et al*. Impact of telemonitoring at home on the

management of elderly patients with congestive heart failure. J Telemed Telecare 2008;14:300-5.

15. Woods L, Cummings E, Duff J, Walker K. Design thinking for mhealth application co-design to support heart failure self-management. Stud Health Technol Inform 2017;241:97-102.

16. Gandapur Y, Kianoush S, Kelli HM, Misra S, Urrea B, Blaha MJ. The role of m-health for improving medication adherence in patients with cardiovascular disease: A systematic review. Q Care Clin Outcomes 2016;2:237-44.

17. Benincasa G, Marfella R, Della Mura N, Schiano C, Napoli C. Strengths and opportunities of network medicine in cardiovascular diseases. Circ J 2020;84:144-52.

18. Scott J, Silva S, Simmons LA. Social networks are associated with ideal cardiovascular health in young black females: A latent class analysis. Circulation 2020;141 Suppl_1:A06.

19. Tabnak News Agency. The Situation of Heart Deaths in Iran; 2020.Available from: https://www.tabnak.ir/fa/news/838094\/%D9%88%D8%B6%D8%B9%DB%8C%D8%AA-%D9%85%D8%B1%DA%AF%E2%80%8C%D9%87%D8%A7%DB%8C-%D9%82%D9%84%D8%A8%DB%8C-%D8%AF%D8%B1-%D8%A7%DB%8C%D8%B1%D8%A7%D9%86/. [Last accessed on 2020 Jun 23].

20. World Health Organization. Coronavirus Disease 2019 (COVID-19): Situation Report, 72. Available from: https://apps.who.int/iris/bitstream/handle/10665/331685/nCoVsitrep01Apr2020-eng.pdf. [Last accessed on 2020 May 15].

21. Curtis JR, Kross EK, Stapleton RD. The importance of addressing advance care planning and decisions about do-not-resuscitate orders during novel coronavirus 2019 (COVID-19). JAMA 2020;323:1771-2.

22. Hartweg D. Dorothea Orem: Self-Care Deficit Theory. Philadelphia: W. B. Saunders; 1991.

23. Sedlar N, Lainscak M, Mårtensson J, Strömberg A, Jaarsma T, Farkas J. Factors related to self-care behaviours in heart failure: A systematic review of European Heart Failure Self-Care Behaviour Scale studies. Eur J Cardiovasc Nurs 2017;16:272-82.

24. Kaplan AM, Haenlein M. Users of the world, unite! The challenges and opportunities of Social Media. Bus Horiz 2010;53:59-68.

25. Phua J, Jin SV, Kim JJ. Uses and gratifications of social networking sites for bridging and bonding social capital: A comparison of Facebook, Twitter, Instagram, and Snapchat. Comput Hum Behav 2017;72:115-22.

26. McPhail TL. Global Communication: Theories, Stakeholders, and Trends. New Jersey: John Wiley & Sons; 2010.

27. Jaarsma T, Cameron J, Riegel B, Stromberg A. Factors related to self-care in heart failure patients according to the middle-range theory of self-care of chronic illness: A literature update. Curr Heart Fail Rep 2017;14:71-7.

28. Vassilev I, Rogers A, Sanders C, Kennedy A, Blickem C, Protheroe J, *et al*. Social networks, social capital and chronic illness self-management: A realist review. Chronic Illn 2011;7:60-86.