

Fertility Issues among Young Cancer Survivors: A Systematic Review

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ARTICLE INFO	ABSTRACT
<i>Article type:</i> Review article	Background & aim: Fertility issues after cancer have recently received great attention. This study was designed to review the impacts of breast cancer treatment on fertility.
<i>Article History:</i> Received: 29-Jun-2020 Accepted: 14-Sep-2020	Methods: This study is a narrative review. Textbooks as well as electronic databases including ProQuest, Google Scholar, PubMed, Scopus, Web of Science, Science Direct, and MEDLINE were comprehensively searched for scientific literature. The search strategy was based on keywords: "Fertility", "Childbearing", "Breast Cancer Survivorship", "Reproductive Issues". A total of 270 titles and abstracts were recognized through searching. Studies, which focused on medical or biological consequences and included premenopausal women or subjects younger than 50 years, were eligible for review. After removing duplicates, studies focused on patients who were not in their reproductive age, and studies with stereotyped results, 30 articles met the inclusion criteria. The articles were screened with regard to their titles and types. The abstracts which best fitted the inclusion criteria were checked for eligibility, and then their full texts were read. To guarantee the consistency of the retrieved information, the data was independently extracted from each study by all the authors, and then was entered to the standardized tables.
<i>Key words:</i> Breast Cancer Fertility Infertility Reproductive Age Cancer Survivors	Results: Long-term fertility dysfunctions happen in most patients under cancer treatment. Also, breast cancer survivors of the reproductive age suffered greater distress over cancer-related infertility. Conclusion: Counseling methods to obtain information about the risk of treatment on fertility and ways to preserve fertility should be presented early in the treatment.

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Introduction

Since specific targeting of tumor cells in cancer treatment is not completely possible, there is a probability that some treatments damage the reproductive system (1). Sexuality and fertility issues after cancer treatment are not the only problems for survivors; however, they are recognized as persistent and less prone to be resolved over time when juxtaposed with other side effects. Nevertheless, since not every cancer survivor discusses fertility concerns with a

physician, long-term sexual dysfunction has been reported in at least 50% of the patients under treatment. It has been reported that the breast cancer survivors of the reproductive age suffered greater psychological distress over cancer-related infertility (2).

Unfortunately, many health care providers are not concerned about the value of subfertility; nonetheless, the issue can directly and extensively affect the quality of life and emotional

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health of many women (3). Based on the literature, a multitude of young women who are diagnosed with breast cancer are interested in preserving their fertility or having (more) children (4). With due attention to the potential for the treatment of temporary or permanent infertility in cancer patients, it is obvious that many life plans, dreams, and wishes can be affected.

Infertility indisputably is devastating for young survivors (5) and is linked with increased levels of psychological discomposure, insignificant adjustment (6), depression, rage, anxiety, sorrow, psychological disorders, and less quality of life (7). Unfortunately, in most patients, time cannot bring about the dissipation of survivors' distress (8), and through this scenario it seems absurdly naive to assume that the importance of fertility for these individuals and care professionals will fade away over time by ignoring the subject. Moreover, the fact that an important issue as fertility is avoided by women does not mean it is insignificant. The provision of a universal care scheme, including screening for depression, identifying the women at high risk, and performing proper interventions, is essential. The question of "Is it possible for me to have children after cancer?" will definitely be asked by many cancer survivors.

In this situation, the physicians' later arguments will be that the patient diagnosed with such a horrible disease is still alive. Although the physician is right (individuals with a diagnosis of chronic diseases do want to be alive), is it their only concern? The physical and psychological challenges for cancer survivors are not only limited to infertility anxiety (9, 10). Even for some survivors, fertility plans have led to critical psychological consequences (11). For cancer patients, recovery and decrease in mortality on the one hand and fertility preservation on the other hand make parenthood a major concern. Women consider parenthood as a determining factor in the quality of life. Concerns about the treatment side-effects and lifespan result in some contradictory effects in productivity plans and parenting roles. In addition, mistrust in the effects of drugs on fertility and fetus and impact of cancer treatment on fertility brings additional anxiety (5, 12).

Indeed, life is more than just surviving; where

there is life there is hope. It is surprising to think that describing cancer and its treatment modalities in detail is a suitable clinical choice; however, considering the patients' thoughts about getting pregnant and talking about dreams and plans for motherhood are not suitable clinical options (13). Therefore, young women with breast cancer struggle with the doubt in their ability to become pregnant after treatments. The fact that getting breast cancer is not considered a contraindication for pregnancy is extensively supported (14, 15). However, adequate counseling for the risk and prognosis of breast cancer recurrence based on cancer pathological features and age is indispensable prior to making fertility-related decisions (16). Secondly, advances in screening methods and treatments could increase the number of childbearing-age survivors with no child or a plan to have children. Accordingly, the importance of parenthood and pregnancy issues is apparent. In clinical training, the issue of educating the women diagnosed with cancer about childbearing options by gynecologists and oncologists empowers them to make informed decisions.

However, based on some studies, women's concerns over fertility are not properly addressed since care providers mostly feel inconvenience and have inadequate knowledge of how to train individuals with cancer-related fertility (17, 18). The main reason lies in the fact that care providers realize the seriousness of fertility as less when it is juxtaposed with the treatment of cancer (19). The present systematic review was designed with the aim of highlighting the impacts of breast cancer treatment and diagnosis on fertility due to identifying the realized issues of women diagnosed with breast cancer. In addition, this review focused on the attitudes and decisions of young breast cancer survivors about childbearing and parenthood to assist health care professionals to properly deal with their patients' needs.

Materials and Methods

Search strategy and selection of methodology were based on conducting a systematic review considering the preferable criteria for systematic reviews and PRISMA guidelines (20). Furthermore, the journals in Proquest, Wiley, Google Scholar, PubMed, Scopus, Web of Science, ScienceDirect, and MEDLINE within

1996 to 2013 were searched through the restriction of the search to women. The keywords or phrases, such as "Reproductive Issues", "Fertility", "Pregnancy", "Childbearing", "Breast Cancer Survivorship", "Breast Cancer Survivors", and "Parenthood", were used to conduct the search. The inclusion criteria were the articles exclusively on young female breast cancer survivors, studies published in the English language, and primary research on pregnancy, childbearing, fertility, and parenthood views/decisions as outcome variables since breast cancer diagnosis based on the women's outlook. The investigations focusing on medical or biological consequences were eliminated.

In the current review, premenopausal women or subjects younger than 50 years were defined as young. It is noteworthy that previous studies provide different definitions for "survivors". For example, in some investigations, a woman is considered a survivor since the date of diagnosis (21); nevertheless, in other studies, a survivor is an individual who has completed his/her treatment (22). Still, in some other studies, survivors are defined as those with 5 years of post-treatment with no symptom of malignancy (23). Mixed methods and particularly qualitative and quantitative investigations were included in this review. Based on the inclusion criteria, the articles were screened and selected with regard to their titles and types. The abstracts which best fitted the inclusion criteria were checked for eligibility, and then their full texts were read. Those studies best fitting the inclusion criteria were evaluated in the review.

A total of 270 titles and abstracts were recognized through this searching. After the removal of duplicate studies that were not extensively related to breast cancer survivors, studies with patients of younger than the reproductive age, and articles with stereotyped results or repetition of previous findings, 87 articles remained to be more closely reviewed. Although a large number of these articles were finally cited in the current review, only 30 articles met the inclusion criteria of this study. Finally, manual searching was performed on the reference lists of investigations retrieved from the electronic databases.

Two reviewers separately evaluated the

possible relation of all the titles and abstracts retrieved from the electronic databases, and in the second stage the full texts of potentially relevant studies were reviewed. A study published as an abstract if containing adequate information was included only to demonstrate that the study met the inclusion criteria and its methodological standard was acceptable. A third reviewer checked the final list of included and excluded articles, and any difference in including particular studies was resolved by discussion.

The 8-item Newcastle-Ottawa Scale (NOS) was used to identify the risk of bias within the included studies. In the NOS, an article can be given a maximum of nine stars in cases relevant to the selection of the study groups (four stars), agreement of the groups (two stars), and definition of the favorable outcome (three stars). The tool and code booklet were prepared by the reviewer to prepare the main confounding factors, adequate follow-up period, and criteria to judge the representativeness of the study community. In order to preserve the data, studies with a score lower than the mean score (lower than a score of 4) were considered low-quality. Therefore, two papers were excluded due to low quality, and one study was ruled out due to duplicate content and re-reporting of information in the form of a new article.

Three categories of qualitative, quantitative, and mixed-method studies were considered for eligible investigations. The study goals, origin, design, sample, inclusion criteria, related measures-data collection, and related explorations were taken into consideration. To guarantee the congruency of the information, the data were separately extracted by two authors, recorded on a specific form, and discussed.

Results

Qualitative studies

Considering the qualitative format, six studies demonstrated women's decisions, attitudes, and views about pregnancy and parenthood after being diagnosed with breast cancer (Table 1).

Table1. Qualitative studies included in the review

Authors (year)	Design	Aim	Participants	Model of interview	Key findings
Thewes B et al. (2003)	Retrospective qualitative	Survey of fertility and menopause-related data	24 women Age range: 26-45 years	Telephone interviews Focus group interviews	Patients expressed that the information they received in the past about fertility and menopausal signs was insufficient.
Ruddy KJ et al. (2011)		Evaluation of the effects of chemotherapy on ovarian reserve	Survivors with 1 year or more since diagnosis Case: 20 Control: 20 Age range: 31-43 years		Survivors had more fertility concerns in comparison to controls.
Gorman JR et al. (2011)	Cross-sectional	Investigation of how young women make cancer treatment decisions and effect of fertility concerns on that procedure	20 young breast cancer survivors	Open-ended telephone interviews	Physicians did not talk about options and ideate about fertility until it was too late.
Lee RJ et al. (2011)	Cross-sectional	Investigation of women's responses to being told about the effectiveness of treatments	24 women under 40 years	Three focus groups with a flexibly structured interview	Survivors welcomed a free and honest discussion with a fertility expert to maximize their options.
Connell S et al. (2011)	Longitudinal	Investigation of concerns about fertility, contraception, pregnancy, and breastfeeding after breast cancer	185 participants Age range: 21-44 years	One-to-one home or telephone semi-structured interviews	Patient's views on fertility status change over time. There are mixed attitudes about pregnancy and desire for having children.
Thewes B et al. (2004)		Collection of preliminary qualitative data on the psychosocial needs of breast cancer survivors	18 participants with early-stage breast cancer	Telephone interviews	The needs of breast cancer survivors were support needs, psychological needs, information needs, physical needs, and practical needs.

1) A retrospective qualitative methodology was chosen for the first study carried out by Thewes B et al. due to the investigation of the fertility and menopause-related needs of younger women with early-stage breast cancer. The participants were 24 women who were within the age range of 26-45 years at diagnosis and were divided into two groups of telephone interviews and focus group interviews. Many of these participants expressed their discontent with previously received information on fertility and menopausal symptoms. They believed that their information was unavailable or insufficient. Some women stated that the importance of information on menopause and fertility issues became increasingly significant after diagnosis; however, it was not been preferable at the time of diagnosis.

Based on the participants' needs, revisiting doctors for reviewing the information on fertility and menopause-related issues was crucial. The majority of the participants believed in receiving fertility-related information prior to or while treatment decision-making and data on the handling of menopausal signs in the onset of the menopausal symptoms. Receiving the information on fertility and menopause through the consultation with a menopause and/or fertility expert was the most preferable route of receiving information. The results of the aforementioned study can help the providers and researchers to communicate better with younger women about menopause and fertility-related complications in treatment for breast cancer (24).

2) To assess the impacts of chemotherapy on ovarian reserve, Ruddy KJ et al. performed an investigation on 20 survivors of breast cancer with normal menses after using adjuvant chemotherapy and juxtaposed them with gravidity and age-matched controls (n=20). In all the survivors, 1 year or more had passed from the diagnosis of early-stage breast cancer, with no indication for recurrence. The investigation of infertility was of the greatest significance. The inclusion criteria of breast cancer survivors were an age of ≤ 40 years at diagnosis, perimenopausal period, history of chemotherapy treatment for stage I-IIIa, no indication for recurrence at the time of the survey, and no history of infertility treatment at diagnosis. The

inclusion criteria for the controls were the age of 43 years, no current use of hormonal contraception, reported menses at least every 2 months, and no history of metastatic cancer, tamoxifen use, previous cytotoxic chemotherapy, and infertility.

The results of the study carried out by Ruddy KJ et al. after a planned temporary analysis of the first 20 matched pairs showed a significant decrease of ovarian reserve in the survivors, compared to that of the control group. The participants' age was within the range of 31-43 years with the mean age for both groups equal to 37 years. During the study, 80% of the survivors and 25% of the controls were interested in discussing fertility (P=0.001). Moreover, 16 survivors and 10 controls intended to have children. This intention in both survivors and controls was with greater fertility concerns (P=0.01). Fertility concerns in survivors with an intention of having a child in the future were statistically more significant than those of the controls (P=0.005). Greater concerns about fertility were observed among young women who were within the perimenopausal period after breast cancer chemotherapy. In assessment with gravidity and age-matched controls, Ruddy KJ et al. reported further menopausal signs. This may have been due to cancer treatment or diagnosis or it may show other differences between the controls and survivors in the aforementioned study (25).

3) Gorman JR et al. investigated the perspectives of treatment decisions for breast cancer survivors and fertility issues. In the aforementioned qualitative study, Gorman JR et al. tried to show how young women make decisions about cancer treatment and how fertility issues can affect the procedure. A total of 20 young breast cancer survivors participated in open-ended telephone interviews, and cross-case comparative analysis was employed to recognize the themes. The following themes were extracted:

- 1) I was young; I required doing what is possible to continue my life and wish the cancer does not come back;
- 2) Fertility concerns are different for every woman;
- 3) My oncologist was an expert, an eminent part of my survivorship;
- 4) They did not tell me about my options and I

did not think about fertility until it was too late.

According to the results of the study concluded by Gorman JR et al., it was concluded that survival concerns motivated treatment decisions because fertility was considered important by the majority of the participants. The time of diagnosis and life circumstances was effective in fertility concerns. Finally, it was noted that concerns may not be recognized at the time of diagnosis; however, it is necessary to update the information which is effective in fertility and fertility preservation (26).

4) In a study carried out by Lee RJ et al., 24 participants younger than 40 years of age were divided into three focus groups utilizing a flexible interview structure. Member checking of the themes was performed, and data analysis was carried out using content analysis. Although survival was preferred to fertility for most women in the aforementioned study, the subjects with no children were more willing to undertake ventures. Many women considered pregnancy and egg harvesting methods after breast cancer as a risk to survival. In addition, conflicting advice from health professionals can exacerbate the fear of pregnancy. Cancer treatment options and health services in general can affect the choices. However, based on the literature, open and truthful discussion with a fertility specialist maximizes the options (27).

5) Connell S et al. concentrated on the process of changing views of young women about reproductive issues during a period of 12-18 months. In a longitudinal study, the data were collected three times within a period of 12-18 months. Phase I (i.e., baseline) included 35 women. The women were 13 individuals whose median age diagnosis was reported as 37 years (range: 29-40 years) and their median time since diagnosis was 26 months (range: 5-37 months).

The inclusion criteria were English speaking, semi-structured interviews, one-to-one home or telephone semi-structured interviews (lasting for 6 months) with women with breast cancer, diagnosis of ≤ 4 years ago, age of ≤ 40 years at diagnosis, and not having excessive stress or not receiving palliative care. According to the results of the study conducted by Connell S et al., it was concluded that the women's outlooks on fertility changed over time. Their views changed from not intending for a child to desiring for children.

However, some women were worried about cancer recurrence after pregnancy (28). All the 185 participants in the aforementioned study were within the age range of 21-44 years.

6) A study conducted by Thewes B et al. considered the psychosocial needs of breast cancer survivors and identified the unique and shared needs of younger survivors against older survivors. A qualitative methodology was chosen due to the unexplored issue of the study. The participants were women treated for early-stage breast cancer and completed their hospital-based treatment course (i.e., 6-24 months before the study). Sampling continued up to achieving adequate information. After conducting 18 telephone interviews, different ongoing psychosocial and information needs, such as support needs, practical needs, psychological needs, physical needs, and information needs, were reported by the breast cancer survivors. More needs were presented by younger women, and the needs were directly associated with being in the premenopausal period or younger age at the time of diagnosis. The women sought informal and sexual support mostly from the treatment team and support groups (29).

The diagnosed women of reproductive age are in need of discussing the effects of treatment on their subsequent fertility. Undergoing chemo- and/or radiotherapy may indeed temporarily or definitively slow down ovarian function causing amenorrhea and/or infertility. The type of cancer and proposed treatment in addition to the age and specific susceptibilities of each patient affect these consequences and their duration and fertility protection measures. In spite of the willingness of the majority of respondents to receive counseling for fertility loss, early menopause, chemotherapy, or fertility conservation, none of them received information on these issues from the clinic staff. Therefore, their knowledge is considered to be insufficient and they are in need of receiving proper information.

The present study was conducted to accentuate insufficient knowledge that premenopausal women with breast cancer receive on infertility, fertility preservation, and menopause issues despite the fact that they showed a great willingness to receive counseling for these subjects.

Table 2. Quantitative studies included in the review

Authors (year)	Design	Aim	Participants	Model of interview	Key findings
Lee S et al. (2011)	Secondary analysis	Evaluation of demographic, socioeconomic, and medical items affecting the referral pattern either before cancer treatment for fertility preservation or after treatment	314 women with breast cancer		Increasing tendency within the last 10 years toward early referral of breast cancer women for fertility preservation
Geue K et al. (2014)		Survey of the willingness for fertility issues and desire for having children among young German cancer survivors	149 cancer women (age range: 18-45 years)	Self-developed questionnaire	Seriousness of fertility subjects for young cancer women

Quantitative studies

Two studies showed women's decisions and tendencies toward pregnancy and parenthood after the diagnosis of breast cancer in a quantitative format (Table 2).

1) A study by Lee S et al. was carried out on a total of 314 patients with breast cancer. They were advised about fertility preservation (n=218) or post-chemotherapy for assisted reproductive technology (n=96) within June 1999 to July 2009. An increasing tendency was observed toward the early referrals of breast cancer patients for fertility preservation during the last 10 years. Early-stage cancer, family history of breast cancer, older age, and academic center contention were among the factors for early referrals. It was observed that participants are more likely to receive intervention before cancer treatment (30).

2) Geue K et al. investigated 149 German cancer survivors regarding the desire for having children and fertility. A self-developed questionnaire was completed by all the 149 cancer patients (age range: 18-45 years). In the aforementioned study, the Patient Health Questionnaire was employed for the measurement of psychological distress. Accordingly, 74% of the patients showed willingness to have children at the time of diagnosis. An increase in the severity of the tendency toward having children was observed during pre- to post-treatment in patients without children; however, the intensity reduced in women who formerly had children.

Based on the results of the above-mentioned study, it was concluded that fertility issues mattered to young cancer patients and they showed a great willingness to have children. They

provided proof for not discussing fertility issues with oncologists. In the study conducted by Geue K et al., it was recommended to investigate the reason for low referral rates to fertility experts in future studies (30). Furthermore, it was proposed that non-respondents' and respondents' attitudes differ about fertility issues

and menopausal signs. It was also shown that fertility was one of the most concerns in the breast cancer population; nevertheless, breast cancer in younger patients was more metastatic and led to poorer prognostic consequences.

Table 3. Mixed-method studies included in the review

Authors (year)	Design	Aim	Participants	Model of interview	Key findings
Braun M et al. (2005)	Cross-sectional study	Investigation of positive and/or negative stimulants to childbirth of breast cancer survivors and their husbands	30 survivorships and their husbands vs. 29 healthy controls and their husbands		Breast cancer survivors' unique negative stimulants in comparison to controls: concerns over mother's health Breast cancer survivors' unique positive stimulants in contrast with controls: tendency to have siblings for their existing children and strong willingness to have a big family less satisfaction in comparison to that of controls
Lewis PE et al. (2012)	Cross-sectional study	Investigation of breast cancer survivorships' psychosocial concerns	33 African American survivors	Semi-structured telephone interviews	45% of the survivors requested to have a child at the time of diagnosis; however, half of these women claimed that they never received fertility information.

1) Two studies investigated women's decisions, views, and attitudes toward pregnancy and parenthood after the diagnosis of breast cancer using mixed methods. Braun M et al. carried out a cross-sectional study on 30 breast cancer survivors and their husbands juxtaposed with 29 healthy controls and their husbands to survey positive and negative stimulants to childbirth. The mean age values of the survivors and their husbands were reported as 35±3.1 and 38.2 years, respectively. In addition, the mean age scores of the controls and their husbands were reported as 31.7±3.9 and 35.2

years, respectively. The inclusion criteria for 30 survivors (i.e., study group) were breast cancer at the stages of I-III without metastasis, treatment completion at least 2 years prior to the study, in remission or with only residential recurrence, age of ≤ 40 years, without other somatic or mental illness, being premenopausal or no indication of being menopausal, and without children or ≤ 2. The inclusion criteria for the controls were being without other physical or mental illness, without children or ≤ 2, and being premenopausal or no indication of being menopausal.

In the study conducted by Braun M et al., having no child or no more than two children was also among the inclusion criteria. The data were collected using a self-report questionnaire, including both quantitative and qualitative parts. Positive motivations for survivors included immortality, satisfaction, giving sense to life, big family, and siblings for their existent children. When the obtained results regarding the breast cancer survivors' unique positive motivations were compared to those of the controls, a strong desire was observed for having siblings for their existing children and a big family. Satisfaction among the survivors was less frequently stated in comparison to that of the control group. The negative stimulants for the survivors were child's health, mother's health, financial concerns, world views, and personal restrictions.

When the obtained findings regarding the breast cancer survivors' unique negative motivations were compared to those reported for the controls, the concerns over the mother's health were remarkable (i.e., the most frequently reported motivation). On the other hand, pessimistic world views, immaturity, and personal limitations were less frequently reported in comparison to the attitudes of the controls. The validity and reliability of the measures included in the quantitative part were confirmed (31).

2) A study carried out by Lewis PE et al. demonstrated cross-sectional information on the psychosocial concerns of the survivors from Sisters Peer Counselling in Reproductive Issues after a controlled randomized treatment (32) counseling program (33). The aforementioned study investigated a total of 33 African American survivors with a median age of 37.39 years at diagnosis (age range: 25-45 years). There was no report about the length of time since diagnosis. The data were collected using a semi-structured questionnaire by telephone interviews. The interviews contained questions about fertility subjects. Both above-mentioned studies reported information on the triangulation of the data; however, they failed to discuss the researchers' reflexive practice. It is required to carry out further investigations to determine how efficiently addressing fertility concerns and decreasing the symptoms affect the breast cancer population.

Discussion

Based on the findings of most studies, the survivors' attitudes toward pregnancy and parenthood are positive (4,5,8,19,34). However, some studies reported that pregnancy and parenthood after breast cancer may recall negative visions and states in some survivors (27,35,36). In spite of mixed views and perceptions about fertility, the results of the studies demonstrated that fertility was the main subject for many young survivors. In one study, with more women under the age of 40 years, fertility preservation was a reason for the selection of specific cancer treatment; therefore, in the aforementioned study, age was an outstanding agent in choosing a treatment method and mentioning fertility. Similar studies demonstrated that participants with one or no children considered fertility when making treatment decisions (37-39)

Contradictory visions and counseling provided by different health specialists could affect the survivors' attitudes toward childbirth and survival. However, women without children tended to prioritize fertility over survival (40). The necessity of education about breast cancer treatment and second views has been extensively expressed by women (41). Having very young children or no children affected the survivors' attitudes toward obtaining data about the effect of their treatment on fertility (42). The awareness of breast cancer treatments' side effects and other choices (43) and reception of fertility-related data during treatment were among the most desired needs of the survivors (44). The data about the impacts of treatment on fertility, age-specific support, and handling menopausal symptoms were what the women asked to receive or to revisit (44).

In the present review, the necessity of reassurance from providers and emotional support during the follow-up was reported by many younger and older survivors. In addition, the continued need for receiving information both during the treatment and follow-up has been reported by survivors. Nevertheless, a limited number of younger women complained that only the physical aspects of their recovery mattered to physicians and emotional issues were ignored.

The need for obtaining practical and

emotional support from children, partners, parents, close friends, and extended family has been reported by both younger and older survivors. However, isolation or a sense of loneliness has mostly been stated by a number of younger survivors. The provision of supportive activities by families and friends has been reported by both younger and older women (45, 46). Moreover, it has been reported that written or electronic information during the treatment helped the survivors. It is noteworthy that many survivors still use the given information to their advantage and find it useful.

The results of the present study emphasized the need of younger women to receive data and support for the subjects of choosing proper forms of consultation about fertility, managing changes in fertility, and dealing with menopausal symptoms. Currently, the development of the referral networks of fertility and menopause specialists with a good conception of oncology subjects for younger patients to refer to has received great attention. The demand for non-hospital-based support services that can code healthy lifestyle issues, such as education about stress management, exercise, complementary treatments, and diet, has been observed for younger breast cancer survivors.

Possibly, the most important issue of the present study was trying to increase the awareness of the unmet expectations of younger women to receive age-appropriate support services and data during and after the treatment course. In reality, the ability to have children since treatment is of great significance for most breast cancer women, even for those who desire to have a child of their own (40). Therefore, information and psychological support groups are suggested as valuable strategies to address the unmet support needs of young survivors (45).

Conclusion

It is recommended to carry out further studies on the tendency of healthcare specialists toward fertility-related subjects among young breast cancer survivors. Such studies not only help to explain cancer clinicians' intentions and attitudes toward the provision of fertility-related information but also provide the opportunity to expound on the perceived shortage of such information.

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Conflicts of interest

Authors declared no conflicts of interest.

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