자가격리자의 스트레스와 대처: 코로나바이러스감염증-19 음성사례를 중심으로

강경림1, 김찬희2, 이민혜3
1경상국립대학교 간호대학 부교수, 2국립창원대학교 간호학과 조교수, 3동아대학교 간호대학 조교수

Abstract
Background: In South Korea, many people have experienced self-quarantine due to coronavirus disease (COVID-19). This study explored stress, coping, and post-quarantine changes among people who were self-quarantined because of close contact but tested negative for COVID-19 in the early days of the pandemic.

Methods: Qualitative interviews were conducted with four focus groups, each comprising five people. Data were analyzed using inductive content analysis.

Results: Three categories of stress and coping during self-quarantine and post-quarantine changes emerged. First, the category of content related to stress comprised "problems that are difficult to handle alone." The subcategories were "painful body and mind," "the experience of being in a jail without bars," "repeated internal and external conflicts." Second, the category for various stress-coping methods was labeled "struggling my way," and the subcategories were "coping methods that helped me overcome" and "coping methods that added difficulty." Finally, the category for changes after self-quarantine was labeled "more mature me." The subcategories involved "thorough observation of infection prevention measures in daily life," "living together," and "a new realization of life."

Conclusions: Our findings contribute toward developing online or offline health programs to help individuals who self-quarantined but tested negative for infectious diseases, allowing them to feel confident to self-quarantine in good health.

Key Words: COVID-19, Quarantine, Stress, Coping, Qualitative research, Focus groups
Introduction

The novel coronavirus disease 2019 (COVID-19), a viral respiratory disease, has spread worldwide since December 2019: the World Health Organization (WHO) declared a global pandemic on March 11, 2020 [1]. Following the prolonged global pandemic, COVID-19 has become an ongoing global public health crisis with an unknown end date. As of April 7, 2024, there were 775,132,086 confirmed cases of COVID-19 worldwide, including 7,042,222 deaths [2]. Infectious diseases, such as COVID-19, can easily infect others. Uncertainty in predicting the end and progression of infectious diseases and the persistence of sequential diseases lead to high anxiety and stress in affected and unaffected individuals worldwide [3].

Isolation and quarantine are among the numerous methods used to prevent the spread of infectious diseases. Quarantining a person with a suspected infection in an adequate place for a certain period prevents the spatial and societal spread of the disease [4]. The fast spread of COVID-19 worldwide has resulted in a rapid increase in the number of infected individuals. In South Korea, in 2021, individuals in close contact with a confirmed patient with COVID-19 were also considered close contacts despite negative test reports and were instructed to undergo compulsory isolation at home for 14 days. Self-quarantined patients were monitored by the local government and isolated, in principle, with no contact with the outside world [5]. Such unavoidable quarantine measures to curb the transmission of COVID-19 have led to the sudden isolation of individuals from the external environment, social relationships such as those at work, and personal relationships with family and friends [6]. Recent reviews have reported that individuals who underwent quarantine or isolation to prevent the spread of infectious diseases experienced various negative emotions, such as depression, anxiety, stress-related disorders, post-traumatic stress disorder, confusion, fear of stigma, anger, and psychiatric problems [7,8].

Similarly, during the COVID-19 pandemic, infected patients experienced psychological distress from isolation in addition to physical and psychological pain [9]. Patients experienced anxiety, emotional dullness, loneliness, disconnection, and boredom as they were isolated from the external environment in a narrow space in a hospital or facility [9]. The study suggests that isolation is a significant source of stress, commonly conceptualized as a psychological and physiological response to perceived challenges or threats to an individual’s well-being [10]. Moreover, individuals who were not infected with COVID-19 but were under self-quarantine due to close contact with infected individuals were also restricted in physical, psychological, and human relationships and daily life. During the Middle East Respiratory Syndrome epidemic, unaffected individuals who were under self-quarantine complained of various difficulties, such as anxiety, depression, feelings of isolation, stress, and worries about social stigma [11]. Chen et al. [12] found that individuals under self-quarantine due to close contact with confirmed patients with COVID-19 showed changes in emotions: in the early stages of quarantine, individuals experience fear and feelings of stigmatization; in the middle stages, their patience diminishes, and they become nervous; by the late stage, they tend to calm down. Thus, individuals who were not affected by COVID-19, but were under self-quarantine due to close contact with confirmed patients, experienced a high level of stress. However, studies on stress, coping patterns, and support for such individuals are limited. As quarantine is an important coping strategy for new infectious diseases, stress and stress-coping measures are essential factors that must be actively studied. In particular, self-quarantine requires voluntary practice, which suggests the importance of adequately mediating the stress from self-quarantine for the safety of individuals and preventing the spread of infectious diseases. Therefore, this study aimed to interview individuals who were not infected with COVID-19 but underwent self-quarantine for two weeks because of close contact with confirmed patients in the early days of the pandemic and explore stress, coping, and post-quarantine changes during self-quarantine, in-depth, in order to provide meaningful primary data for effective support measures in the future.
Materials and Methods

1. Study design

This qualitative study aimed to comprehensively understand and explore the stress, coping, and post-quarantine changes in individuals in close contact with confirmed patients with COVID-19 who underwent subsequent self-quarantine for two weeks.

2. Participants

The inclusion criteria in this study were as follows: 1) aged 18 years and older, 2) released from quarantine after a 2-week self-isolation period following contact with a confirmed patient with COVID-19, and 3) tested negative on a COVID-19 Polymerase Chain Reaction test conducted after contact with a confirmed patient with COVID-19. Individuals who were unable to participate in the focus group interviews (FGIs) because of cognitive and communicative disabilities were excluded. During the self-isolation period, the participants lived alone in separate spaces for two weeks and were supervised using a government-monitoring application on a mobile phone. As the researcher had limitations in recruiting participants who underwent self-quarantine, those who could provide a wealth of information relevant to the research topic were introduced through purposive sampling by community members of the city. Potential participants were informed of the study topic and purpose by phone or through a social networking service (SNS). This study included 20 participants, comprising 6 men and 14 women. Their mean age was 57.05 years (range: 21~74 years). Eight participants graduated from high school, while the remaining 12 had university or higher education. Only one participant was unmarried, and all married participants lived with their families. In addition, eight participants were employed.

3. Data collection and ethical considerations

This study was approved by the Institutional Review Board of Dong-Guk University (IRB No: DGU IRB 20210029) and was conducted from July 6 to 17, 2021. According to quarantine guidelines in South Korea, only up to eight people, including the researchers, could meet in person during the study period. Thus, a total of four groups comprising five participants each were interviewed. The FGI group was organized to comply with the quarantine guidelines during that period, allowing participants of the same gender to comfortably share their individual experiences during the isolation period (excluding one group in which a mother and son participated together). The background and purpose of the research were explained to the participants before the interviews, and they were asked whether they had any doubts. They were also notified that they could leave the study at any point without any penalty and that the collected data would be kept anonymous, would not be used for any other purpose, and would be destroyed after the completion of the study. The participants understood the details of the study and provided written informed consent prior to participation. A gift certificate for a small amount was provided to the participants after the study.

Both researchers conducted focus group interviews for approximately 60~90 minutes for each group. For convenience, the interviews were conducted in a conference or seminar room of the institution near the participants’ residential areas. Prior to the focus group interviews, the general characteristics (age, sex, education, marital status, employment, etc.) of the participants were evaluated for approximately five minutes, and instructions were provided for the interviews. The interview content was recorded with the participants’ voluntary consent. The main interview content and non-verbal behaviors of the participants were recorded in notes and analyzed. Non-verbal responses were utilized during the content analysis to deeply understand the participants’ emotions and attitudes and to verify the consistency between verbal expressions and non-verbal behaviors. Focus group interviews were conducted until no new content was extracted, indicating saturation.

The interviews were conducted sequentially. An introduction and transition question guide was used to avoid deviating from the research purpose during the interviews (Table 1).

4. Data analysis

The transcribed data were analyzed based on the inductive approach of content analysis suggested by Elo and Kyngäs [13]. The data were analyzed as follows. First, three researchers repeatedly
read the independently collected data to assess the interview content and flow. Second, the repeated words and phrases in the data were summarized to extract codes in an open manner. Third, the researchers reviewed the codes and categorized the related content into groups. Fourth, the categorized content was checked repeatedly to determine its relevance. The naming tasks were repeatedly performed to encompass the meanings of the categories. Finally, abstracted categories that reflected the key categorized content and their relevance were extracted to complete the descriptions of the phenomena that fit the study purpose. Furthermore, the meanings and relationships of concepts related to the extracted themes were clarified by creating tables to ensure the validity and relevance of the data analysis.

5. Rigor

The following rigor criteria for qualitative studies suggested by Guba and Lincoln [14] were used to ensure the reliability and feasibility of this study: truth value, consistency, applicability, and neutrality. First, truth value was secured through focus group interviews with participants who had undergone self-quarantine after contact with confirmed patients. Moreover, the researchers recorded and summarized the interview content to repeatedly ensure its accuracy with the participants. The recorded interview content was transcribed and confirmed with the participants through SNS and phone calls. Second, for consistency, the researchers followed the content analysis method of Elo and Kyngäs [13], continuously sharing records of processes and summarizing the content. The detailed contents of the research process and steps were described. Participants’ statements were adequately cited for each subcategory in the summary of the results. Third, to ensure applicability, the general characteristics of the participants were investigated, and the results were summarized and described. Finally, neutrality was secured by the researchers who participated in the entire research process by minimizing individual bias through continuous discussion and consensus.

6. Researcher preparation

All the researchers were female university professors. They have participated in several qualitative research seminars and workshops and published multiple qualitative research papers.

Results

Participants who underwent self-quarantine talked about their stressful experiences of isolation and trial-and-error coping methods. They commonly experienced difficult times but learned a great

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Table 1. Introduction and transition question guide

<table>
<thead>
<tr>
<th>Question guide</th>
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<tbody>
<tr>
<td>- Please tell us freely about your 2-week self-quarantine experience</td>
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<tr>
<td>- Please tell us about the stress that you experienced during self-quarantine</td>
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<tr>
<td>- Please share with us how you coped with the stress</td>
</tr>
<tr>
<td>- Please tell us about any new or persisting problems or changes that you might have experienced after self-quarantine</td>
</tr>
</tbody>
</table>

Table 2. Stress, coping strategies, and post-quarantine changes in participants

<table>
<thead>
<tr>
<th>Category</th>
<th>Subcategory</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress from self-quarantine: problems that are difficult to manage alone</td>
<td>Painful body and troubled mind</td>
<td>Turbulent negative emotions and thoughts</td>
</tr>
<tr>
<td></td>
<td>The feeling of being in a jail cell without bars</td>
<td>Uncomfortable physical symptoms</td>
</tr>
<tr>
<td></td>
<td>Repeated internal and external conflicts</td>
<td>Temporarily in bondage</td>
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<tr>
<td></td>
<td>Coping with stress: struggling my way</td>
<td>Fighting against oneself</td>
</tr>
<tr>
<td></td>
<td>Coping methods that helped me overcome</td>
<td>Struggling with my surroundings</td>
</tr>
<tr>
<td></td>
<td>Coping methods that made the situation increasingly difficult</td>
<td>Accepting the circumstances</td>
</tr>
<tr>
<td></td>
<td>Changes after self-quarantine: a more mature me</td>
<td>Discovering what is possible here and now</td>
</tr>
<tr>
<td></td>
<td>Thorough observation of infection prevention measures in daily life</td>
<td>Establishing small rules for daily life</td>
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<tr>
<td></td>
<td>Awareness of living together</td>
<td>Denial of reality and resentment</td>
</tr>
<tr>
<td></td>
<td>A new understanding of life</td>
<td>No plan or non-compliance</td>
</tr>
<tr>
<td></td>
<td>New appreciation for the effectiveness of quarantine rules</td>
<td>Unreasonable plans or actions</td>
</tr>
<tr>
<td></td>
<td>Meticulous attention to practicing preventive measures</td>
<td>Realizing that people are connected</td>
</tr>
<tr>
<td></td>
<td>Realizing that people are connected</td>
<td>Growing in my understanding and consideration of others</td>
</tr>
<tr>
<td></td>
<td>Experiences of various rehearsals</td>
<td>A new realization regarding interruptions to daily life</td>
</tr>
</tbody>
</table>
deal from them. Therefore, they experienced increased maturity after the quarantine (Table 2).

1. Stress from self-quarantine: problems that are difficult to manage alone

Self-quarantine during the difficult period of the COVID-19 pandemic aggravated the psychological and physical pain of the participants. Many participants felt imprisoned when they had to stay in a designated space of their own choice. They experienced internal and external conflicts between themselves and others as they became increasingly sensitive. Managing such circumstances alone led to significant stress for the participants.

1) Painful body and troubled mind

Most participants experienced negative thoughts and emotions such as anxiety, resentment, anger, and guilt about newly confirmed cases and isolation. In particular, although the participants tested negative for COVID-19, physical symptoms such as respiratory symptoms, fever, and headache were observed during the self-quarantine period, leading to greater pain.

The very first thought in my mind was how unfair it was. I only went to the fitness center on Thursday. That was the only time, and I had to undergo self-quarantine. I felt that it was unfair. I was really angry. (FGI2, P6)

I felt guilty about not being there (workplace) because someone else had to do my job instead. (FGI4, P4)

We checked our body temperature every day during self-quarantine. If the temperature was slightly higher, I became worried. I wondered, "Is there something wrong with me?" When the body temperature was a little bit higher than usual, I was worried that it would increase even more. (FGI1, P3)

Moreover, the participants also experienced various distressing physical symptoms that caused concern, ranging from digestive problems caused by a lack of activity to dermatitis due to stress.

I did not have food on time, so I started to get constipated. My stomach felt unwell. It was not a pleasant experience. (FGI1, P1)

I was under too much stress and developed scalp inflammation. I am still under treatment. Self-quarantine really stresses me a lot. (FGI3, P4)

2) The feeling of being in a jail without bars

Most of those who underwent self-quarantine at their residence expressed that the experience was challenging. They felt as if they were in prison because of the travel restrictions imposed on them regarding venturing outside their residence, as they were continuously monitored through a mobile application.

It felt like a prison, a prison without bars. (FGI1, P2)

When I went to the balcony, the machine started beeping, and the borough office worker called me to instruct me that I should get back home when I was already home and never left my place. (FGI1, P3)

The participants were unable to work because of quarantine restrictions. Their interrupted daily life patterns, irregular rhythms, and boredom led to difficulties and a sense of helplessness.

I usually went to bed at 11 am, but I could not sleep, so I would watch TV and go to sleep at 3 am [...] my daily life pattern was interrupted. (FGI1, P1)

I often go to exercise, meet others, and grab food with others. During self-quarantine, I could not do any of those activities. I felt frustrated and helpless afterward. I did not have an appetite. I started to become lazy and lose myself. Life felt boring, just not fun at all. (FGI1, P4)

3) Repeated internal and external conflicts

The participants experienced many internal conflicts during self-quarantine. They felt the urge to leave their isolation space without their mobile phones to avoid being tracked and hide their self-quarantine acts from others because the fear of criticism only worsened their pain.

On the second day, I started to have a fever and felt like I might die. I took antipyretic medicines for four days. I called the borough office to ask them to take me to a hospital. Their response was "Call 911." It would be embarrassing to have an ambulance come by to pick me up and take me
to a hospital. I thought, "Should I leave my cell phone at my place and go to a hospital?" It felt like hell. (FGI1, P5)

I did not commit any crimes, but I found that I could not say "I am under self-quarantine." When my friends asked me what I was doing, I answered: "I'm doing good." I felt like I was committing a crime. That was the most disturbing part of self-quarantine, lying to others about it. (FGI4, P5)

In contrast, participants who lost peace of mind experienced pain and conflict in conversations and relationships with family members and acquaintances.

People treated me as if I had a plague. They treated me like a carrier of a real virus [⋯]; that is how I felt. (FGI2, P6)

I was not the only one who was stressed. My whole family was stressed, and that made me even more stressed. During conversations, I would be annoyed for nothing. I would snap back and start arguing [⋯] (FGI3, P3)

2. Coping with stress: struggling my way

Each participant used different ways of coping with stress during self-quarantine. Various healthy strategies, such as acceptance, focusing on the here-and-now, and daily rule-setting, have helped cope with stress. However, unhealthy coping strategies, such as denial of reality, resentment, and unreasonable plans, sometimes further aggravate stress.

1) Coping methods that helped me overcome

Accepting the given circumstances, discovering what was possible at that place and time, and establishing small rules for daily life were helpful strategies for coping with stress during self-quarantine. Accepting the current circumstances rather than regretting past actions or circumstances, focusing on how to overcome difficult situations, and leading a regular daily life helped to reestablish relationships and tasks that the participants neglected in daily life.

I came to accept that fact. Stress does not change anything. I was also reassured as I tested negative for COVID-19. That helped to cope with stress during self-quarantine. (FGI2, P2)

One day, I cleaned the bathroom. The next day, I cleaned my balcony, and some other day, I cleaned the closet. I did some chores that I had neglected for a few days. I organized my albums and other things. I organized anything I could, and a week went by. (FGI1, P3)

I set up a daily plan for self-quarantine. I would watch the news first thing in the morning for any recent news on COVID-19 and pretend like I was going to work. It felt new. I could not go out, so that was the only thing I could enjoy. (FGI3, P1)

I talked on the phone for a long time with friends who were far away. I told them: "I was unlucky, and I am under self-quarantine." I had a lot of long calls with my friends. My strategy was to talk to friends and acquaintances. It had positive effects on me. (FGI2, P5)

2) Coping methods that made the situation increasingly difficult

The lack of planning during self-quarantine, denial of reality, resentment, and unreasonable plans or actions made the circumstances more difficult for the participants.

I kept having negative thoughts [⋯]. "I did not test positive, why should I be under self-quarantine?" These thoughts did not have any positive effects on me. (FGI3, P3)

I was like a bird in a cage [⋯]. I kept thinking negatively [⋯]. I was just staying on the balcony for most of the time during self-quarantine. I think I just wasted my time (during self-quarantine). (FGI3, P5)

The worst thing you can do is to spend time without a plan and anything to do. (FGI4, P3)

I have trouble sleeping, so I usually take medicine to sleep. During self-quarantine, I tried to sleep without medicine. But I just could not sleep without taking medicine for even a day. I was stressed, and I could not help myself after not taking medicine for about five days. I realized that I made the wrong choice. I should have helped myself relax and slept well. (FGI4, P5)

3. Changes after self-quarantine: a more mature me

The participants returned to their daily lives after self-quarantine. They realized the importance and effects of daily quarantine measures and tho-
roughly complied with the recommended measures compared with the pre-quarantine period. Furthermore, the participants realized that organic cooperation and mutual understanding among individuals were necessary during the COVID-19 pandemic. A few participants also discovered new aspects of life after self-quarantine that they had not realized beforehand. Although several participants still experienced health problems and expressed fear of re-isolation, they commonly showed development in their maturity through their self-quarantine experiences.

1) Thorough observation of infection prevention measures in daily life

Although the participants tested negative for COVID-19, the self-quarantine experience provided an opportunity to become aware of the seriousness of infection and re-quarantine, the importance of daily quarantine practices, and better compliance with quarantine measures. Many participants stated that they were not infected with COVID-19, even after contact with confirmed patients, as they complied with quarantine measures. Moreover, a few participants confessed that they neglected to practice daily quarantine measures before self-quarantine and meticulously practiced quarantine measures to prevent undesirable re-isolation.

A lot of people were tested this time in my fitness center. But not a single person tested positive. This is because the air was well-ventilated, and everyone wore masks all the time. (FGI 2, P5)

After the quarantine, I started to think whether there was actually a confirmed COVID-19 case right next to me. I wash my hands often and always wear a mask. Before self-quarantine, I would wear the mask only over my mouth and take off the mask while I walk. But now, I keep it on all the time. (FGI1, P1)

I tried to maintain social distance to not bump into anyone. Even when I go somewhere close, I take my car, quickly run my errands, and come back home. In coffee shops, I used to take off my mask, drink coffee, and talk. I try my best to be careful. (FGI 3, P3)

However, some participants exhibited non-compliance with quarantine guidelines, showing reluctance to disclose their information due to fear and discouragement regarding re-quarantine.

In the past, I used to jot down my phone number and scan QR codes without any hesitation, as I had not experienced quarantine before. But now I cannot help but feel compelled to think, "Should I change even just one digit at the end of my phone number?" (FGI3, P2)

2) Awareness of living together

The participants also learned that anyone could be infected with COVID-19 and realized that everyone was connected. They understood that poor choices and negligence could cause others to experience distress.

As I went into self-quarantine, it also meant that anyone, including my family, may have to frequently undergo self-quarantine too. (FGI 2, P4)

I became more cautious as I thought that I should not spread COVID-19 in any case [...]. (FGI 3, P1)

If I spread COVID-19 to someone else without knowing, that would be very problematic [...]. When I go to restaurants, I debate whether I should write down my contact information. But I end up writing them down because I am afraid that I may hurt others and spread COVID-19 by chance. (FGI 4, P2)

Furthermore, participants developed a sense of gratitude through their experience of seeing the hard work of various personnel during self-quarantine. Their deeper understanding of those experiencing similar circumstances led to thoughtful considerations.

I felt very grateful to those who have helped us and sacrificed themselves to help us self-quarantine. Looking back, I think we should be thankful that we can be outside and enjoy our daily lives thanks to their hard work. (FGI3, P3)

Some people say, "Infected individuals have to be strictly tracked down" and have negative feelings for them. But they never wanted to be infected on purpose. They could be my child and my friends. I think we have to always be in their shoes and think from their point of view. (FGI2, P2)
3) A new understanding of life

Self-quarantine provides an opportunity to prepare for future pandemics and the anticipated future life scenarios. Their experiences were not only related to the current pandemic but also to changes in their personal lives.

If we assume that a more terrifying virus may show up in the future, this COVID-19 pandemic is just a taste of what may happen in the future. We learned from the pandemic that wearing masks, complying with quarantine measures, and practicing personal hygiene are very effective in preventing the spread of infectious diseases. (FGI2, P2)

Next year, I have to retire. I thought self-quarantine may be good practice for my life after retirement. (During quarantine) I tried to practice taking a break from work. (FGI4, P1)

In contrast, their temporarily altered lives also helped them realize that it is acceptable to take a break from their stressful daily lives.

At that point in life when it just seemed like I had to keep hustling, I realized that I could take a break, recharge, and hustle faster and better to reach my goals [...]. I resumed working after taking a break for two weeks, and I had a different mindset going into work. (FGI4, P4)

Discussion

This study aimed to understand the stress, coping strategies, and post-quarantine changes experienced by individuals who underwent self-isolation after contact with confirmed patients according to the national quarantine guidelines.

In this study, the participants self-quarantined after contact with confirmed patients with COVID-19. They experienced unbearable stress and economic, psychosocial, and physical limitations, causing interruptions in their daily lives. Restrictions included limited social exchanges and work activities, and the participants endured psychological pain due to the fear of stigma and criticism of self-quarantine from others. This finding was consistent with a study in the United Kingdom, in which ordinary people experienced a loss in social interaction, income, routine, and psychological emotions during the lockdown, similar to that experienced in prison or by those with claustrophobia [15]. During the ongoing COVID-19 pandemic, most cases of self-quarantine involve confirmed patients and contacts other than those who spontaneously choose to socially distance themselves. Quarantine is essential for controlling infectious disease outbreaks by preventing physical contact with people and the environment, thus, limiting the spread of pathogens. However, prolonged social isolation caused by quarantine can lead to physical and mental problems such as stress, loneliness, anxiety, depression, and decreased immune function [16–19]. The participants in this study experienced adverse reactions such as anxiety, feelings of injustice, and anger regarding isolation rather than mentioning issues related to loneliness. This is contrary to the findings of previous studies, suggesting that reduced social contact due to the COVID-19 pandemic increases the risk of loneliness [20]. This can be interpreted as being related to factors such as age, type of residence, and duration of isolation. Previous research has indicated that social isolation does not necessarily result in loneliness [21] and that older age is associated with less loneliness [22]. Moreover, while the risk of loneliness is higher in individuals living alone [23], most participants in this study lived with their families, which likely influenced their experiences. Furthermore, considering that extended isolation periods can lead to more depressive symptoms [24], the two-week isolation period of the participants in this study was not long enough to cause loneliness. Finally, the specific circumstances of the participants, namely the anxious situation of having been exposed to COVID-19, may have caused differences in their subjective emotional responses. Furthermore, the participants had an increased risk of infection when they were in contact with confirmed patients. When physical symptoms were observed, the participants felt great anxiety about the COVID-19 infection and faced uncertainty about their future, which increased their psychological pain. In a previous study, older people with chronic diseases experienced difficulties in social activities under social distancing conditions while enduring a vague fear of the COVID-19 infection [25]. The participants faced the stress experienced by patients with COVID-19 in addition to the fear of
The stress experienced by self-quarantined patients after contact with confirmed patients differs from that of healthy individuals or patients with COVID-19. In this study, each participant used different coping strategies for stress and difficulties experienced during self-quarantine. The positive coping strategies used by the participants in this study included acceptance, finding work/tasks, and planning. In contrast, denial, anger, lack of planning, and non-compliance were ineffective. Coping, which refers to strategies for addressing stress, limitations, or loss, reduces stress and helps achieve a balanced functioning state [26]. Acknowledging stress as a challenge can increase motivation to overcome it [27]. By contrast, recognizing stress as a threat can lead to helplessness and psychological health problems [28]. Among the many strategies used by adults to cope with the social changes caused by the COVID-19 pandemic, positive reframing, acceptance, and humor are associated with positive mental health, while other strategies such as self-blame, venting, behavioral disengagement, and self-distraction are associated with poor mental health [29]. This finding suggests that positive coping strategies are essential for improving mental health outcomes during quarantine. Strategies used by the participants in this study, such as planning and finding work/tasks, can help them develop self-control. In disasters, such as the COVID-19 pandemic, finding work/tasks is a type of psychological first aid for victims who feel overwhelmed or helpless, promoting self-control [30]. Self-control can reduce vulnerability and psychological stress by protecting individuals from serious health problems [31]. Therefore, providing coping strategies and skill training for self-control and other services similar to psychological first aid may be effective in improving the mental health outcomes of those in self-quarantine who test negative for COVID-19.

The participants better complied with the COVID-19 quarantine measures after the self-quarantine period. This is consistent with previous findings that increased awareness of the vulnerability and severity of COVID-19 leads to better compliance with quarantine measures [32]. The participants experienced a stressful period of quarantine after being in contact with confirmed patients and endured the consequences of the pandemic. Their quarantine experience increased their awareness of COVID-19 and infectious diseases, thereby improving their quarantine behavior to prevent COVID-19 infection. It is thought that the painful stigma, fear of transmission, and not wanting to repeat the experience of self-quarantine motivated compliance with COVID-19 quarantine measures among the participants.

Although a few participants expressed continued difficulties and fear after self-quarantine, most showed self-development and growth after stressful experiences. They accepted and adapted to the circumstances, became aware of new aspects of life, and experienced changes in their relationships with others. This may be an effect of resilience, which is the power to overcome a life crisis and recover to a previous level of adaptation [33,34]. The Sendai framework (the 2015∼2030 Sendai Framework for Disaster Risk Reduction: SFDRR), selected in 2015 for disaster risk reduction, includes investments in resilience to improve the disaster response capacity of communities and countries [35]. This indicates that resilience is a fundamental individual characteristic in coping with and overcoming disaster crises and that active intervention must be provided to promote resilience in disastrous situations. Resilience is affected by personal and extrinsic factors. Self-efficacy, empathy, acceptance, social support, and positive interrelationships act as protective factors with positive effects on resilience [36]. However, most participants in the present study did not mention coping strategies related to gaining social support. This may be related to the reluctance to disclose due to the social stigma associated with isolation and infection. Although patients with COVID-19 could benefit from social support through disclosure, some refrained from disclosing their status because of fear of stigma and discrimination [37]. Therefore, to enhance the protective factors and boost resilience during an infectious disease outbreak, it is crucial to consider ways to utilize social support and public resources to ensure psychological safety by protecting privacy and reducing stigma.

The WHO has emphasized that psychological problems must be considered for the general population during the COVID-19 pandemic [38]. The results of this study suggest that timely inter-
vention is required to alleviate the negative effects of stressful events on the mental health of individuals who are not infected with COVID-19 but are under quarantine. Based on the stress responses and difficulties, coping strategies, and post-quarantine changes observed in this study, interventions, including continuous psychological monitoring (evaluation), support, cognitive assessment skill improvement, coping strategy training, and resilience enhancement are required to secure the mental health of affected individuals. Regular psychological evaluations and supportive interventions through non-face-to-face methods, such as video conferences or telephone calls [39], and positive evaluations of stressful situations can lead to active coping [40]. Therefore, cognitive reassessment skills need to be improved. Those under quarantine who experience stress and lack social interaction and physical activity may have difficulty interpreting the situation and controlling their emotions. Cognitive reassessment helps to effectively manage stress by recognizing it as a positive challenge rather than a threat [41]. In a previous study on quarantined individuals with negative COVID-19 test results, cognitive reassessment was negatively correlated with anxiety and stress [42]. This suggests that interventions to improve cognitive reassessment skills are needed in individuals with negative interpretations, poor coping strategies, and high levels of stress.

This qualitative study explored, in-depth, the stress, coping strategies, and post-quarantine changes in individuals under self-quarantine who tested negative for COVID-19. The findings of this study provide useful guidance for interventions to improve the mental health of individuals facing stressful isolation during infectious disease pandemics. However, several limitations of this study should be considered when interpreting the findings. This study focuses on isolated individuals despite negative COVID-19 test reports early during the pandemic. Therefore, there are limitations to applying the research findings to all individuals isolated throughout the entire period of the COVID-19 pandemic. Second, detailed interviews on the stress experienced by young, middle-aged, and older participants could not be conducted. Therefore, the trends and outcomes of long-term mental health problems caused by quarantine could not be assessed. Therefore, follow-up quantitative or qualitative studies must be conducted to compare the stress and coping responses in different age groups and investigate long-term mental health outcomes according to the coping strategies used during quarantine.

Conclusions

In this study, individuals who tested negative for COVID-19 but underwent self-quarantine experienced difficulties and stress owing to economic, psychosocial, and physical restrictions. Adaptive and maladaptive coping strategies and responses were identified for the participants. Moreover, self-quarantine, a crisis event, caused various changes in awareness about life, oneself, others, and in behavior. Therefore, health programs tailored to clients’ characteristics are necessary to help isolated individuals cope effectively with stress and maintain positive mental health. The results of this study provide primary data for crucial future health programs. An effective non-face-to-face mental health promotion program would significantly improve individuals’ crisis coping strategies in the event of future disasters due to infection.

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Conflicts of interest

The authors declared no conflict of interest.

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References

5. Korea Disease Control and Prevention Agency. Coronavirus infectious disease—19