



## Original Article

## Experiences of peer support activities and the need for a metaverse-based program in young women with breast cancer: A qualitative study

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## ABSTRACT

**Objective:** This study aimed to explore young breast cancer survivors' experiences of peer support activities and their need for a metaverse-based peer support program.

**Methods:** This qualitative content analysis study involved 15 young women with breast cancer under the age of 40. Participants with diverse experiences in peer support activities were purposefully selected. Data were collected in March 2023 through three focus group interviews and three additional individual interviews. Saturation was reached when no new themes emerged from the interviews. The interviews were transcribed verbatim and analyzed using conventional content analysis. This study ensured the trustworthiness of the data based on criteria including truth value, applicability, consistency, and neutrality.

**Results:** Four categories emerged: advantages, disadvantages, preferences for peer support activities, and the need for metaverse-based peer support programs. Participants valued peer support activities for exchanging information, nurturing empathy, and encouraging healthy behaviors. Challenges included information confusion, peer conflict, isolation, and stigma. Preferences for group composition, size, and medium varied; however, all participants agreed on the importance of operational guidelines. Participants expected a metaverse-based peer support program to provide safe and enjoyable experiences despite concerns about unfamiliar platforms.

**Conclusions:** This study highlights the unique needs and preferences of young breast cancer survivors regarding peer support activities. Well-organized and tailored peer support can significantly enhance their quality of life. These findings provide valuable insights for developing effective metaverse-based peer support programs to meet the needs of young women with breast cancer.

## Introduction

Breast cancer is the most common cancer in women,<sup>1</sup> and its incidence continues to increase yearly.<sup>2</sup> While breast cancer typically affects women over the age of 50,<sup>2</sup> about 4% of cases occur in young women under the age of 40, and 1 in 68 women are diagnosed before the age of 40.<sup>3</sup> Young women with breast cancer have significantly inferior breast cancer-specific and overall survival rates than women diagnosed in their 40s and 50s,<sup>4</sup> as well as a higher risk of hereditary breast cancer.<sup>3</sup> Therefore, more aggressive treatment is recommended for young women with breast cancer, and long-term follow-up is required for their survival even after the completion of standard treatment.<sup>5</sup> Moreover, young women face unique developmental tasks such as marriage and childbirth, as well as social transitions such as education and employment, which further increase the need for psychosocial support.<sup>5</sup>

Peer support is an activity in which people with the same disease exchange information, share experiences, and support each other in overcoming their disease.<sup>6</sup> For women with breast cancer, participating in peer support activities can provide psychosocial support,<sup>7,8</sup> including reducing anxiety and promoting emotional well-being. It is also a cost-effective and valuable strategy for promoting healthy behaviors and enhancing quality of life.<sup>6,9</sup> However, general peer support groups, predominantly comprising women at later life stages, fail to address the distinct needs of young women with breast cancer.<sup>10</sup> These young women exhibit heightened risk perceptions of cancer recurrence,<sup>11</sup> higher levels of depression and anxiety,<sup>12</sup> and experience unique psychosocial demands related to work, finance, fertility, and family and social relationships.<sup>12,13</sup> Therefore, peer support specific to the unique needs of young women with breast cancer should be offered.

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Owing to the coronavirus disease 2019 (COVID-19) pandemic, social interactions in the real world have been limited and online social encounters have increased.<sup>14</sup> In this context, there is a growing interest in and demand for metaverses as a realistic and tangible way to communicate via virtual environments.<sup>15</sup> The metaverse is an immersive, three-dimensional virtual world based on the real world but without physical constraints that enables interaction between people through avatars.<sup>16</sup> The metaverse serves as a virtual spatial backdrop where users can engage in social, economic, and cultural activities using avatars.<sup>17</sup> Given the high rate of internet usage and preference among young people, metaverses are expected to be effective as a non-face-to-face platform for peer support group activities for young women with breast cancer.<sup>18</sup>

However, there has been a lack of research on the peer support experiences of young women with breast cancer, and a metaverse-based peer support program has not been implemented. The Republic of Korea has nearly 100% smartphone penetration among its young population<sup>19</sup> and one of the highest internet penetration rates globally.<sup>20</sup> This high internet and device penetration and familiarity provides an optimal environment for implementing metaverse-based peer support programs. Therefore, this study aimed to explore the experiences and preferences for peer support activities of young women with breast cancer and their need for a metaverse-based peer support program. Through this preliminary investigation, valuable insights will be gained that will inform the development of effective metaverse-based peer support programs tailored to the unique needs of young women with breast cancer, ultimately improving their health and quality of life.

**Methods**

*Design*

This qualitative content analysis study comprehensively explored young breast cancer survivors' experiences and preferences for peer support activities and their need for a metaverse-based peer support program.

*Participants and setting*

Participants in this study were women with breast cancer between the ages of 18 and 40, based on the European Society for Medical Oncology's definition of "young women" as those under the age of 40 at the time of breast cancer diagnosis.<sup>3</sup> Considering the physical burden of participating in the interview, women who had completed all active treatments, including surgery, chemotherapy, and radiotherapy and were currently in good general condition without any evidence of further metastasis or recurrence were included.

Participants were purposefully sampled from peer support groups to ensure the inclusion of individuals with diverse experiences in peer support activities. Participants were recruited through both online and offline peer support groups. Online groups refer to patient-driven communities or chat rooms, while offline groups encompass patient associations led by medical institutions. With the cooperation of group managers, we posted a participant recruitment document summarizing

the study's purpose, process, and eligibility requirements. Once the potential participants contacted the researcher directly, they were screened to ensure they met the inclusion criteria. A total of 19 women voluntarily contacted, of whom one did not meet the age criterion; 18 women met all inclusion criteria.

*Focus group organization*

Focus group interviews (FGIs) are an effective way to obtain a broad range of information and gain insights through the interaction of research participants by focusing on a specific topic and sharing their experiences.<sup>21</sup> FGIs are particularly suited to this study as they allow researchers to observe the peer interactions of young women with breast cancer during the interviews.

Kruger and Casey suggested that the ideal group size for FGIs on nonprofit topics is between five and eight people per interview and that conducting three to four interviews is appropriate.<sup>21</sup> Based on this, three groups of six participants each were formed. To identify differences and similarities in women's experiences and needs depending on their characteristics, participants were divided into three groups: those with a relatively short (Group 1) or long (Group 2) time since diagnosis, and those with a high level of participation in peer support activities or with experience running their own groups (Group 3). Three participants, one from each group, dropped out for personal reasons, resulting in three FGIs with five participants each, totaling 15 participants.

*Data collection*

Data were collected in March 2023. The FGIs were conducted using the platform Zoom, given the COVID-19 situation and the geographical distribution of the participants. This platform is widely used for remote learning and work in Korea; its usage meant that there were no participation restrictions. All participants logged into Zoom and turned on their webcams to facilitate vivid face-to-face communication. To respect privacy concerns, participants were given the option to choose a name to use during the FGI, either a pseudonym or their real name. To enhance participants' understanding and communication, we provided two short videos (totaling 13 min), including a brief explanation of the metaverse and an example of socializing in it. Participants were asked to watch these videos in advance before participating in the FGI.

Before the FGI, the researchers introduced themselves and explained the interview process. The researchers were all female and created a comfortable environment for women with breast cancer to discuss their lived experiences. To conduct effective FGIs, questions were developed based on the five question types proposed by Kruger and Casey,<sup>21</sup> consisting of opening, introductory, transition, key, and closing questions (Table 1). The questions regarding the metaverse-based peer support program aimed to ascertain general perceptions, needs, and preferences, including expectations and concerns about the program, not assessing program experience. The interviews were semistructured using open-ended questions to capture the participants' authentic views.

The first author, with clinical and research expertise in breast cancer and experience in qualitative research, conducted the FGIs. The

**Table 1**  
Questions for the focus group interview.

Question types	Questions
Opening question	Can you tell us a little about yourself?
Introductory questions	How or why did you join peer support groups? What were your expectations about participating in peer support groups?
Transition question	What activities do you engage in with your peer support group?
Key questions	What did you find good about peer support activities? What experiences or instances have made you feel uncomfortable? What type of peer support activities do you prefer? What are your expectations and concerns about metaverse-based peer support programs? What kinds of programs would be useful and beneficial?
Closing question	Is there anything else you would like to add?

corresponding author acted as a secondary facilitator, taking field notes, recording main contents from the interviews, and asking additional questions as needed. Additionally, we presented key findings to the participants at the end of the interview to ensure that the researcher's understanding accurately reflected the participants' experiences without distortion. The corresponding author also provided technical support to minimize participant discomfort during the interviews. All FGIs lasted approximately 2 h.

After completing the three FGIs, additional individual phone interviews were conducted with three participants from the FGIs for approximately 30 min. Individual interviews included those who actively contributed ideas for a metaverse-based peer support program during the FGIs to gain a deeper understanding of participants' needs and perspectives. These two different types of interviews played complementary roles in enriching our insights into the topic. After reviewing the interview transcripts, all researchers agreed that theoretical saturation had been reached and the interviews were ended.

**Data analysis**

Transcription began on the day of the interviews to capture the main points and atmosphere of the interviews. After the transcription, one researcher verified the transcriptions to ensure accuracy. Nonverbal expressions reflecting the participants' emotions were documented along with field notes for the analysis. The first author conducted the primary data analysis, and all researchers held four meetings to review and refine the analysis and finalize the results.

The data were analyzed using conventional content analysis, as proposed by Heish and Shannon.<sup>22</sup> First, the data were read repeatedly to obtain the meaning of the data as a whole. Second, codes were generated and named by highlighting meaningful words, phrases, and sentences. Third, by comparing the similarities and differences between the generated codes, the related codes were grouped and classified into subcategories. Fourth, the subcategories were organized into categories. Fifth, naming the subcategories and categories was repeated by comparing their relevance. Finally, the key findings reflecting this rich content were presented.

**Research rigor**

This study secured research rigor based on Guba and Lincoln's criteria: truth value, applicability, consistency, and neutrality.<sup>23</sup> First, to achieve truth value, participants who could describe the research phenomenon were selected and allowed to express their thoughts freely. To minimize omissions and distortions in the data, transcriptions were made verbatim from the participants' words. After data analysis, one participant from each

group verified that the results reflected their experiences. Second, the participants' characteristics were presented to ensure their applicability. Third, to enhance consistency, the data were analyzed, results were derived according to the research methods proposed by Heish and Shannon,<sup>22</sup> and the entire study process was described in detail. Fourth, to ensure neutrality and eliminate researcher bias, efforts were made to analyze the data from the participants' perspectives.

**Ethical consideration**

Before data collection, the research protocol was reviewed and approved by the research ethics committee of University of Ulsan (IRB No. 1040968-A-2023-003) to ensure the rights of the participants. Before starting the interviews, the study purpose and process were explained to the participants. The research explanation and consent form were sent to participants via email. Participants were requested to carefully read the explanation, sign the consent form, and return it via email. This procedure ensured the acquisition of written consent from all participants. Interviews were recorded with participants' consent, and all personal information was encoded to ensure anonymity during transcription. A small compensation was provided after the interviews were completed.

**Results**

Fifteen young women with breast cancer participated in the study. The participants' ages ranged from 26 to 39 years, with an average age of 33.93. The time since breast cancer diagnosis varied from 1 to 7 years, with a median of 2 years. Six participants had stage I, eight had stage II, and one had stage III breast cancer and received various treatments depending on the characteristics of their breast cancer. Regarding participation in peer support activities, seven women were active, six were moderate, and two were inactive (Table 2).

After analyzing the data using conventional content analysis methods, 14 subcategories were identified and consolidated into four categories with more comprehensive implications (Table 3).

**Category 1: Advantages of peer support activities**

**Subcategory 1: Sharing diverse information in real-time**

After being diagnosed with breast cancer and beginning treatment, participants' need for information increased dramatically. Even if they had experienced caring for a family member with breast cancer or had received education in the hospital, they were still confused about how to take care of their bodies. Their search for information regarding these questions led them to engage in peer support groups. Talking to peers and

**Table 2**  
Demographic and disease-related characteristics of the participants (n = 15).

Group	No.	Age (years)	Time since diagnosis (years)	Cancer stage	Treatment history	Engagement
G1	P1	32	1	I	OP, CTx, RTx, HTx	Active
G1	P2	37	2	II	OP, CTx, RTx, HTx	Moderate
G1	P3	34	1	I	OP, CTx, RTx, HTx	Active
G1	P4	33	1	II	OP, RTx, HTx	Active
G1	P5	29	1	II	OP, CTx, RTx	Moderate
G2	P1	38	6	II	OP, CTx, RTx	Moderate
G2	P2	39	7	I	OP, CTx, HTx, TTx	Inactive
G2	P3	34	2	III	OP, CTx, RTx, TTx, HTx	Moderate
G2	P4	32	6	II	OP, CTx, RTx, HTx	Inactive
G2	P5	39	6	I	OP, CTx, RTx	Moderate
G3	P1 <sup>a</sup>	34	3	II	OP, CTx, RTx	Active
G3	P2	26	2	II	OP, CTx, RTx, HTx	Active
G3	P3 <sup>a</sup>	32	1	I	OP, HTx	Active
G3	P4 <sup>a</sup>	32	1	I	OP, CTx, RTx, HTx	Active
G3	P5	38	2	II	OP, CTx, RTx, HTx	Moderate

CTx, chemotherapy; G, group; HTx, hormone therapy; OP, operation; P, participant; RTx, radiotherapy; TTx, targeted therapy.

<sup>a</sup> Additional individual interview participants.

**Table 3**  
Experiences of young women with breast cancer in peer support activities and the need for a metaverse-based peer support program.

Categories	Subcategories
Advantages of peer support activities	Sharing diverse information in real-time Fostering empathy and comfort through communication Collaborating for a healthier future
Disadvantages of peer support activities	Confusion caused by flooding unverified information Friction and conflict due to differences in experience Feeling excluded even from peer support groups Feeling stigmatized and trapped as a patient
Preferences of peer support activities	Composing groups based on interests vs. diversity Scaling the group size large vs. small Engaging in online vs. offline activities
Need for metaverse-based peer support programs	Establishing operational guidelines for facilitating peer support activities Providing a safe playground beyond physical limitations Addressing concerns about unfamiliarity with the platform Creating diverse content by leveraging the unique nature of the metaverse

sharing information in real time helped answer their questions faster than other channels. Such interaction also gave them practical and useful tips that they could not obtain anywhere else, such as medical insurance or hospital information.

When I ask, “I’m experiencing these symptoms, what should I do?,” comments appear in about a second, so, I can get my questions answered very quickly. (G1, P4)

Honestly, the education provided in the hospital was too conventional, and it was information that everyone already knew, so, I didn’t know what to do when I got out of the hospital. They (the peers) helped me a lot. (G2, P5)

*Subcategory 2: Fostering empathy and comfort through communication*

Participants cited the greatest benefit of peer support groups as comfort and empathy, which they could not obtain from their family and close friends. Knowing that “I am not alone” in their long journey through the disease and treatment trajectory comforted participants. In particular, the peer support group was a helpful outlet for participants who experienced difficulty meeting peers with breast cancer in real life because of their young age. Through peer support activities, participants relieved their psychological burden, distress, and depression. Additionally, as the topics of conversation expanded from disease and healthcare to everyday life, the participants’ relationships broadened.

I think there’s an underlying empathy that doesn’t need to be explained because we all went through the same things at the same time. (G1, P3)

We have all experienced the same pain, so, even though we’re strangers and have never met, I feel like we’re family. (G3, P3)

*Subcategory 3: Collaborating for a healthier future*

Being diagnosed with breast cancer at a young age meant that participants had to manage their health for the rest of their lives, even after treatment. Healthcare, which felt difficult to practice alone steadily, was enjoyable with peers. They engaged in purposeful activities based on their individual interests, such as maintaining a healthy diet and regular exercise. They shared recipes and meal plans or validated their daily exercise routines. They also practiced mind control by talking about what they were grateful for during the day to handle anxiety and overcome the stress related to breast cancer. Further, they set up a morning wake-up challenge to overcome insomnia caused by endocrine treatment. Therefore, the participants encouraged each other to lead physically and psychologically healthier lives.

Before, I used to eat a lot of junk food or processed food for breakfast, lunch, and dinner, but now that I’m in the “cooking meeting” to diet together; I’m trying to cook seasonal foods for at least one meal a day.

Other people—those who are disease-free—tend to react like this: “Why do you need to diet?” I think it’s more comforting to do things with peers than with someone else. (G3, P1)

*Category 2: Disadvantages of peer support activities*

*Subcategory 1: Confusion caused by flooding unverified information*

As many people gather and share information at any given time, unverified and unscientific information also spreads. Unsubstantiated claims such as “eating certain foods will cause breast cancer recurrence” or “taking certain nutritional supplements will cure cancer” were very tempting to patients preoccupied with cancer and health. Not only old patients with reduced cognitive abilities but also young patients in desperate situations tended to believe and test unverified claims. Some people have even infiltrated peer support groups to sell drugs or proselytize vulnerable patients. This indiscriminate spread of information left the participants confused.

We are just patients, not experts with professional medical knowledge. I thought the plethora of information on the internet could be very confusing for patients. (G2, P5)

There are people who say, “You should buy an ultrasound machine and do breast self-exams at home.” There is a lot of misinformation being exchanged, so, it’s a little overwhelming. (G2, P3)

*Subcategory 2: Friction and conflict due to differences in experience*

The patients in the peer support groups not only had varying disease characteristics, such as cancer stage, health condition, and treatment method but also different personal circumstances, including marital status and the presence of children. Even in peer support groups with the same disease, differences in experience can cause conflicts. Given that each person’s situation and viewpoint differed slightly, sometimes even a casual remark was deeply hurtful. As ill and sensitive patients gathered, trivial arguments turned into fights, leading to the group’s dissolution. However, the participants tried to understand and empathize with each other’s difficulties and avoid conflict.

The swelling comes as a side effect (of chemotherapy). I’m not a person who experiences swelling frequently, and even if there is a little swelling, it’s painful; but someone said sharply, “Hey, don’t say you are experiencing swelling unless your swelling is as bad as mine.” (G1, P4)

I try to hold back as much as possible because everyone’s situation is different, and even a passing comment can be hurtful. (G1, P5)

*Subcategory 3: Feeling excluded even from peer support groups*

In peer support groups, differences in intimacy between patients occurred naturally as friendships developed through communication.

However, as some patients had already formed close relationships with each other, newer or more introverted patients had difficulty engaging in conversations. Furthermore, some participants felt ignored when they did not receive responses from others, which made them feel hurt and isolated. To mitigate these issues, participants were careful not to show off their socialization in front of others during group activities.

Some people can't join meetings because they're undergoing treatment or living in a rural area. They make complaints like this: "I can't even meet you guys, but you guys meet all the time." I think we have to be careful because it's a group that's designed to help us share our pain, so, if someone shows off her friendships too much, this may make other people feel lonely. (G3, P3)

One day I asked something, and they ignored me and just talked about themselves. It was really hurtful. (G3, P2)

#### *Subcategory 4: Feeling stigmatized and trapped as a patient*

Depending on the disease process, participants' peer support patterns changed noticeably. Initially, they actively participated in peer support activities to address their unmet information and communication needs; however, as treatment ended, they communicated less with each other. The negative news of relapse or metastasis frequently shared in the group caused frustration and anguish with thoughts such as "I am going to die too." Therefore, they felt that withdrawing from peer support groups benefited their mental health. Additionally, the desire to live a normal life away from ill people triggered the participants to distance themselves from their peer support groups.

A lot of people have just been diagnosed or are still going through it, so, there's always a lot of bad posts when I go on there (online community). I think it's actually very emotionally draining to hear, "I've relapsed, I've metastasized." (G2, P4)

I think I didn't actively participate in the group because I didn't want to be isolated and labeled as an ill person, and I felt that, if I stayed in that group, I would be an ill person forever. (G2, P2)

#### *Category 3: Preferences of peer support activities*

##### *Subcategory 1: Composing groups based on interests vs. diversity*

As each patient's situation is different, it is difficult to fully connect with everyone in a general group. Therefore, the participants wanted to communicate with their peers with similar disease characteristics or interests. In particular, participants preferred interacting with peers of the same age whom they did not have many opportunities to meet in real life. Having common characteristics or interests naturally leads to a sense of empathy, allowing them to talk more deeply. However, by joining a diverse group of patients, they could get "living advice" from older patients who had been diagnosed with breast cancer at a young age and wisely overcome difficulties.

We were all diagnosed at a similar age and around the same time, so, if I had a question, they were all wondering about the same thing. So, I think we communicated really well. (G2, P4)

When I was thinking about getting married, I was comforted by a patient in her 40s who said, "I was treated in my late 20s and I'm now married and doing well." Now that I'm older, I think I can help the younger generation by sharing the thoughts I had at that time. (G2, P2)

##### *Subcategory 2: Scaling the group size large vs. small*

There were distinct advantages and disadvantages to large and small groups. Participants explained that a larger group was helpful because it allowed for more conversations and better information flow. From an

operational perspective, activating a group that begins with a small number of people is challenging. However, large groups can be overwhelming and stressful because conversations are constantly ongoing. In small groups, the participants had more intimate and humanized interactions, and their level of engagement was more controlled. Therefore, some participants preferred small groups with common interests than large groups.

When it's just the two of us, there are several more things we can fight about, but when we're talking to more people, we can harmonize with each other. (G3, P3)

I think it's helpful to be with a large group of people together when you have a lot of questions. After the treatment ends, and life is back to normal, I think it's more appropriate to get to know each other and perform hobbies and activities in a smaller group. (G3, P5)

##### *Subcategory 3: Engaging in online vs. offline activities*

Chat engagement was the most preferred mode of interaction compared to other forms of peer support activities, including online communities or in-person gatherings. Participants cited the benefits of chat as being able to interact with peers in real time and respond quickly. Young women with breast cancer often hide their cancer diagnoses from friends and family; therefore, they prefer the anonymity of online activities for fear of exposure to acquaintances. Empathy and intimacy created through online interactions naturally led to offline gatherings of small groups of peers. Offline meetings allowed them to create authentic and intimate relationships that were impossible to achieve by chatting alone.

In chats, I can use the bookmark and search functions, so, they're very useful. In the offline meetings, we can all get together and talk about our life stories and problems, so, it's more focused and comfortable. (G3, P3)

I think it's nice to be able to talk to peers in person and know their faces, their voices, and what they look like; it gives me a sense of intimacy (G1, P5).

##### *Subcategory 4: Establishing operational guidelines for facilitating peer support activities*

The participants emphasized the importance of guidelines to ensure the successful operation of the group. They recognized the need for managers to prevent and mediate conflicts that may arise. Group managers create a positive atmosphere by taking the initiative to empathize comfortably and answer patients' questions. They also sanctioned activities irrelevant to the group's purpose, such as sales or proselytizing. However, the nature of peer support groups makes it difficult to filter out misinformation accurately because managers are patients as well. Therefore, the participants requested the inclusion of medical staff who could answer questions and verify and correct medical information.

I created a group, but I ended up closing it because the patients fought too much. I was on chemo at that time, and there were no managers or rules to control and mediate conflicts. Some people joined the group to sell drugs. It would have been easier to communicate with patients if there were some strict rules. (G2, P3)

A lot of things are wrong, so, I think it would be nice to have a healthcare professional there to answer questions or give feedback on such things right away. (G2, P5)

#### *Category 4: Need for metaverse-based peer support programs*

##### *Subcategory 1: Providing a safe playground beyond physical limitations*

Participants expressed strong expectations that the metaverse would

allow them to connect virtually with people they could not meet in person because of physical limitations and engage in various activities together. Participants appreciated that the avatars allowed them to customize their appearance and outfits to express their personalities, while hiding their diseased and disfigured bodies as patients with breast cancer. Additionally, participants felt that the metaverse was a safe environment in which anonymity was guaranteed. Some participants described this as a particularly useful channel when offline gatherings were difficult because of the COVID-19 pandemic.

People like me—that is, those who haven't come out about their cancer diagnosis—can't share their pain or worries with others. In the metaverse, we don't show our faces, so, I think it's easier to openly talk and relieve each other's loneliness. It's a virtual space, so, if I'm an introvert in real life, I can turn into an extrovert in the metaverse. (G3, P3)

#### *Subcategory 2: Addressing concerns about unfamiliarity with the platform*

All the participants had heard of the metaverse; however, few had experienced it. Therefore, the participants only had a vague idea of what they could do in a metaverse. Some expressed concern that setting up and using a new, unfamiliar platform for peer support activities would be cumbersome and inconvenient. Sufficient explanations of how to utilize the platform are required, as there are differences in the ability to utilize the new platform, even among young people. The participants also expressed the need to manage the content of conversations to prevent personal information from being leaked.

I had heard of the metaverse but had never experienced it myself, so, I was a little confused. I wasn't sure about what activities I could actually do in the metaverse. (G3, P4)

I thought that installing the app, logging in, and performing extra activities to participate in the program would be burdensome and inconvenient. (G1, P1)

#### *Subcategory 3: Creating diverse content by leveraging the unique nature of the metaverse*

Participants looked forward to content that capitalized on the characteristics of the metaverse. Many said it would be more fun to perform activities that utilize virtual spaces, such as walking, traveling, and playing games with other patients, rather than simple conversations that might be easier to be engaged in through traditional channels. They also suggested small-group activities in which patients with the same interests could share information about healthcare, such as diet and exercise, and introduce it to other patients through virtual exhibitions.

I think it would be refreshing to sit around a campfire and read through the gratitude list of each person—like camping or taking a virtual trip. I think it would also be great to break up into small groups of a few people based on our interests. (G3, P4)

## **Discussion**

This study was conducted to examine the experiences and preferences regarding peer support activities and the need for a metaverse-based peer support program among young women with breast cancer. Data collected through three focus group interviews and three additional individual interviews were analyzed using a conventional content analysis method,<sup>22</sup> resulting in four categories and 14 subcategories.

The participants reported that real-time access to information about breast cancer treatment and healthcare was a key benefit of peer support activities. Previous research has shown that one of the most frequently unmet needs of women with breast cancer is up-to-date and understandable information.<sup>24</sup> Young women, in particular, prefer more extensive

and detailed information<sup>11</sup> but perceive that existing information is not appropriate for their age and life stage,<sup>25</sup> and healthcare providers do not fully understand their disease.<sup>26</sup> Similarly, participants in this study engaged in peer support activities to obtain information specific to young women with breast cancer that they were not obtaining from healthcare providers or traditional channels. For young, information-starved breast cancer survivors, peer support groups are the most important source of knowledge.<sup>27</sup>

Participants also sought comfort and empathy from their peers. Young women are known to have higher risk perceptions for developing a second breast cancer,<sup>11</sup> as well as higher levels of emotional distress and psychosocial needs<sup>12</sup> than older women. However, it is difficult to receive genuine empathy from family and friends,<sup>28</sup> so participants interacted with peers in the same situation to gain emotional support. Participants also set shared goals to improve their health and encouraged each other to achieve them. Sharing information and emotional support tailored to participants' needs and helping them prepare for a healthy future are the essence of peer support.<sup>29</sup>

However, peer support groups are places where personal opinions can be freely expressed and remain unfiltered, leading to the dissemination of unscientific information among patients. Similarly, more than 30% of cancer-related information exchanged on social media has been found to be medically and scientifically inaccurate or unproven,<sup>30</sup> and the Internet is flooded with inaccurate information about breast cancer.<sup>31</sup> This can be confusing for participants, creating significant barriers to breast cancer treatment and healthcare. Therefore, interventions should be provided to help patients develop the ability to evaluate and screen health information with the appropriate involvement of healthcare professionals.

This study found that differences in experience and intimacy among participants led to conflict and isolation in peer support groups. Interpersonal conflict and isolation are the main challenges in maintaining peer support groups.<sup>32</sup> Organizing groups based on common interests can be a valuable strategy to address these issues, as they allow participants to share their underlying empathy and facilitate authentic communication. Young patients with breast cancer also feel different from older patients in areas such as relationships, fertility issues, work, and finances, and they want to connect with young peers of their own age.<sup>33</sup> Therefore, peer support group-based programs should be developed for this population.

Participants expressed emotional distress due to the negative news they encountered in peer support groups. In particular, participants who completed the treatment tended to withdraw from the peer groups because they no longer wanted to remain as patients. A novel finding of this study is that the participants' peer support activities changed from initial information-seeking to communication as time passed after diagnosis, and their need for peer support activities decreased after the treatment ended. Therefore, when designing interventions based on peer support groups, it is essential to consider the patients' disease trajectories and develop contents suited to their needs. It is also necessary to minimize the impact of the negative information shared among groups and provide programs that support a successful return to daily life.

In this study, participants preferred large, informative groups in the early stages of the disease, but then naturally transitioned to smaller groups that allowed for more human-centered and intimate interactions. More importantly, young women with breast cancer preferred online over offline support groups because of their reluctance to disclose their cancer diagnosis to others,<sup>26</sup> in contrast to the general population with breast cancer who preferred in-person groups.<sup>28</sup> Given that young women with breast cancer perceive the online space as a safe and convenient venue to communicate anonymously, the online environment may be the best medium to design programs for this population. Furthermore, this finding reflects the constraints young women face in attending in-person gatherings due to their social and developmental requirements, such as having a career and engaging in childcare, as well as their familiarity and preferences for non-face-to-face communication and digital media.

Previous studies have reported that unmoderated and unstructured peer groups have no effect or adverse effects.<sup>9</sup> Operating guidelines and managers are required to prevent and mediate interpersonal conflicts alongside participants' voluntary self-regulation. Additionally, as peer support led by healthcare professionals modulates health behaviors,<sup>34</sup> appropriate interventions by nurses or other healthcare professionals in peer support groups will be beneficial. This is also in line with the needs of the participants, particularly in terms of screening for inaccurate information and providing specialized medical knowledge. Such careful organization is necessary to maximize the advantages of peer support activities to improve overall quality of life.<sup>35</sup>

With its ability to overcome physical limitations and allow engagement in various activities in a virtual space, the metaverse is an ideal platform for peer support programs targeted at young breast cancer survivors. The metaverse is also distinctive in that it helps young women who want to conceal their breast cancer diagnosis and their sickly, disfigured appearance to reconstruct their identity through avatars. Although young women tend to have higher levels of digital literacy than other age groups,<sup>36</sup> there may be a gap in their ability to use unfamiliar platforms. Special attention should be paid to developing programs that address both digital literacy and competency to prevent health disparities. Strict technical security is required because sensitive personal information can be easily exposed.<sup>37</sup>

### Strengths and limitations

This study is significant as it offers valuable insights for the development of a metaverse-based peer support program that aligns with the needs and preferences of young women with breast cancer. However, this study had several limitations. First, because of the challenges in finding participants that precisely fit desired classifications and scheduling constraints, strict categorization based on participant characteristics was not possible, limiting in-depth exploration of differences in peer support experiences. Second, variations in internet penetration and cultural differences in social interaction across countries may affect participants' preferred medium for peer support and their needs for metaverse-based programs.

Finally, most participants in this study had stage I or II cancer, and all but two were in their 30s. In addition, to ensure the safety of the study participants, we limited participation to those who had completed active treatment and were in good health, without recurrence or metastasis. Therefore, this study's results may not be representative of all young women with breast cancer. However, the characteristics of the participants in this study are expected to be similar to those of the target population in future interventions. Therefore, this study can broaden our understanding of the distinct needs of young breast cancer survivors and has implications for improving their quality of life.

### Conclusions

This study examined the experiences and preferences of young women with breast cancer regarding peer support activities and the need for a metaverse-based peer support program. Peer support groups are effective outlets for sharing information and empathy and moving toward a healthier future. However, they have several drawbacks, including the spread of inaccurate information, peer conflict, isolation, and patient stigma. While breast cancer survivors' patterns of peer support change throughout their treatment, young women prefer to connect with peers of the same age with common interests online and require clear guidelines to operate the groups successfully.

The metaverse can be a suitable platform for peer support group programs because it overcomes physical limitations and provides enriching and enjoyable experiences in a safe environment where anonymity is guaranteed. This study provides valuable insights and essential information regarding the unique peer support needs and preferences of young women with breast cancer. Further research should be conducted

on the development and application of metaverse-based peer support interventions.

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### CRediT author statement

**Jeonghee Ahn:** Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Writing – Original draft, Writing – Review and editing, Supervision, Funding acquisition, Project administration. **Kyoung-eun Lee:** Methodology, Investigation, Data curation, Formal analysis, Writing – Original draft, Writing – Review and editing. All authors had full access to all the data in the study, and the corresponding author had final responsibility for the decision to submit for publication. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

### Declaration of competing interest

The authors declare no conflict of interest.

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### Ethics statement

This study was conducted after obtaining approval from the Research Ethics Review Committee of University of Ulsan (IRB No. 1040968-A-2023-003). All participants provided written informed consent.

### Data availability statement

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

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