

Fertility Preservation in Young Breast Cancer Patients: a Concept Analysis

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Abstract

The purpose of this study was to clarify and analyze the concept of fertility preservation in young breast cancer patients. As the reproductive age of women increases and the number of young cancer patients increases, there is an uncertain situation in which young cancer patients diagnosed with breast cancer may lose fertility in the course of cancer treatment. Fertility preservation is a widely used concept. It is necessary to clarify the meaning and concept of fertility preservation in young breast cancer patients in order to reduce confusion in the selection of cancer treatment and fertility preservation. For this study the process of Walker & Avant's analysis was used. Eleven studies from electronic data bases met criteria for selection. Fertility preservation can be defined by the following attributes 1)basic human desire 2)voluntary choice according to the individual's point of view 3)change of perception through consultation. The antecedents of fertility preservation consisted of: 1)Appropriateness of providing information 2)differences in individual values 3)socio-environmental factors. The consequences occurring as a result of fertility preservation were: 1)improvement distress and 2)enhancement of quality of life. Results of this analysis provides a theoretical framework for oncology medical staff to better understand fertility preservation in young breast cancer patients, to improve quality of life.

Keywords: fertility preservation, breast neoplasm, concept analysis, young adult

Introduction

A woman's view of fertility changes throughout her life. Changes in a woman's body along with time leading to menarche, pregnancy, and menopause are most pronounced. However, when a woman is diagnosed with infertility or has an unwanted pregnancy, it is considered distressing. The number of unmarried young cancer patients is increasing because of the increase in women's reproductive age and advances in medical technology, which in turn is also leading to a higher cancer survival rate. Naturally, preservation of fertility after cancer treatments is emerging as an important issue for young female cancer patients¹⁻⁴. In 2006, the American Society of Clinical Oncology presented a guideline stating that patients receiving cancer treatment for the first time should receive sufficient explanations about the possibility of infertility and methods of

preserving fertility. Although medical staff focuses on cancer treatment itself when diagnosing cancer, the completely revised American Society of Clinical Oncology guideline⁵ emphasized that a sufficient explanation of fertility should be provided to the patients before starting any treatment. According to the ranking of cancer incidence among women according to age group in Korea published by the Ministry of Health and Welfare in 2018⁶, breast cancer had the second-highest incidence rate of 5.1% after thyroid cancer, among 15-34-year-old patients, whereas its incidence rate in 35-66-year-old patients was 77.6%⁶. An important characteristic of breast cancer in Korea is that it increases at a high rate of 6.1% every year. The total number of breast cancer patients per 100,000 female population is continuously increasing; in 2000, it was 26.3; in 2012, it was 76.8; and in 2017, it was 103.0⁷. In Western

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countries, the proportion of premenopausal women with breast cancer is very low, and the incidence increases with age. The figure is more than twice as high as in Korea^{6,7}. With improvement in cancer treatment, in particular, the 5-year survival rate for breast cancer improved to 93.3%, which is higher than that of other female cancers, i.e., 75.2% for gastric cancer and 80.5% for cervical cancer⁷. Given the characteristics of Korean breast cancer, which occurs frequently in young women under the age of 40 and has a high incidence and survival rate, it is necessary to minimize the side effects that occur in the course of cancer treatment and to improve the quality of life by preserving and recovering body functions⁷.

Chemotherapy is an important cancer treatment, and high-dose chemotherapy causes ovarian dysfunction, with a risk of about 92%, regardless of age³. Young female cancer survivors are anxious and stressed about the possibility of infertility, hoping to be able to become parents after treatment^{4,5}. Preservation of fertility is very important because the number of young cancer patients who are of childbearing age is increasing, and preservation of fertility is one of the most important parts of life after cancer treatment⁸. In a study of young breast cancer survivors under 40 years of age, 12% considered fertility preservation as a factor in determining treatment, and it was reported that after diagnosis, about 53% attempted pregnancy⁹. Women diagnosed with cancer, on the other hand, may be preoccupied with survival and be unaware of the potential future fertility impairment¹⁰. When chemotherapy and hormone therapy are started, a woman's fertility may decrease, and she may not have the opportunity to give birth in the future. Therefore, sufficient discussion about the fertility of young women should be made before starting treatment^{2,4}. According to a study on female cancer patients of childbearing age if they received professional advice from a medical team about their fertility before treatment, they had less regret and a higher quality of life, even if their fertility was decreased¹¹. However, in a telephone interview study of young African-American breast cancer survivors under the age of 45 years, 45% of respondents said they wanted to have children at the time of breast cancer diagnosis, but 50% of them were not informed about their fertility at all¹².

The purpose of this study is to accurately recognize the meaning of fertility for breast cancer patients by clearly defining the meaning and concept of fertility

preservation in young breast cancer patients who are in an uncertain situation where they can lose their fertility during cancer treatment. This study was also conducted to reduce the confusion in choosing cancer treatment and to preserve fertility and to help determine fertility preservation. Therefore, based on the conceptual analysis framework of Walker and Avant¹³ this study will unify the concepts through a systematic conceptual analysis of fertility in young breast cancer patients and provide a clear theoretical basis. The purpose of this study is to clarify the conceptual attributes of fertility preservation in young breast cancer patients and to prepare a theoretical basis. This study used the conceptual analysis procedure of Walker and Avant.

Materials and Method

1. design

This study was conducted using the previous study and literature search method. The conceptual analysis of "preserving fertility in young breast cancer patients" was carried out according to the conceptual analysis procedure of Walker and Avant¹³. The detailed process is as follows:

- First, select a concept.
- Second, establish the purpose of conceptual analysis.
- Third, check the scope of use of the concept.
- Fourth, determine the properties of the concept.
- Fifth, present model examples.
- Sixth, present additional examples.
- Seventh, identify the antecedent factors and results.
- Eighth, determine the definition of empirical reference.

2. Subjects

The scope of the literature review for this study is limited to dictionary definitions of "breast cancer" and "preservation of fertility," theories related to fertility, and previous studies. For literature searches in Korea, journals and dissertations retrieved from the Korea Education and Research Information Service (www.riss4u.net) were used for analysis, and for overseas literature, papers retrieved from PubMed, CINAHL, and PsycInfo were used for analysis. The study

period considered was the last 15 years, i.e., from January 1, 2006, to June 30, 2021, and the keywords were “young breast cancer or breast neoplasm” and “fertility preservation.” There were 4 cases in RISS, 684 cases in PubMed, 94 cases in CINAHL, and 62 cases in PsycInfo. Results, excluding 130 publications, that were duplicated out of a total of 844 searched materials, publications that were evaluated to be completely irrelevant to the purpose of the research according to certain criteria, and 679 publications that were written in languages other than Korean and English, or 35 whose original text was not accessible, were confirmed. Among them, the full texts of 19 documents, excluding 16 documents that did not meet the criteria, were examined by checking the abstract, and a total of 8 documents that did not meet the criteria were excluded; thus, a total of 11 documents were used for the final analysis (Figure 1). Literature that met the following criteria was excluded from the study.

- Documents related to fertility in male and gynecological cancer patients, and data on the experience of medical staff in preserving fertility rather than patients
- Data on drug treatment regimens and treatment guidelines for the preservation of fertility in breast cancer patients.
- In the process of reading the entire text, some materials are judged to be of too low relevance to the research topic.

After reviewing the literature related to the preservation of fertility in young breast cancer patients, in order to understand and appreciate the various uses of the concept of fertility, in addition to studies dealing with fertility, Korean and English dictionaries, life sciences, neuroscience, psychology, public health, and sociology research literature was additionally reviewed. In addition, literature dealing with theories related to the concept of fertility was searched and utilized by referring to references from previous studies.

3. Data Collection and Analysis Methods

The researcher confirmed how the concept of fertility preservation in young breast cancer patients was used within the selected literature. After that, each data table was created, and systematic and reliable conceptual analysis was made possible by extracting and describing the types of documents and the

meanings and attributes of concepts. The data table was independently prepared by two researchers, and after discussion and agreement, the reliability and validity of the study were secured by selecting and analyzing data and extracting the meaning and attributes of concepts. This process was repeated three times until the two researchers reached a full consensus. The purpose of preparing the prepared datasheet is not to reach a final judgment, but to conduct a comprehensive review in the process of first reviewing the literature. After that, the decisive attributes of the concept were identified; model cases, additional cases, antecedent factors, and results were derived; and theoretical definitions were derived by organizing them.

Results

1. Scope of use of fertility preservation in young breast cancer patients

1) Dictionary definition

Merriam-Webster's dictionary defines fertility as “the ability to produce young,” “the Dictionary, “fertility means productiveness, meaning the number of births distinct from the capability to bear, and fecundity means “capability to bear children”¹⁷. In other words, fertility is a concept that includes fecundity, where the idea of the number of progeny is included, whereas fecundity means the quality of reproduction without the concept of number, and it was confirmed that fertility is a larger concept than a fecundity.

2) Scope of use of the concept

(1) Use of concepts in other academic fields

Demographers used the term fertility to indicate the pregnancy power, meaning the number of children born in a country, and they used this term “fertility” to estimate demographic change with the number of children born¹⁸. In psychology and research, fertility is also used as a concept of the ability to reproduce many offspring. Fertility refers to a woman's health status, such as age, waist and hip ratio, and body fat distribution when a man chooses a mate, which was considered an indicator of fertility¹⁹. In medicine, fertility is the ability to become pregnant, and in the case of young cancer patients, many medical treatments are being studied to preserve fertility before and during cancer treatment. In the case of young female cancer patients, ovarian

function deteriorates because of treatment such as chemotherapy, and once the ovarian function has degenerated, it cannot be restored. In the case of the aforementioned patient group, fertility is likely to decrease significantly during the cancer treatment process, so research on fertility preservation methods is ongoing²⁰. The method of preserving fertility in female cancer patients currently being applied in clinical practice varies depending on marital status. Married women use the embryo cryopreservation method, which involves fertilizing and freezing the sperm and oocytes of their spouses. For unmarried women, the oocyte freeze-preservation method is used. Since both require a superovulation induction process for oocyte collection, cryopreservation of ovarian tissue is used to separate and preserve ovarian tissue when emergency chemotherapy is needed, such as in the case of leukemia^{3,8}.

(2) Use of concepts in nursing literature

A woman's fertility depends on changes in her life and environment, and it may be something she wants, but it is also used as a negative concept that she does not want and has to²¹. For example, regardless of the stage of mental maturity, with the onset of menstruation, a woman's body is ready for childbirth, but a woman must keep herself from becoming pregnant until menopause outside of family planning²². For this reason, "fertility" can be used as an opposing concept depending on the situation, such as women who are not planning to become pregnant should be careful not to become pregnant during intercourse, even though they can become pregnant²¹.

Biologically, the desire to be a parent is an important part of cancer survivors' lives and affects their lifelong health and quality of life²³. Fertility is an important area of interest for young female cancer patients²⁴. The preservation of fertility serves as a hope for cancer patients, and it causes major distress when fertility is lost^{1,10,24}. However, young female cancer patients have to make decisions about fertility preservation and adjuvant chemotherapy as soon as they are diagnosed. The patients not only do not have enough time to consider fertility preservation, but they may be overwhelmed by the cancer diagnosis itself and not consider the therapeutic effect on fertility after breast cancer treatment^{4,25,26}. Particularly, in the case of unmarried breast cancer patients, fear of hair loss, chemotherapy, and shameful feelings about breast surgery can cause anxiety. Patients are also concerned about whether cancer treatment will affect future

pregnancies and whether fertility treatment may affect cancer treatment and negatively affect medical prognosis²⁵. The level of concern about fertility depends on three factors: the environment, personal values, and expectations. Fertility is of paramount importance and a high priority for patients who have tried to conceive, are young, or have no children^{4,26}. Young patients who consider survival to be the most important priority accept the possibility of infertility and choose to receive cancer treatment immediately²⁶. In a qualitative study of unmarried breast cancer patients, the preservation of fertility is an important issue, but at the same time, uncertainty about fertility, due to the influence of chemotherapy, etc., acts as a major stress factor. In addition, it was very difficult to consult with the medical staff regarding fertility preservation because patients considered it a very sensitive and complex issue²⁷. In addition, compared to men, women's fertility-preserving treatment is more complex and difficult to find practical solutions, so it is difficult for female cancer patients to consult with medical staff first²⁸. They answered that they felt lonely and alienated when having conversations with family members and medical staff on the topic of fertility due to the difficulty of the topic²⁹. Therefore, it is very important for the medical staff to sufficiently discuss with the patient before treatment about the preservation of fertility and to provide accurate information on the method of preserving fertility as it reduces the psychological distress of cancer patients^{8,24,25}. In particular, in nursing, more holistic care can be provided by sharing opinions and explaining experiences about uncertainty regarding fertility after treatment, fears, and concerns about fertility after treatment²⁷. For effective counseling, medical staff also need to receive conversational education such as how to communicate with the patients²⁹.

For young female cancer patients, being able to have children after treatment has many meanings. Preservation of fertility has the greatest impact on improving the quality of life of patients. It makes them feel "healed"; looks at the future positively; becomes a link to reconnect with colleagues, friends, and family; and becomes a stimulant to recover their health^{2,27}.

2. List of tentative criteria and attributes of fertility preservation in young female cancer patients

As a result of examining a wide range of literature in which the concept of fertility preservation in young female cancer patients is used, the following tentative

list of criteria and attributes were identified. This process is the core of conceptual analysis and is a process of identifying the properties of concepts that appear repeatedly in the literature¹³.

1) List of provisional standards

- ① Preservation of fertility can be downplayed as the burden of cancer diagnosis itself²⁵
- ② Treatment to preserve fertility can have a negative effect on cancer survival^{2,30}
- ③ The desire to become a parent affects the quality of life throughout life¹
- ④ Uncertainty increases fear and distress^{24,27}.
- ⑤ Timely and sufficient counseling from medical staff reduces distress^{8,24,25}
- ⑥ Being able to become a parent serves as hope⁴
- ⑦ Uncertain situations make you feel lonely²⁹
- ⑧ The choice of fertility varies according to society, culture, environment, and individual values^{4,23,26,30}

2) Defining attributes

As a result of reviewing the literature on the fertility of young female cancer patients, we find that fertility is a basic human desire and can be voluntarily selected according to an individual’s point of view. It was confirmed that the perception of fertility through

counseling can be differentiated. Therefore, the properties of fertility preservation in young female cancer patients confirmed in this study are as follows (Table 1).

(1) Parenthood is a basic human desire (③,⑥).

(2) Voluntary choice according to individual’s point of view (①,⑧).

(3) Negative psychological changes due to uncertainty (②④⑦).

(4) Change of perception through consultation with medical experts (⑤).

3. Model examples of concepts

A model case is an example in which all the important properties of a concept are included¹³.

K, a 32-year-old woman who was married last year and does not yet have children, accidentally touched a hard lump on her left chest while taking a shower. She came to the hospital and was diagnosed with stage 2 breast cancer after an ultrasound and biopsy. K was so sad that she thought she was going to die right away when the doctor told her that she needed surgery and chemotherapy right away and could not believe that she had this disease. The doctor explained that after the operation, she had to undergo chemotherapy for 6 months and antihormonal drugs for 5 years. She was also told that if she received this treatment, her ovaries could degenerate and lead to infertility. K was

Table 1. Antecedent, Attributes and Consequences of Fertility Preservation in Literature Review

First Author (year)	Research design	Antecedent	Attributes	Consequences
Bártolo A. (2021)	Descriptive study	Partner disclosure of fertility status	Desire to have a biological child	Improve psychosocial Outcome (distress↓)
Camp-Sorrell D. (2009)	Review	counseling	(future pregnancy is) Viable option	Impact long term health and quality of life
Carneiro, MM (2018)	Review	Advances in breast cancer treatment Consultation with a reproductive specialist	Individualized option	Supportive care
Corney, R. (2014)	Qualitative study	Various information by healthcare professional	Option of ART Emotional and practical support	Improve quality of life
Gorman J.R. (2011)	Qualitative study	Timely information	Life circumstances and timing In relation to diagnosis varied	Improve quality of care

First Author (year)	Research design	Antecedent	Attributes	Consequences
Goossens J. (2015)	Qualitative study	Feeling of loneliness	Difficulties in communicating potential fertility loss	improve quality of oncofertility care
Hampe M. E. (2020)	Review	counseling	fertility preservation is not a priority	Improve quality of life
Penrose R.B. (2013)	Review	enduring distress and feeling uncertainty	Lack of information Cancer treatment	Improve distress
Peate M. (2009)	Review	distress	Possibility of losing their fertility after cancer treatment	
Rosen(2009)	Review	Timely information	Desire for biological parenthood	Improve distress

Desperate to be told that she could not have children and thought that not being a mother would be equivalent to giving up on being a woman (a basic human desire). Doctors introduced that she had embryo cryopreservation methods if she wanted to have children, as K and her husband are a young couple without children. The doctor said breast cancer treatment is delayed by about 2 months because the procedure requires an egg collection process. The doctor also warned that superovulation injections administered for oocyte collection could make breast cancer worse and advised her to discuss with her family whether to start breast cancer treatment or choose a fertility-preserving method. K's husband thought that she should receive treatment as soon as possible and become healthy rather than h the possibility of having a child. However, K felt that life without children would be too frightening and meaningless, so she wanted to receive fertility-preserving treatment (a voluntary choice based on her personal point of view). K was worried about whether to choose between chemotherapy and preservation of fertility (psychological changes due to uncertainty). After hearing detailed explanations of fertility preservation methods and experiences from other patients from a breast cancer nurse, she gained confidence that breast cancer can be cured sufficiently even after embryo cryopreservation (recognition change according to the role of medical staff). This childless young breast cancer patient's case includes all four attributes of fertility.

4. Development of additional cases

1) Similar cases

Similar cases are cases in which most of the attributes of the concept of interest are included, but not all of them. This example demonstrates why it cannot be a model case and helps clarify what is considered a concept and what is not, helping to clarify actual concepts and confirm their properties¹³.

A 37-year-old Y, who was diagnosed with breast cancer, asked her doctor if she could have children after 6 rounds of chemotherapy after surgery. Then, the doctor said that she has to take

tamoxifen for 5 years from now and could not become pregnant during the drug treatment period and that there is a very high probability that she will not be able to have children because she is currently amenorrhetic. Y, who thought that she would be able to have a child after chemotherapy (parenting is a basic human wish), claimed that she had not heard enough from the medical staff before starting treatment. She said that her choice would have been different if someone had informed me about it (voluntary choice based on a personal point of view). She expressed that it was difficult and hopeless to accept the fact that she could not have a family and that she could not have children, even though cancer could be treated (negative psychological changes due to uncertainty).

This similar case is a case in which the attribute of change of perception according to the role of medical staff is not included.

2) Related cases

A related case is an example of a concept related to the concept being analyzed, but a case that gives a different idea when closely examined. It is similar to the concept under analysis, and in a sense, is connected to it²⁶.

L, a 28-year-old unmarried woman, visited the hospital with a lump on her chest and was diagnosed with stage 3 breast cancer. She had a large cancer and was told that she could get the surgery after she received prior chemotherapy. The doctor said that ovarian dysfunction may occur as a side effect of chemotherapy prior to chemotherapy and may lead to infertility. In the words of the medical staff, L said that she did not want to become pregnant and that if she wanted a child, she could adopt it later (voluntary choice according to the individual's point of view). It is more important for her to be healed quickly and become healthy than for a child. She was always worried about getting pregnant while having intercourse with her boyfriend, but now she does not have to worry about having an unwanted pregnancy in the future.

In this case, among the properties of fertility preservation, "parenting is a basic human desire," "negative psychological change due to uncertainty," and "recognition change according to the role of medical staff" factors could not be found. In this case, fertility is negative, meaning that it is uncomfortable when having sex with a boyfriend, and parenting is also possible through adoption, one's choice without the attribute of basic human desire. The attribute for fertility preservation includes only the voluntary choice attribute according to an individual's point of view.

3) Opposite case

A counter-example is an example of "what the concept is not." This example helps with the concept because it is easier to say what a concept is not than what it is¹³.

L, 30, unmarried, has a family history of being diagnosed with breast cancer by both her maternal grandmother and mother. When she was 24, her mother was diagnosed with breast cancer. At this time, she also received a BRCA genetic test, and both BRCA I and II were positive. L has been thoroughly self-examination and regular check-ups and has accumulated knowledge through an Internet search for breast cancer diagnosis and prevention since the

age of 24. However, L was diagnosed with stage 2 breast cancer at the age of 33 and heard the news that a Hollywood actor with a BRCA gene mutation, similar to her case, had undergone oophorectomy and mastectomy to prevent breast cancer. She also said that she would undergo ovarian resection in advance.

In this case, among the attributes of preserving fertility, the patient's behavior is determined by information obtained through an Internet search, rather than by consultation with medical staff and voluntary selection according to an individual's point of view. A case in which a patient decides to undergo oophorectomy to prevent the recurrence of breast cancer rather than feeling anxious about preserving fertility during cancer treatment is a case of not thinking about preserving fertility. In this case, "parenting is a basic human desire," "voluntary choice according to an individual's point of view," "negative psychological change due to uncertainty," and "attributes of cognitive change according to the role of medical staff" are not included.

5. Confirmation of antecedent factors and results of the concept

Antecedents are events or ancillary conditions that occur before the occurrence of a concept. After conceptual analysis, checking the antecedent factors and results helps to reflect the social situation in which the concept is commonly used and refine its attributes. Antecedents are things that must happen before a concept occurs, and consequences are events or ancillary conditions that occur after they occur¹³.

1) Antecedent factors

The first antecedent factor for fertility preservation in young breast cancer patients identified through the literature is the adequacy of providing sufficient information on fertility preservation.

Young breast cancer patients often do not receive accurate information about fertility preservation. The reasons are as follows: failing to consider the possibility of future fertility preservation because of the pressure to be diagnosed with breast cancer, lack of time to discuss fertility preservation, and the belief that delaying breast cancer treatment negatively affects cancer treatment. As a result, it can be stated that the provision of information on fertility by medical staff with professional knowledge is a major driving factor^{8,24,25}. The second antecedent factor is the preservation of fertility and parenting, which

is a factor determined by differences in individual values. The desire to have children was found to be influenced by the frequency of partner-supportive conversations among married people^{1,25}. In the case of unmarried breast cancer patients, there is a dilemma in making a choice due to the fear of being rejected by their spouse in the future and the anxiety that if they choose fertility-preserving treatment, the time to receive breast cancer treatment will be delayed²⁷. In the case of young breast cancer patients, the choice of breast cancer treatment or fertility-preserving treatment when diagnosing breast cancer differs according to individual priorities^{2,31}. The third antecedent factor is a socioenvironmental factor. According to this factor, there are social and cultural differences in fertility decisions⁴. Family or spouse's support, which can be seen as one of the social and environmental factors, is an important essential factor when planning on fertility preservation, so it can be said to be a prerequisite for fertility preservation²⁶. In addition, since financial resources are required for the treatment to preserve fertility, financial status can also be said to be a prerequisite for fertility preservation⁸.

The three antecedent factors for fertility preservation in young breast cancer patients are as follows:

1. adequacy of provision of information on fertility preservation^{8,24,25}

2. differences in individual values^{26,29}

3. socioenvironmental factors^{8,9,27}

2) Confirmation of consequences

The decision on whether to preserve fertility in young breast cancer patients is determined by complex and diverse individual factors³². A (2)voluntary choice according to the individual's point of view,

(3) psychological changes due to uncertainty, and

(4) changes in perception according to the role of medical staff navigator role is needed that integrates the role of a counselor to heal various psychological emotions such as anxiety, fear, and sadness, as well as providing medical information on fertility through sufficient information and communication with medical staff before breast cancer treatment. This can increase the satisfaction of breast cancer treatment, lower the distress, and ultimately improve the quality of life(Figure2).

: Improving the quality of life^{2,27,29}

6. Empirical reference

As the last stage of conceptual analysis, it refers to the classification or category of actual phenomena to explain the occurrence of a certain concept⁹. It was found that the important attributes and empirical criteria of fertility in young female cancer patients were the same. They were found as follows:

(1) basic human desire,

Discussion

Treatments for cancer diagnosis include surgery, chemotherapy, and radiation therapy, which cause ovarian dysfunction and lower fertility in women. Recently, as the childbearing age of women for the first child is gradually increasing and also the proportion of young female cancer patients is increasing, it is an important issue to preserve the fertility of young women diagnosed with cancer³. In particular, it is difficult to recover ovarian function, which has been degraded once due to treatment, and it is uncertain whether or not to preserve fertility after treatment. Therefore, this study confirmed the meaning and concept of fertility in young female cancer patients who may lose fertility due to cancer treatment. Therefore, for young women who are single or do not have children, it is very important to provide and understand sufficient information about preserving fertility before cancer treatment^{4,8,26}. As shown in previous studies, fertility is a basic human desire for young breast cancer patients. However, it is uncertain whether fertility can be preserved due to cancer treatment, such as chemotherapy and antiestrogen therapy⁷. Therefore, cancer treatment has been shown to increase fear and distress in young breast cancer patients. However, when the medical staff gave sufficient explanations and discussions about fertility preservation to the patients before treatment, the psychological distress of cancer patients was low⁹. When selecting the treatment after fully knowing about the uncertainty of fertility, it was found that even if the patient lost fertility, the feeling of regret was low and the quality of life was high. In particular, the choice of fertility may vary according to an individual's point of view. If the medical staff's professional counseling and discussion on fertility preservation were done well before treatment, the psychological impact on patients would be relatively low even if they lost fertility. Therefore, pre-consultation with professional medical staff on fertility is very important.

Therefore, this study aims to reduce confusion that may occur in uncertain situations after breast cancer diagnosis through conceptual analysis and understanding of fertility preservation in young breast cancer patients. The application of interventions for fertility preservation, such as the development and application of professional counseling programs for fertility preservation, is thought to ultimately improve the quality of life of young breast cancer patients.

However, this study has limitations in generalizing the results of studies, such as the results were obtained by selecting only Korean and English literature, which were used by viewing the title and abstract. The concept analysis method of Walker and Avant¹³ used in this study has limitations in analyzing concepts appropriate for the nursing phenomenon; thus, various concept analysis methods that combine the theoretical and field steps are needed. Therefore, it is thought that repeated research on the concept of "preserving fertility" is necessary to identify various influencing factors that were not confirmed in this study.

Conclusion

This study is a conceptual analysis study using Walker and Avant's method.

As a result of the analysis, 1) young female cancer patients' fertility is a basic human desire, 2) they experience psychological changes due to uncertainty about fertility before treatment, 3) they can choose to preserve fertility according to the individual's point of view, and 4) it was found that there is a property that can change the perception of whether to preserve fertility depending on the role of the medical staff.

From the above research results, the following conclusions were drawn. First, research related to the development of an intervention program for sufficient education and counseling on the preservation of fertility in young female cancer patients in actual clinical practice is necessary. Second, it suggests conducting a follow-up study to confirm the patient's quality of life results after the application of an educational intervention program on the preservation of fertility in nursing practice.

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