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Effects of self-disclosure and resilience on reproductive concern in patients of childbearing age with breast cancer: a cross-sectional survey study

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ABSTRACT

Objectives To assess reproductive concerns in patients of childbearing age with breast cancer and examine the relationship between self-disclosure, resilience and reproductive concerns.

Design Cross-sectional survey.

Setting Five tertiary first-class general hospitals in Sichuan Province, Southwest China.

Participants A total of 319 patients with breast cancer of reproductive age who were hospitalised in the breast oncology department participated in this study.

Main outcome measures Primary outcomes were the relationship between resilience, self-disclosure and reproductive concerns, and mediating effect analyses. Secondary outcomes included the status of reproductive concerns.

Results The model accounted for 39.1% of the variance in reproductive concerns. Self-disclosure had a direct negative effect on reproductive concerns (β= −0.371, p=0.001). Resilience had a direct negative effect on reproductive concerns (β= −0.349, p=0.001) and a direct positive effect on self-disclosure (β=0.507, p=0.001). Furthermore, self-disclosure partially mediated the relation between resilience and reproductive concerns (β= −0.177; SE=0.041; 95% CI −0.261 to −0.104; p<0.050), with a bootstrap of 10 000 samples.

Conclusions The findings suggest that self-disclosure and resilience may ease reproductive concern. Therefore, self-disclosure education and resilience-oriented interventions should be provided to patients of childbearing age with breast cancer, to reduce reproductive concerns.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Multiple statistical methods (descriptive analysis, Pearson's correlation analysis, univariate analysis, mediator effect analysis, structural equation mode) have been used to explore the relationship between independent (demographic and psychosocial) variables and reproductive concern.

⇒ The samples obtained by convenience sampling are very arbitrary and may have led to selection bias.

⇒ The assessments of resilience, self-disclosure and reproductive concern in this study were all self-reported data from a cross-sectional study, which may have led to report bias.

⇒ While this study only included self-disclosure as a mediating variable, other mediating variables, such as marital intimacy, may also have an impact on resilience and reproductive concern; thus, more variables may be considered in future studies.

BACKGROUND

In 2020, there were 2.26 million new cases of breast cancer worldwide; breast cancer ranked first in the incidence of cancer and there exists a clear trend of younger people being diagnosed.[1] In China, the number of new cases of breast cancer reached 420 000 in the same year, and female breast cancer cases accounted for 19.9% of all malignant tumour cases.[1] Chinese females aged 35 and younger with breast cancer accounted for 7.6% of all cases, and patients aged 35–44 accounted for 23.2%.[2] With the improvement in the diagnosis rate of early cancer, the update of the treatment mode and the improvement of the chemoradiotherapy regimen, the survival rate of patients with breast cancer has improved significantly, and more and more patients with breast cancer hope to regain fertility after being cured.

In China, since the introduction of the national three-child policy in May 2021, all provinces and cities in western China have actively responded to the call and issued a series of birth support policies in many places to encourage third-child births.[3] Data from the seventh National Census show that the population in the western region is 382.85 million, accounting for 27.12% of the total population. Since the previous National Census in 2010, the proportion of the population in the western region has increased by 0.22 percentage points.[4] In western China, 20–34 years of age is the peak age to give birth, but influenced by the 'two-child policy' and 'three-child policy', the fertility rate of

women aged 35–49 has also shown an upward trend in recent years.[5] According to the current evidence, fertility in patients with early breast cancer does not increase the recurrence risk of breast cancer.[6] For breast cancer patients of childbearing age, the desire to have children often becomes strong after obtaining a good quality of life.

Breast cancer can be the result of multiple factors, such as inflammation, genetics, oestrogen, progesterone and the immune system. This may raise concerns about disease recurrence, loss of fertility and risk to offspring. The diagnosis of cancer is a great blow to the patient. The change in female body image and sexual characteristics caused by surgery, as well as the side effects of postoperative radiotherapy and chemotherapy, can result in a continuous state of stress for the patient, produce negative emotions and accelerate deterioration due to cancer. As a special group, patients with breast cancer of childbearing age have multiple identities, such as women, daughters, wives and mothers. They are the backbone of their families and their workplaces, and regularly face stressful situations. Especially in China, women are given the role of bringing up children, and children play a bonding role in the maintenance of family relationships. As a result, patients with breast cancer of childbearing age who have not yet given birth or want to bear children again bear heavier fertility pressure, which can easily cause conflicts between husband and wife, lead to a crisis in the marital relationship, and may then affect social stability. Carter *et al*[7] reported that 77% of patients with cancer had clinically significant levels of distress associated with the loss of fertility or impaired fertility. Reproductive concern refers to an individual's worries about reproduction and child rearing, including reproductive ability, their own health, their children's health and child care.[8] Studies have shown that fertility problems may be more stressful for the patients than cancer itself, persisting for several years and even affecting patients' long-term mental health and quality of life.[9 10]

Reproductive concerns have been proven to be prevalent in patients with cancer and are influenced by various factors such as demographic, clinical and psychosocial factors, including age, number of children, family per capita monthly income, fertility intention, social relational quality, fertility preservation and self-disclosure.[11] According to Benedict *et al*,[9] good psychosocial adaptation was found to be related to lower reproductive concern. The American Psychological Association defines resilience as 'the process of adapting well in the face of adversity, trauma, threats or significant sources of stress'. The concept of resilience includes rebounding from adversity. Resilience has a cushioning effect on stress perception, helping to relieve inner pressure and promote mental health. Among patients with infertility, patients with high resilience were found to have high self-esteem and optimism, and can effectively cope with the stress of fertility.[12] This suggests that resilience may be a protective factor for reproductive concern. Domestic and international

studies[13 14] show that patients whose fertility worry is linked to high levels of resilience have more active ways to deal with stress, and are good at discovering the beauty in life, rather than focusing on unfortunate events such as infertility. However, previous research has given little consideration to how resilience can influence reproductive concern.

Furthermore, according to Li *et al*,[15] self-disclosure of young patients with cancer could influence their reproductive concern, and positive self-disclosure helps to alleviate reproductive concern. Studies by Yu *et al*[16] and Ren *et al*[17] also support this conclusion. By pouring out their true thoughts and expressing their own needs to others, patients can obtain positive social support and reduce their negative emotions, which helps to reduce fertility worries. Unfortunately, cancer-related stigma is prevalent and persistent in patients with cancer and survivors.[18] This leads to many patients with cancer choosing not to disclose their cancer status to others. In clinical work, we often encounter a variety of different reactions to similar stressful events. Some patients with cancer will choose to express through self-disclosure, whereas others close themselves off. We speculate that this may be related to psychological resilience. The major manifestations of resilience are social competence, problem solving, autonomy and a sense of purpose.[19] These traits can help patients with cancer proactively choose ways that benefit self-recovery from adversity. For example, patients with cancer with high levels of psychological resilience may be more inclined to gain family or social support by talking to others and expressing their self-needs. Given that scant literature exists on the relationship between self-disclosure and resilience among cancer survivors, or if self-disclosure of patients with cancer mediates the relationship between resilience and reproductive concern, many aspects of the experience remain unclear.

Therefore, we investigated the effect of self-disclosure and resilience on reproductive concern in patients of childbearing age with breast cancer. First, we hypothesised that Chinese patients with breast cancer experience a certain degree of reproductive concern. Second, we hypothesised that higher resilience is associated with lower reproductive concern. Finally, we hypothesised that this relationship is mediated by self-disclosure of patients with breast cancer.

METHODS
Study design and sample
This was a cross-sectional questionnaire survey conducted from December 2021 to April 2022. A convenience sampling method was used to select patients with breast cancer of reproductive age who were hospitalised in the breast oncology departments of five tertiary first-class general hospitals in the Sichuan Province. Inclusion criteria were: (1) diagnosed with breast cancer by a pathological diagnosis; (2) aged between 20 and 49 years; (3) clearly conscious, with certain language expression

and comprehension skills; (4) aware of the disease and willing to participate in this study; (5) with family planning or reproductive needs. Exclusion criteria were: (1) patients with a history of severe mental illness accompanied by serious life-threatening diseases such as heart, kidney, liver diseases etc; (2) patients with recurrence or metastasis.

This study was approved by the medical ethics committee, and all subjects gave informed consent. The study explored the predictive effects of self-disclosure and resilience on reproductive concern. Two methods of sample size estimation were adopted. First, the sample size calculated by the G*Power V.3.1.9.7 software developed by the University of Düsseldorf in Germany using α=0.05, power=0.95, f2=0.15[20 21] was a minimum of 107 cases. Second, Kline et al[22] suggested that the number of samples in path analysis should be 10–20 times that of the parameters to be estimated. This study planned to include 20 variables; therefore, samples were required for 240–480 cases, allowing for an inefficiency rate of 20% of the questionnaires.

Data collection
The researchers first obtained the support and consent of the relevant departments in the five hospitals, and then recruited one investigator in each hospital. The investigators explained the research purpose to the patients and obtained their informed consent. Before each patient formally completed the consent form, the investigator used a standardised guide to explain the study procedures and affirmed that the information provided by the patient would be strictly confidential. The investigators distributed the questionnaires on site. The patients filled in the questionnaire anonymously. After completion, the questionnaires were immediately returned to the investigator and checked to ensure that there were no omissions or unclear items.

Measures
General information
Data on demographic and clinical characteristics including age, education, marital status, number of children, employment, type of health coverage, stage of tumour, family history of disease, surgical approach, and monthly family income per capita were collected using a general information questionnaire.

Reproductive concern
Reproductive concern was measured using the 18-item Chinese version of the Reproductive Concerns Scale, which comprises 6 domains: spouse informed consent, pregnancy preparation, acceptance, pregnancy ability, their own health, and children's health.[23 24] Each item was rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), with total scores ranging from 18 to 90 and higher scores indicating a higher level of reproductive concern. The overall Cronbach's alpha of the

scale was 0.792, the test–retest reliability was 0.956, and the content validity index was 0.910.

Self-disclosure
Self-disclosure was measured using the 12-item Chinese version of the Self-disclosure Scale.[25 26] Each item was rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree), with total scores ranging from 12 to 60 and higher scores indicating a higher level of self-disclosure. The overall Cronbach's alpha of the scale was 0.886, and the test–retest reliability coefficient was 0.870. A confirmatory factor analysis also showed a good index of fit.

Resilience
Resilience was measured using the 10-item Chinese version of the Connor-Davidson Resilience Scale (CD-RISC10).[27] Each item was rated on a 5-point scale from 0 (not true at all) to 4 (true, nearly all the time) with total scores ranging from 0 to 40 and higher scores indicating higher resilience. The Cronbach's alpha of the CD-RISC10 was 0.941.

Data analysis
SPSS V.22.0 statistical software was used for data analysis; the scores of each variable were expressed as mean and SD, and the general data were expressed as frequency and percentage. Correlations and structural modelling analysis were used to explore the relationship between psychological resilience, self-disclosure and reproductive concern. The following criteria were used to evaluate the fitness of the hypothesised model: $\chi^2/df<3$, goodness-of-fit index (GFI)>0.90, adjusted goodness-of-fit index (AGFI)>0.90, comparative-fit index (CFI)>0.90, incremental-fit index (IFI)>0.90, Tacker-Lewis index (TLI)>0.90 and standardised root mean square residual (SRMR) < 0.08. Multiple mediation effects tests and bootstrap methods were used to analyse the mediation effect of self-disclosure between resilience and post-cancer reproductive concern. If the bootstrap 95% CI for the estimated mediating effect did not contain 0, the corresponding effect was significant. The inspection level was α=0.05.

Patient and public involvement
(1) How was the development of the research question and outcome measures informed by patients' priorities, experience and preferences?

Not applicable.

(2) How did you involve patients in the design of this study?

From December 2021 to April 2022, patients with breast cancer of reproductive age who met inclusion and exclusion criteria and were hospitalised in the breast oncology departments of five tertiary first-class general hospitals in the Sichuan Province were enrolled. The investigator explained the purpose, significance and scheme of the study at their bedsides and asked the patients about their willingness to participate in the study. Patients who were

Table 1 Descriptive statistics for sociodemographic, and clinical characteristics (N=319)

Variable	N	%	Variable	N/M	%/SD
Age range (years)			Stage of tumour		
25–34	65	20.4	I	59	18.5
35–49	254	79.6	II	144	45.2
Education			III or higher	116	36.3
Primary school	40	12.5	Family history of disease		
Middle school	63	19.7	Yes	56	17.6
Senior school	124	38.9	No	263	82.4
College or above	92	28.9	History of miscarriage		
Marital status			Yes	105	32.9
Unmarried	67	21.0	No	214	67.1
Married	196	61.4	Surgical approach		
Divorced	56	17.6	Breast-conserving surgery.	61	19.1
Number of children			Breast-radical surgery	220	69.0
0	93	29.2	Did not undergo surgery	38	11.9
1	170	53.3	Maternity protection		
≥2	56	17.5	Yes	124	38.9
Employment			No	195	61.1
Full-time job	88	27.6	Monthly family income per capita (USD)		
Part-time job	90	28.2	<450	82	25.7
Unemployed	141	44.2	450–750	139	43.6
Type of health coverage			750–1450	58	18.2
Self-pay	41	12.9	> 1450	40	12.5
Public fee	37	11.6			
Medical insurance	241	75.5			

M, mean.

willing to participate filled in the informed consent form and made a new appointment for the investigation.

(3) Were patients involved in the recruitment to and conduct of the study?

No.

(4) How will the results be disseminated to study participants?

All data were only used for statistics and analysis, and the research results will be presented in the form of papers. Patients will not be specially informed of the results.

(5) For randomised controlled trials, was the burden of the intervention assessed by patients themselves?

Not applicable.

RESULTS
Descriptive statistics
The sociodemographic and clinical characteristics of young patients with breast cancer are shown in table 1. A total of 319 young patients with breast cancer participated in this study. Most participants were aged between 35 and 49 years (79.6%) and were married (61.4%). The number of patients who had finished senior schooling was the largest (38.9%). More than half of the patients had 1 child (53.3%); 44.2% did not have a job; 36.3% were in the third stage of the disease or higher; 76% had no comorbidities. Most participants had no family history of breast cancer (82.4%) and had no history of miscarriage (67.1%). Breast-radical surgery was a more frequently performed procedure (69.0%) than Breast-conserving surgery (19.1%). Patients with a monthly family income of US$450–750 formed the largest group (43.6%).

Univariate analysis in reproductive concerns
There were significant differences in reproductive concerns according to the sociodemographic and clinical characteristics including age, marital status, number of children, employment, monthly family income per capita and stage of tumour (table 2).

Self-disclosure, resilience and reproductive concerns
Analysis results for self-disclosure, resilience, social support and reproductive concerns are shown in table 3. The overall Self-disclosure Scale score was 40.41±7.34; CD-RISC10 score was 26.50±7.49; and the Reproductive Concerns Scale score was 43.04±10.81.

Table 2 Univariate analysis in reproductive concerns by sociodemographic characteristics (N=319)

	Reproductive concerns			95% CI (M)	
Characteristics	M	SD	F	Lower	Upper
Age			4.652**		
25–34	45.00	11.995		41.03	47.97
35–49	42.80	10.504		41.50	44.10
Marital status			2.760**		
Unmarried	45.67	11.439		40.88	48.46
Married	42.90	10.339		41.45	44.36
Divorced	40.79	11.816		39.62	43.95
Number of children			7.653***		
0	45.37	11.155		41.07	48.66
1	43.72	11.476		41.14	45.31
≥2	40.48	10.413		39.43	44.54
Employment			2.872**		
Unemployed	45.20	11.918		41.68	48.73
Part-time job	42.09	10.949		41.80	46.38
Full-time job	41.65	9.884		40.01	43.30
Monthly family income per capita (USD)			4.325***		
> 1450	42.10	10.848		40.71	45.48
750–1450	42.46	10.536		40.69	44.23
450–750	44.05	11.372		41.06	47.04
<450	45.50	11.163		40.93	47.07
Stage of tumour			2.356*		
III or higher	47.30	13.022		37.98	56.62
II	45.06	11.082		42.92	47.19
I	40.49	10.093		38.82	42.15

Only significant results have been listed.
*P<0.05, **p<0.01, ***p<0.001.
M, mean.

Correlations between self-disclosure, resilience and reproductive concerns

Pearson's correlation analysis (table 4) showed that self-disclosure was positively correlated with resilience.

Table 3 Analysis results: self-disclosure, resilience and reproductive concern

	M	SD	Min	Max
Self-disclosure	40.41	7.34	15	59
Resilience	26.50	7.49	5	39
Reproductive concern	43.04	10.81	34	75
Spouse informed consent	7.29	2.69	3	15
Pregnancy preparation	7.20	2.61	3	15
Acceptance	7.61	2.39	3	15
Pregnancy ability	7.33	2.54	3	15
Own health	10.50	3.15	3	15
Children's health	9.11	2.92	3	15

Self-disclosure and resilience were negatively associated with reproductive concerns.

Model test

The correlations between self-disclosure, resilience and reproductive concerns were tested by structural equation modelling. The model (figure 1) fit the data well ($\chi2$/df=1.279, SRMR=0.045, RMSEA=0.030, GFI=0.909, AGFI=0.914, CFI=0.976, IFI=0.976 and TLI=0.973). The model accounted for 39.1% of the variance in reproductive concerns. Self-disclosure had a direct negative effect on reproductive concerns (β= −0.371, p=0.001). Resilience had a direct negative effect on reproductive concerns (β= −0.349, p=0.001) and a direct positive effect on self-disclosure (β=0.507, p=0.001). Furthermore, self-disclosure was a partial mediator of the relation between resilience and reproductive concerns (β= −0.177; SE=0.041; 95% CI −0.261 to −0.104; p<0.05) with a bootstrap (10 000 samples). See table 5.

Table 4 Correlation between resilience, self-disclosure and reproductive concern

	Resilience	Self-disclosure	Reproductive concern	Cronbach α
Resilience	1			0.923
Self-disclosure	0.469**	1		0.907
Reproductive concern	−0.477**	−0.468**	1	0.897

DISCUSSION

The purpose of this study was to investigate the protective role of self-disclosure and resilience against reproductive concern in Chinese patients of childbearing age with breast cancer. As hypothesised, we observed a moderate degree of reproductive concern among the patients, which was consistent with a previous Chinese study.[17] We also found support for the hypothesis that higher resilience is associated with higher levels of reproductive concern. Finally, this relationship was partially mediated by self-disclosure of patients with breast cancer.

The status of reproductive concern

This study confirmed that reproductive concerns are prevalent among patients of reproductive age with breast cancer. A large number of studies[28–36] have been conducted on fertility preservation and fertility counselling, which are also seen as major protective factors in reproductive concern. Fertility problems after cancer treatment involve multiple disciplinary areas, including oncology, reproductive endocrinology, mental health counselling, clinical research and patients. However, in clinical work, patients with cancer rarely get fertility-related information from oncologists.[28] Zaami et al's[29 30] study shows that both maintaining fertility and family planning are key problems which need to be addressed. A multidisciplinary collaboration with fertility counselling helps to promote an emphasis on the maintenance of fertility and family planning, which can alleviate the reproductive concern of patients with breast cancer to a certain extent. Assisted reproductive technology can be used to protect the fertility of patients with breast cancer of childbearing age, as assisted reproductive technology was not found to be associated with an increased risk of neurodevelopmental diseases or the worsening of school cognitive performance.[31] Gullo et al[32] showed that the ability to freeze embryos made better family planning possible and enabled patients to transfer embryos at an ideal time. Sometimes an inositol supplement such as D-chiro-inositol before ovarian stimulation could improve fertility outcomes.[33 34] In addition, even if artificial insemination fails, multiple techniques have promising applications, such as the injection of embryo culture supernatant to the endometrial cavity.[35 36] The development of fertility preservation technology has made many patients with breast cancer conceive successfully after completing tumour treatment, but a lot of patients with breast cancer cannot get pregnant throughout their lives. Therefore, it is helpful to view reproductive concern from multiple perspectives, including demographic and psychosocial factors.

Sociodemographic variables and reproductive concern

Sociodemographic factors can also affect reproductive concern. Patients with breast cancer who are under 35 years of age and unmarried often have high levels of reproductive concern. With an increase in the incidence of breast cancer among younger women and the overall age at which women are giving birth and the implementation of the national three-child policy, young patients with breast cancer aged under 35 are more likely to have no children or only one child, making their fertility needs higher. In China, influenced by the traditional idea that women should have children, Chinese unmarried women
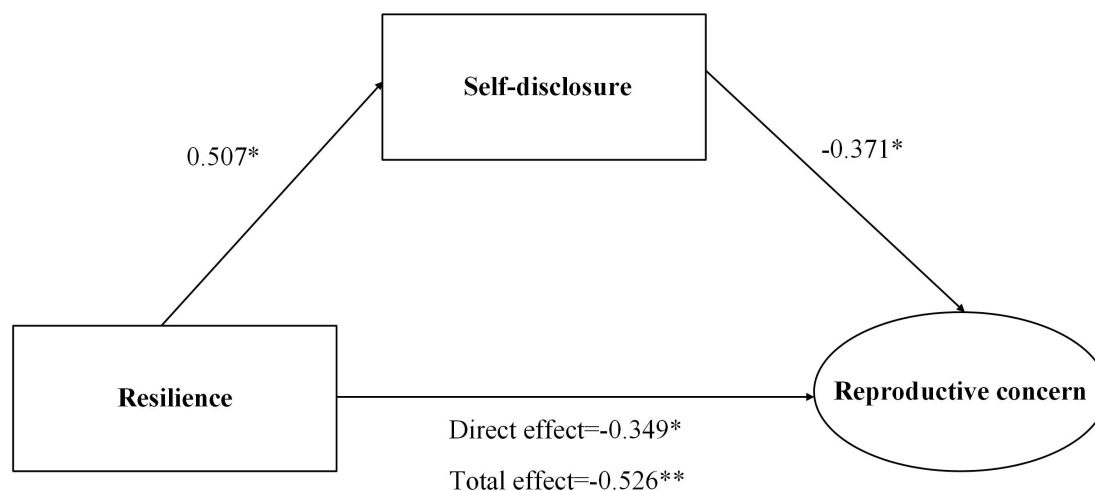

Figure 1 Model of the mediating effect of self-disclosure on the association between resilience and reproductive concern;, *p<0.01, **p<0.001.

Table 5 Standardised estimation of each path in the modified model

Path			Path coefficient	Estimates	SE	C.R.	95% CI		P value
							Lower	Upper	
Self-disclosure	<--	Resilience	0.424	0.507	0.055	7.661	0.400	0.596	0.001
Reproductive concern	<--	Resilience	−1.015	−0.349	0.193	−5.254	−0.525	−0.191	0.001
Reproductive concern	<--	Self-disclosure	−1.138	−0.371	0.233	−4.882	−0.502	−0.201	0.001

generally believe that they should have at least one child. The diagnosis and treatment of cancer may deprive them of motherhood, which increases reproductive concern. Patients who have full-time jobs and higher income apparently have lower levels of fertility worry. On the one hand, although new targeted drugs, such as endocrine therapy drugs and other rapidly developed therapeutic drugs, improve the survival rate of patients, they also increase their economic burden. Xu and Wu[37] survey found that the total hospitalisation cost of breast cancer survivors in China increased by 67% from 2011 to 2015. Chinese cancer survivors mainly rely on basic medical insurance to cover medical expenses, and the limited types of cancer drugs currently available result in cancer survivors spending more on anticancer treatments than they can afford. On the other hand, some physical and psychological disorders in cancer treatment may lead to temporary or even permanent unemployment, contributing to financial toxicity. For patients with lower income or unemployed, or with changed or reduced employment, it is more difficult to bear the cost of fertility treatment, aggravating the reproductive concern of patients. Kong et al[38] showed that patients' return to work is the most important way to relieve economic stress. Therefore, the social security sector should give priority to low-income or unemployed groups and provide them with jobs or financial assistance as much as possible.

Self-disclosure, resilience and reproductive concern

This study also confirmed the protective effects of resilience and self-disclosure on reproductive concern. Resilience has direct and indirect effects on the reproductive anxiety of patients with breast cancer of reproductive age. In other words, when faced with a major stressful event, patients with breast cancer recover from the traumatic experience and gain strength, showing positive emotions such as hope and optimism, which can help individuals experience less psychological stress. When patients with breast cancer of childbearing age fail to have children or still feel the need to have children after their cancer diagnosis, they often fall into a bewildering predicament, which leads to a series of psychological problems related to childbearing. Patients with breast cancer with higher psychological resilience can actively cope with and adjust to the negative events related to their own adverse situation, and thus, reduce reproductive anxiety. Conversely, patients with low resilience are more likely to magnify the adverse consequences of infertility that may result from cancer treatment, exacerbating negative emotions

and leading to increased levels of fertility anxiety. Resilience may also be beneficial in promoting self-disclosure in patients with breast cancer, consistent with studies by Yamashita and Yoshioka.[39] More specifically, a person who is mentally strong and able to respond successfully to stressful events is more likely to receive positive social support by sharing their true feelings and needs with others, and this kind of positive self-regulation helps to reduce the anxiety around fertility.[40] When an individual with low resilience meets difficulties and setbacks, they will generally choose to suppress their feelings and not express themselves.[41] Therefore, resilience-oriented programmes should be developed that will help improve the stress tolerance and mental health of patients with cancer.

This study showed that self-disclosure was significantly associated with reproductive concern. Cancer treatment damages the fertility of patients to some extent, and patients may have negative emotions such as worry, inferiority and sadness. When patients share their worries with others, it can help patients to recognise and adapt to stressful events, but also help family or friends to identify patients' worries and offer guidance, and alleviate the worries caused by fertility problems. Li et al[15] also pointed out that patients' cancer-related self-disclosure to others can relieve their negative emotions and promote their adjustment and adaptation to various stressors, including fertility. However, multiple studies[42–44] have shown that people who experience psychological distress are not willing to proactively express their thoughts or seek psychological or emotional support. Therefore, it is crucial to find the factors that promote positive disclosure by patients. Good family intimacy has been proven to increase willingness to self-disclose and enhance the self-expression efficacy between patients and family members.[45 46] The tolerance and care patients feel from their spouses, family and friends is beneficial in helping them readapt to stressful events. Rabin's[47] findings in 2019 from a study of 120 patients with cancer suggest that those who receive positive responses and more social support after self-disclosure are more likely to disclose again in the future. Therefore, while promoting patients' self-disclosure, medical staff should also actively mobilise patients' family and social support, to enable patients to gain a positive experience in self-disclosure and encourage them to choose redisclosure in the future thus creating a virtuous cycle.

CONCLUSIONS

Patients with breast cancer of childbearing age who are young, have fewer children, lower family income and unemployment also have a higher level of reproductive concern. Targeted interventions must be carried out for this demographic group. Self-disclosure and individual resilience of patients with breast cancer could protect against reproductive concern. Encouraging emotional self-disclosure is significant for lowering caregiver burden and improving the individual resilience of breast cancer survivors. Self-disclosure education-oriented interventions should be provided to breast cancer survivors, as they might help reduce reproductive concern. Further studies should continue to explore protective factors and modifiable risk factors related to the reproductive concern of young patients with breast cancer.

LIMITATIONS

This is a rare study of reproductive concern among patients with breast cancer of childbearing age, exploring the protective and harmful factors of reproductive concern from demographic and psychosocial factors. Thus, we suggest that it is essential for medical staff to increase their attention towards patients with cancer who have not yet had children or who still have the will to give birth again. Nevertheless, this study has some limitations. First, the assessments of resilience, self-disclosure and reproductive concern in this study were all self-reported data from a cross-sectional study, limiting the generalisability of the findings. Future studies may consider the use of multiple assessment and experimental design techniques to reduce reported bias to further confirm the relationship pattern between variables. Second, this is a cross-sectional survey, and longitudinal studies may be considered in the future to further determine the causal relationship between variables. Third, this study only included self-disclosure as a mediating variable. Other mediating variables, such as marital intimacy, may also have an impact on resilience and reproductive concern, and more variables may be considered in the future. Finally, this survey was conducted during the COVID-19 pandemic, a stressful event, which may have had an impact on the research variables.

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