

How to Cite:

Estebsari, F., Kandi, Z. R. K., Nasab, A. F., Milani, A. S., Jafarzadeh, E., Hoseini, A., Hosseini, M., & Mostafaie, D. (2022). The components of lifestyle in patients recovered from COVID-19: A phenomenological study. *International Journal of Health Sciences*, 6(S3), 7860–7873. <https://doi.org/10.53730/ijhs.v6nS3.7878>

The components of lifestyle in patients recovered from COVID-19: A phenomenological study

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Abstract---As the world is dealing with the COVID-19 pandemic, people's lifestyles have also been affected. The present study was conducted to explain the components of lifestyle in patients who have recovered from COVID-19. This qualitative study was conducted with a phenomenological approach on 16 people recovered from COVID-19 living in Tehran. The participants were selected by purposive sampling, and in-depth unstructured interviews were held with them. The data were analyzed in MAXQDA. Four main categories were extracted as the components of the lifestyle of patients recovered from COVID-19, including physical problems (with the subcategories of frailty and feeling old, and post-recovery physical symptoms), physical activity (with the subcategories of inability to take a walk, and inability to exercise), nutrition (with the subcategories of loss of appetite, taking supplements, and compliance with healthy eating), psychological problems (sleep disorder, obsession, stress, anxiety about infecting family and friends, and neurological disorders). The alterations in people's lifestyles due to the COVID-19 pandemic and the protocols imposed to prevent the disease transmission are undeniable. Health planners and policy-makers should therefore pay particular attention to these changes as new challenges, especially in designing lifestyle-related interventions.

Keywords---lifestyle, COVID-19, qualitative study, phenomenology.

Introduction**Applying the styles to an existing paper**

On January 30, 2020, the WHO declared the outbreak of 2019-nCoV novel coronavirus a Public Health Emergency of International Concern (PHEIC) (Siniorakis et al., 2020), and on February 11, 2020, it officially named the disease COVID-19 and changed the name of the virus causing it from nCoV-2019 to SARS-CoV-2 (Baggio et al., 2021). The emergence of this pandemic has severely affected various people and caused huge health, economic, environmental, and social challenges for the entire human population (Halpin et al., 2021). In the early stage, COVID-19 is associated with the most common non-specific general symptoms, such as weakness, fatigue, body aches, fever, and dry cough (Jutzeler et al., 2020). The most important clinical symptoms of patients with COVID-19 include fever, cough, phlegm, headache, vomiting, diarrhea, fatigue, rhinorrhea, and chest pain (Zhang & Ma, 2020). According to the Centers for Disease Control and Prevention (CDC) reports, symptoms emerge 2-14 days following exposure to the virus, and in the initial stage, large amounts of this virus are produced in the upper respiratory tract of the infected patient, which means that the virus further spreads to other people (Zhang & Ma, 2020).

Many countries have adopted preventive measures such as movement restrictions and quarantine due to the nature of the disease and the route of transmission of the virus and its rapid spread throughout the world (Narayanan et al., 2020), and measures such as physical distancing, wearing masks, and frequent hand washing as well as boosting the immune system have been proposed as the best method to control the pandemic as observance of the health protocols (Wen et al., 2020). These items restrict people's social activities and make their lifestyle passive (Estebarsari et al., 2020; Medrano et al., 2021). This epidemic has thus had a significant effect on people's lifestyle (Arashiro et al., 2020). Lifestyle denotes the person's habits and includes principles and sets of behaviors and ways of living among people, families, and societies in predetermined situations (Estebarsari et al., 2019; Estebarsari et al., 2018). The World Health Organization (WHO) considers lifestyle a set of well-defined specific behavioral patterns resulting from the interaction of personality traits, social relationships, environmental conditions, and socioeconomic positions (Ferooshani et al., 2014; Kiajamali et al., 2017). Healthy lifestyle is a multidimensional and multifactorial phenomenon involving behavioral patterns that ensure the individual's health (Estebarsari et al., 2014; Ghasemi et al., 2014). It leads to the consistent pursuit of health and hygiene-related behaviors (Bahabadi et al., 2020) and is considered a valuable way of reducing the spread and effect of health problems, promoting health, coping with life stressors, and improving quality of life (Pourjam et al., 2019). Although quarantine and physical isolation may have positive effects and protect people's physical health by preventing and reducing the transmission of the virus, these measures can also have extensive, long-term negative psychosocial effects. Given that the world is still battling the COVID-19 pandemic and all people still have to observe the recommended protocols, the present study aims to investigate the changes in the lifestyle of people who have recovered from COVID-19. Since the promotion of health in a society is a dynamic process of empowerment of individuals to control their health through positive lifestyle changes, paying attention to people's lifestyle-promoting behaviors during the COVID-19 pandemic is highly important, and the present findings are expected to be of use as a basis for improving the lifestyle and thereby the quality of life of people recovered from COVID-19 and all members of the society.

Materials and Methods

Study design and setting

The present qualitative study was conducted with a phenomenological approach and its sampling procedure lasted from July to October 2020. The statistical population included Tehran residents who had recovered from COVID-19.

Study population

The participants were selected by purposive sampling. The inclusion criteria were: Age 18 years and above, having their details registered and confirmed in the COVID-19 infection statistics of the Ministry of Health, having had obvious symptoms of the disease at the time of infection, elapse of at least four months since their infection, no known severe psychiatric disorders or dementia, ability to communicate and speak well, and willingness to take part in the study. After

obtaining approval from the ethics committee, the participants were selected based on the inclusion criteria. The interview dates and times were set with the participants as per their preferences. The interviews were held on the phone or in Sky Room (virtual platform). The participants were fully briefed on the study objectives and they then gave their informed written consent. Before the interview, the consent form was given to the participants by email and signed by them. Attempts were made to select participants from a diverse background, and they thus had different ages, genders, and occupations. The participants were asked to describe their experiences about how their lifestyle had changed during infection with COVID-19 and after recovery from the disease.

Data collection tools and methods

Data were collected through in-depth unstructured interviews. After fixing a date and time for the interviews, the participants were contacted on the phone (or in Sky Room) with full respect for their confidentiality and comfort. All the interviews were held on the phone according to the interview guide. The interviews began with general questions to gain participants' trust, and then continued with specific questions to achieve the study objectives. At the start of the interviews, general welcoming questions were asked, such as "How did you get the infection?", and the sessions then continued with the following questions: "What symptoms did you have?" and "What changes took place in your daily lifestyle after recovery?". The interviews were conducted using an exploratory and unstructured method, so as to enable the easy transfer of the experiences of people who had recovered from the disease. The interviewers also used follow-up phrases such as "Could you elaborate on that?" to further discover and understand the discussed items and thus help the participants express their experiences about the items. The interviews ended with an open-ended question: "Is there anything else you would like to add?" or "If you remember anything, please add". With prior permission from the participants, the interviews were recorded and transcribed verbatim immediately afterwards or as soon as possible, and analyzed in MAXQDA-2018. Each interview lasted 45 to 90 minutes. In cases where the participants had not permitted their interview to be recorded, field notes were taken of their statements, tone of speech and also their laughter, sobs, and regrets. The interviews continued until the saturation of data. After 15 interviews, no new categories were being extracted any longer, but one further interview was conducted to ensure the saturation of data, and ultimately, sampling ended with the saturation of data after 16 interviews. None of the interviews with the participants needed to be repeated, and data were analyzed concurrently with their collection using a phenomenological approach (Kim et al., 2013).

Data analysis

The data were analyzed using Colaizzi's 7-stage method as follows (Lee et al., 2014): In the first stage, to empathize and interact with the participants, their statements were played again and transcribed to obtain a deeper understanding of the subject. In the second stage, to extract important sentences related to the phenomenon under study, the field notes were reviewed and their key sentences (concepts) were identified. In the third stage, the concepts were formulated and

assigned a code (196 codes in total). In stage four, the previous stage codes were categorized in one of the 35 general concepts (subcategories). In the fifth stage, by a general description of concepts from the different subjects and the development of 12 subcategories, a general description of the issue was formulated. In stage six, a form structured from the previous explanations was provided, which led to four main categories for the lifestyle theme. Finally, in stage seven, based on the final systematic description, the statements were quoted and reviewed with the help of the participants to ensure their reliability.

Validation

The validity of this study was assessed using the inter-rater reliability method. The interviews were recorded and transcriptions were sent to experts in the field to get their approval. The same experts reviewed and confirmed the data again after their analysis.

Ethics approval and consent to participate

The present study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences (IR.SBMU.PHARMACY.REC.1399.193) and was performed in accordance with the Declaration of Helsinki. The participants were briefed on the study objectives and then gave their informed written consent. Before the interview, the consent form was given to the participants by email and signed by them. They were ensured of the confidentiality of their data and the publication of the results in a general format and also of their right to stop their interview at any time.

Results

The mean age of the participants was 31 years (age range from 21 to 68 years). Nine of the participants were female and seven were male. Most cases of infection had occurred in crowded places, and the patients had received most of their information about the disease and its care protocols from the Ministry of Health's 4030 call system, social networks, and the radio and TV (Table 1).

Four main categories were extracted from the results of the qualitative phenomenology, including physical problems, physical activity, nutrition, and mental problems (Table 2).

Table 1
Participants' details

	Variable	Frequency	Percentage
Age	20 to 40 years	11	69
	41 to 68 years	5	31
Gender	Female	9	57
	Male	7	43
Mode of infection	Presence in crowded places without social distancing	7	44
	Employment in a medical profession	5	31

Source of information about COVID-19 and its prevention and treatment	Infection by others	3	19
	Do not know	1	6
	Social networks	4	25
	Friends and family	1	6
	Radio and TV	4	25
	Ministry of Health and the 4030 call system	5	31
	The WHO	2	13

Table 2
An analysis of the experience of changes in lifestyle among people recovered from COVID-19

Theme	Category	Subcategory (frequency)
Lifestyle	Physical problems	Frailty and feeling old (18)
		Post-recovery physical symptoms (16)
	Physical activity	Inability to take a walk (18)
		Inability to exercise (19)
	Nutrition	Loss of appetite (16)
		Taking supplements (15)
		Compliance with healthy eating (16)
		Sleep disorder (14)
	Mental problems	Obsession (12)
		Stress (24)
		Anxiety about infecting family and friends (18)
		Neurological disorders (10)

Physical problems

The physical problems category had two subcategories, including frailty and feeling old, and post-recovery physical symptoms.

Frailty and feeling old

Although she was only 35 years old, participant 4 said: *“I have knee and ankle pain. And now, the heaviness in my stomach has worsened, as if I’m an 80-year-old woman”*. This disease seems to consume the body’s energy and weaken it, and this weakness in the body makes it impossible to carry out the daily activities. Participant 5 explained: *“I had lost my physical strength. I used to do the house chores easily, but now it’s become difficult for me”*.

Post-recovery physical symptoms

Despite the recovery and the elapse of several months from the time of infection with the virus, some participants still talked about symptoms that hurt them and had changed their lifestyle. Participant 10 said: *“Right now that I have to go to work, it’s only with a mask on. Sometimes I even have to carry these small portable*

oxygen capsules with me, cause I feel I get out of breath, and although the CT-scan showed nothing wrong with my lungs, it still hurts”.

Physical activity

Physical activity is among the lifestyle factors that has changed in people who have recovered from COVID-19. *Inability to take a walk:* Participant 12 said with regret: *“I don’t have the strength I used to before the illness. I used to take a walk every day, but now I can’t even walk for half an hour”*, and participant 6 said: *“I can’t walk at all”*. *Inability to exercise:* The inability to exercise was observed even in the more athletic and stronger participants. Participant 8 said: *“I used to go to the gym, but now that I have recovered, whenever I go to the gym, I don’t have the strength I used to, and shortness of breath and coughs take me whenever I start exercising”*. Participant 5 revealed: *“I exercise and jog in the street with my colleagues in the morning and it used to be easy, but now I can only run for two minutes”*.

Nutrition

Loss of appetite: Participant 10 said: *“Unfortunately, my appetite is half what it used to be; not half, a quarter. Imagine a half full plate; I can’t eat even two spoonfuls now. I have lost a lot of weight”*. Participant 8 said: *“Actually, I can’t eat the foods I used to enjoy before my illness, and I have badly lost my appetite”*. *Taking supplements:* As recommended by others, the participants had turned to boosting their immune system and taking various supplements after their recovery. Participant 11 explained: *“I take vitamin C and vitamin D. Right now, I take vitamin C every day, followed by Iron supplements from foreign brands”*. Participant 2 said: *“I started turning to Iron and Zinc supplements because of my hair loss after the illness”*. *Compliance with healthy eating:* Physical frailty, efforts to improve the health status and recover and also efforts to prevent re-infection had turned the participants to healthy nutrition. Participant 7 explained: *“I eat one full meal, but before, I used to have two full meals”*. Similarly, participant 13 said: *“I eat more pulses and try to have a healthier nutrition, so I eat more fruits and vegetables”*.

Mental problems

Analyzing participants’ statements revealed the emergence of several mental problems in addition to physical problems in those who had recovered from COVID-19. *Sleep disorder:* Sleep disorder is a common complaint that was reported by most participants. Participant 4 said: *“I can’t sleep at night, I have insomnia, shortness of breath. It’s become so bad now that my daughter has gone and bought me sleeping pills. I take one every night, so that I can sleep”*. *Obsession:* Participant 10 said: *“I get stressed over whether I have touched this car seat or not. It’s as if I have obsessive disorder”*. In line with this statement, participant 16 also said: *“I washed my hands so frequently that I got eczema at the top, and I went to see a dermatologist”*. *Stress:* The results showed that the participants were exposed to a variety of stressors after recovery, such as stress about re-infection. Participant 12 explained: *“I’m always anxious and concerned about re-infection, so I try to chill to calm myself down”*. Some participants reported

that, after their recovery, they had stress for no particular reason. Participant 14 said: *"I actually look for things that I think explain it; like, I say it must be over my mum, but no it's not; then I say maybe it's over my brother, but no it's not. Whatever problem I think about, it doesn't change my stress level. I constantly have it [stress for no reason]"*.

Anxiety about infecting family and friends: The recovered participants expressed concern about infecting their family and friends. Participant 10 said: *"I was worried about my family and friends who had underlying diseases. I remained in quarantine for a whole month"*. Participant 9 anxiously stated: *"I protected my family very much, because I thought I had got the disease once and suffered through it and didn't want them to be infected"*. *Neurological disorders:* Participant 4 said: *"I've almost lost my memory. I think I've become a little more forgetful"*. This disease appears to have caused serious mental problems for the participants. Participant 6 commented: *"I'll commit suicide if I get this disease again. I'm not prepared to experience suffocation again"*.

Discussion

Compliance with the WHO protocols for controlling the COVID-19 pandemic as an emerging disease has caused extensive lifestyle changes. The present study was conducted to explain the components of lifestyle in patients who had recovered from COVID-19. The lifestyle changes experienced by the study participants included physical problems, physical activity, nutrition, and mental problems, which agrees with the results of other research on the subject (Wen et al., 2020; Odone et al., 2020). Previous studies have confirmed that activity and rest, type of nutrition, type of coping with stress, mode of communication with others, and post-recovery care are part of the lifestyle changes experienced by the recovered patients (Narayanan et al., 2020; Cancellato et al., 2020). In the present study, frailty and feeling old and post-recovery symptoms were the changes observed in the physical domain. In agreement with these findings, other studies conducted on patients recovered from COVID-19 also reported the persistent presence of at least one symptom, particularly fatigue and shortness of breath (Medrano et al., 2021; Balanzá-Martínez et al., 2021).

Physical activity was another issue raised by the participants with regard to their post-COVID-19 lifestyle changes. It should be noted, however, that COVID-19 has had substantial effects on people's pattern of physical activity throughout the world since its onset. During this pandemic, people are forced to quarantine themselves at home, and activities like working out in the gym and outdoor exercises and jogging have been prohibited. Infection with the disease and its complications have made people unable to attend to this aspect of their health. Nevertheless, people with mild upper respiratory tract symptoms can still exercise (Lippi et al., 2020). In cases of symptoms such as severe sore throat, body aches, shortness of breath, general fatigue, dry cough or fever, the recommendation is to avoid all kinds of physical exercise altogether (Meyer et al., 2020). Normally, after recovery and the complete disappearance of symptoms, people can begin low-intensity regular exercise (Shirvani, H., & Rostamkhani, 2020). Although staying home is a safe measure to prevent person-to-person transmission of the virus, this measure may have unwanted adverse consequences, such as reduced

physical activity and increased sedentary behaviors such as sitting and lying down for too long when watching the TV (He et al., 2021). Therefore, people have been advised to do exercises that can be easily performed at home, such as strength training, balance and control exercises, stretching or a combination of these exercises (Chirico et al., 2020).

Another issue raised by the participants consisted of nutrition-related problems. Adhering to a balanced and healthy nutritional regimen containing all the essential nutrients is highly important for maintaining health. A healthy nutrition and balanced micronutrient intake are the main factor involved in maintaining and boosting the immune system and reducing diseases (Aldaco et al., 2020). Any nutritional imbalance affects the function and integrity of the immune system (Pakravan-Charvadeh et al., 2021), so that the lack of certain nutrients reduces the immune system function and consequently increases the possibility of infections or their exacerbation (Taghdir et al., 2020). According to studies conducted on COVID-19 patients, most hospitalized patients have severe inflammation and loss of appetite, leading to a significant reduction in food intake (Mumena, 2021)). A study conducted by Górnicka et al. (2020) showed that quarantine can have dual positive and negative effects in terms of changing the food regimen and lifestyle as a result of prolonged home-staying. The participants of their study reported a reduction in their physical activity and an increase in their food intake (Górnicka et al., 2020), which agrees with the present findings. Given the vital role of the immune system in preventing and dealing with this virus, the best and simplest way to enhance the immune system and prevent infection with the virus is to supply the body's need for fluids, electrolytes, energy, and quality proteins (Błaszczuk-Bebenek et al., 2020; Naja & Hamadeh, 2020). The role of a balanced and diverse nutrition and food regimen in preventing infectious diseases is emphasized because malnutrition can predispose people to infectious diseases (Pakravan-Charvadeh et al., 2021).

Mental health problems were another issue raised by the participants as lifestyle changes. With the COVID-19 pandemic persisting, people gradually exhibit different levels of mental distress, such as irritability, fearing infection, anxiety, depression, sleep disorders, lack of concentration and different positive or negative reactions to these experiences (Jutzeler et al., 2020). Due to the fear of severe disease consequences and the transmission of infection to others, patients suspected of COVID-19 had experienced different levels of loneliness, denial, anxiety, depression, insomnia and despair along with symptoms of obsession, such as frequent body temperature measurement, repetitive disinfection of the hands, and aggressiveness (Chung & Yeung, 2020). Virus-induced anxiety causes an obsessive fear of infection in some COVID-19 patients and triggers harmful compulsive behaviors (Jung & Jun, 2020), and all of these patterns are considered a threat to the mental health of the society (Liu et al., 2020). In agreement with the present findings, Wang et al. (2020) also found in their assessment of people's mental health during the COVID-19 epidemic in China that mild to severe stress, anxiety, and depression can be observed in people during this pandemic (Wang et al., 2020).

Studies conducted in Iran have shown significantly higher levels of anxiety in women, people who regularly follow COVID-19-related news, and people who have

a relative who has been infected (Abdi, 2020). The psychological effects of the COVID-19 pandemic are undeniable; therefore, training people on how to manage their emotions and increase their emotional, behavioral, and social adaptation to deal with risks is crucial and can have positive effects on the public mental health during a crisis (Gao & Scullin, 2020). According to previous studies, the quality of sleep has been worsening in most people during the pandemic due to the increase in their perceived stress (Sinha et al., 2020), which concurs with the present findings. Consuming foods containing serotonin and melatonin, such as almonds, banana, cherries, and oat, and also protein-rich foods such as milk and dairy products, which are the main source of tryptophan, is thus recommended for controlling stress and improving sleep quality (Farahaninia et al., 2006).

The present study showed some fundamental changes in patients' lifestyle, both during infection with COVID-19 and after recovery. After their recovery from COVID-19, the participants in this study were forced to change certain aspects of their lifestyle, such as their nutrition, physical activity, sleep, and modes of communication with others in order to maintain their own and other people's health. Identifying the changes in the lifestyle of recovered COVID-19 patients is crucial for designing and developing interventional strategies to improve the quality of life and well-being of the entire society at this point in time. The strengths of the present study included the unstructured in-depth interviews conducted and the extraction of data that could truly show the experiences of those affected by COVID-19. Nevertheless, given the nature of qualitative studies, the present study had certain limitations too, including the subjective data, small sample size, and non-generalizability of the results. Accordingly, future studies are recommended to rely on more objective research methods.

Conclusion

The only way to deal with the COVID-19 pandemic as a emerging disease is to observe the protocols provided by the WHO. Social and physical distancing, the compulsory wearing of face masks for all, and self-quarantine of patients and suspected individuals have caused significant changes in people's lifestyle, including both patients and healthy people. These changes affect not only their personal, group, and social relationships, but also the larger scale of the relationships between countries and continents. These changes have also influenced people's physical, mental, and social health and quality of life. Health authorities should therefore pay particular attention to these challenges and changes in people's lifestyle in designing and planning health-related interventions.

Acknowledgments

The authors wish to express their gratitude to the directors of the surveyed hospitals and health centers for introducing patients recovered from COVID-19 and also all the participants who cooperated in this study.

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