A correlational study of reproductive concerns with self-disclosure and mental resilience in breast cancer patients of childbearing age in China

Ya Yu (✉ 1491079185@qq.com)

Southern Medical University

Yanxin Ye

Southern Medical University

Suting Liu

Southern Medical University

Lili Zhang

Southern Medical University

Research Article

Keywords: Breast cancer, Reproductive concerns, Self-disclosure, Mental resilience, Mediator model

Posted Date: February 12th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-220161/v1>

License: This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

Abstract

Objective

The current study aimed to investigate the prevalence of reproductive concerns in breast cancer patients of Chinese women of childbearing age, to explore the effects of self-disclosure and mental resilience on reproductive concerns, and to explore the relationships among the three variables.

Methods

Correlation research design was used. 274 women suffering from breast cancer with age ($M=38.10$, $SD=6.44$) were taken from two tertiary hospitals in Guangzhou. The participants were asked to fill out a set of self-reported questionnaires including the Sociodemographic data, Reproductive Concerns after Cancer scale (RCACs), the Distress Disclosure Index (DDI), and the 14-Item Resilience scale (RS-14). The mediation analysis was tested using SPSS (Process-plugin) and the bootstrap method.

Results

A total of 252 valid questionnaires were collected in this study. 36.1% of the patients scored highly in at least one dimension of reproductive concerns, with Child's health and Personal health being the top two concerns. Correlation analysis revealed that there was a significant positive relationship between self-disclosure and mental resilience. Self-disclosure and mental resilience had a negative relationship with reproductive concerns, respectively. The results of the mediation analysis showed that there was a mediational role of mental resilience between self-disclosure and reproductive concerns.

Conclusion

It was concluded that breast cancer patients with high levels of self-disclosure, are more resilient and have fewer reproductive concerns.

Introduction

In recent years, the incidence of breast cancer in Chinese women is rising and showing a younger trend.^[1] Among women with breast cancer, 25% are diagnosed in their reproductive years.^[2] With the introduction of late marriage and late childbirth and the opening up of the two-child policy, many women are still willing to have children after a cancer diagnosis.^[3] However, due to the uncertainty of fertility caused by cancer treatment, the characteristics of the disease itself, and the side effects in the treatment process, female cancer patients may experience a range of reproductive concerns, including the fear of infertility, the negative impact of infertility on relationships, the risk of birth defects or cancer in children, and concerns about poor health affecting the ability to raise children.^[4, 5] Several papers indicated reproductive concerns are common among cancer survivors.^[6, 7] These concerns persist after diagnosis and treatment and may worsen during survivorship with researches indicating that concerns about infertility remain constant or even increase over time^[8, 9] and reproductive concerns can independently predict depressive symptoms later in survivorship (12 years on average) in breast cancer patients younger than 45 at the time of diagnosis.^[10] Other researches also confirmed that reproductive concerns are associated with poorer psychosocial health outcomes and poorer quality of life in survivorship.^[11-13]

Assisted reproduction, as a fertility protection technology, has been gradually applied in the fertility care of cancer patients, and to some extent alleviated the concerns of patients.^[11-13] However, it is not widely used in clinical practice, especially for women, due to the expensive cost, ethics, and some other issues.^[15]

It is reported that female cancer survivors experience reproductive concerns associated with unmet access to information and services related to their fertility.^[7, 16] Several interventions with the main purpose of providing information related to fertility, such as fertility counseling^[14] and web-based texting send evidence-based information on reproductive health issues,^[17] have been carried out. However, studies of the effectiveness of these interventions have produced mixed results. Sinha et al. found that fertility counseling for women newly diagnosed with cancer can reduce anxiety, pain, and reproductive concerns.^[18] While Young et al. reported that compared with patients who did not receive fertility counseling before cancer treatment, those who received fertility counseling before cancer treatment were 1.2 times more likely to subsequently have moderate to high reproductive concerns.^[19] Regardless of the outcome of fertility counseling, one thing is certain that fertility counseling gives patients more information about post-cancer fertility. But what does this information bring to the patient? Whether there is more or less reproductive stress is uncertain. Therefore, further exploration of other interventions is needed.

Self-disclosure is the transmission of personally relevant and revealing information to another person, which can include factual thoughts or feelings as well as nonverbal, behavioral communication.^[20] The importance of self-disclosure has been emphasized, there are frequent claims that open communication and self-disclosure are beneficial to patient adaptation. Zhen and colleagues revealed that self-disclosure eased the depression of the flood victims.^[21] Another group showed that cancer survivors with higher levels of self-disclosure have more positive effects and more post-traumatic growth.^[22] Zhang et al. performed a randomized controlled trial of a guided self-disclosure intervention to facilitate benefit finding in Chinese breast cancer patients, like the above results, this study also achieved the expected good results.^[23] However, evidence on the impact of self-disclosure on reproductive concerns is scant, with only one study showing a negative correlation between reproductive concerns and self-disclosure.^[24] Therefore, more research is needed to verify the relationship between reproductive concerns and self-disclosure.

Mental resilience is considered as a dynamic process in which individuals show effective adaptation in the face of stress and adversity.^[25] Individuals with high mental resilience can find the psychosocial, cultural, and material resources to maintain their happiness and make concentrated use of them to achieve a good state of mental adaptation.^[26] Some studies have also confirmed the negative correlation between resilience and stress^[27-30]. Therefore, we hypothesize that patients with high mental resilience may have more positive cognition and better adaptability in the face of post-cancer fertility problems, thus effectively alleviating their post-cancer reproductive concerns.

At present, there are few reports on relationships among mental resilience, self-disclosure, and reproductive concerns. We would like to explore the relationships among the three variables. Self-disclosure can significantly predict more external protective factors, such as social support and intimate relationship.^[31, 32] While these factors are beneficial for enhancing mental resilience.^[33, 34] So, self-disclosure may promote mental resilience. Therefore, we hypothesize that (1) self-disclosure is positively correlated with mental resilience and negatively correlated with reproductive concerns, (2) mental resilience plays a mediating role between self-disclosure and reproductive concerns. The model was shown in Figure 1.

Materials And Methods

Participants and procedure

This is a cross-sectional study based on several self-reported questionnaires. A convenience sampling method was carried out in two tertiary hospitals in Guangzhou from November 2019 to August 2020. The inclusion criteria for the target population are as follows:(1) the patient was pathologically diagnosed with breast cancer;(2) surgery or neoadjuvant chemotherapy has been performed;(3) between the ages of 18 and 49;(3) having normal cognitive abilities;(4) willing to participate in the investigation. The exclusion criteria were as follows:(1) not knowing the diagnoses of their diseases, (2) Combined with other types of cancers.274 questionnaires were issued, of which 252 were valid, with an effective recovery rate of 91.97%. The study was approved by the institutional review board.

Measures

The sociodemographic characteristics were designed by the researchers after consulting the literature, including age, marital status, educational level, number of children, recurrence of cancer, family history of tumor, occupational status, medical burden, fertility intention after cancer diagnosis, therapy method, the time since the first diagnosis.

Reproductive concerns were measured by the Reproductive Concerns After Cancer scale (RCACs). The scale was developed by Gorman et al^[35] in 2013, with a total of 18 items. The scale is divided into six dimensions: Becoming pregnant, concerns about Fertility potential, Partner disclosure, Child's health, Personal health, and Acceptance. Likert 5 scoring method is adopted for each item, in which items 5, 10, and 15 are scored in reverse. The higher the score, the more anxious the patient was about fertility. The total Cronbach's coefficient of the Chinese version of the RCAC scale was 0.792, and the Cronbach's coefficient of each dimension was 0.720~0.864.^[36]For each dimension, a mean value of 4 indicates a high level of reproductive concerns.^[35]

The level of self-disclosure was measured using the Distress Disclosure Index (DDI) developed by Hessling et al^[37] in 2001. A five-point Likert scale from 1 to 5 is used for each item. Items 2, 4, 5, 8, 9, and 10 are scored in reverse. The higher the DDI score indicating the higher the degree of self-disclosure. This scale was revised in Chinese by Li Xinmin et al.^[38]in 2009 with good internal consistency reliability ($\alpha=0.886$).

The 14-Item Resilience Scale (RS-14) ^[39]was used to measure mental resilience, containing two factors, namely "personal competence" and "positive cognition". Likert 7 rating scale was used for each item, with a total score ranging from 14 to 98 points. The higher the score, the better resilience. The Cronbach's α of the Chinese version of the RS-14 scale was acceptable ($\alpha=0.93$).

Statistical analysis

SPSS 26.0 software and the PROCESS plug-in was used for data analysis. Measurement data were expressed as mean standard deviation and counting data in the form of percentages. Two independent sample T-tests and ANOVA tests were used to compare reproductive concern scores between/among groups. Pearson correlation analysis was conducted to explore the correlations among reproductive concerns, mental resilience, and self-disclosure. PROCESS V3.5 (Model 4) was used to analyze the mediating effect of mental resilience between self-disclosure and reproductive concerns. The 95% confidence interval (CI) was calculated by 5000 bootstrap samples. If the 95% CI of the mediation path does not contain 0, the indirect effects are considered statistically significant.

Results

Common method deviation test

Before data analysis, Harman single factor test was used to conduct a common method deviation test for all items of the scale used in this study. The results showed that there were 9 factors eigenvalue greater than 1, and the variation explained by the first factor was 22.733%, less than 40%^[40], indicating that the data in this study were not significantly affected by common method deviation.

Participants

A total of 252 valid questionnaires were collected in this study. Participants had an average age of 38.10 years. Among the 252 participants, 65.5% were under the age of 40, 93.3% were married, 8.7% had no children. Regarding to employment status, 38.5% were full-time staff, 13.1% were individual/part-time staff and 48.4% were unemployed/students. Among these participants, 16.7% had a family history of cancer, 20.6% were experiencing a relapse, 27.8% were receiving radiotherapy and 14.7% still had fertility intention after a cancer diagnosis. The details of other sociodemographic characteristics are shown in Table 1.

Table 1 The demographic characteristics of participants(N=252)							
Items	n(%)		P	Items	n(%)		P
Age			0.001	Recurrence of cancer			0.735
≤40	165 (65.5%)	49.37±9.03		Yes	52 (20.6%)	47.25±8.91	
41-49	87 (34.5%)	44.33±8.33		No	200 (79.4%)	47.73±9.17	
Marital status			0.003	Family history of cancer			0.029
Married	235 (93.3%)	47.17±8.99		Yes	42 (16.7%)	50.43±8.84	
Being in love	17 (6.7%)	53.94±8.49		No	210 (83.3%)	47.07±9.07	
Education			0.001	Medical burden			0.571
Junior High school and below	134 (53.2%)	45.75±7.47		No burden	24 (9.5.0%)	47.83±10.24	
High school or technical secondary school	59 (23.4%)	48.54±9.79		slight	71 (28.2%)	48.77±9.22	
junior college or university degree	57 (22.6%)	50.67±10.67		Moderate	86 (34.1%)	47.45±8.89	
Master and above	2(0.8%)	60.50±6.36		Very heavy	71 (28.2%)	46.63±8.34	
Fertility intention after diagnosis			0.001	Radiotherapy			0.165
Yes	37 (14.7%)	56.22±10.14		Yes	70 (27.8%)	48.91±9.43	
No	215 (85.3%)	46.15±8.06		No	182 (72.2%)	47.14±8.95	
The number of children			0.003	Occupation			0.001
0	22 (8.7%)	53.86±10.91		Full-time	97 (38.5%)	50.06±10.07	
1 child	80 (31.7%)	46.66±9.50		Individual/Part-time job	33 (13.1%)	46.70±9.11	
2 or more children	150 (59.5%)	47.23±8.28		Unemployed/Students	122 (48.4%)	45.95±7.84	
The time since the first diagnosis			0.651				
0-6 months	183 (72.6%)	47.54±9.16					

6-12 months	46 18.3%	47.20±9.80
≥12 months	23 9.1%	49.26±7.14

Prevalence of reproductive concerns

Approximately 36.1% of participants reported a high level of reproductive concerns in ≥ 1 dimension, and 4.8% reported a high level of concerns in ≥ 2 dimensions (Table 2). Concerning the type of concerns, 32.9% reported a high level in the dimension "Child's health". A total of 7.9% of the participants reported a high level in the dimension "Personal health," 2.0% reported a high level in the dimensions "Fertility potential," and "Becoming pregnant." To our surprise, none of the subjects showed a high level in the remaining two dimensions "Partner disclosure" and "Acceptance". See Table 2 for more details.

Table 2 Reproductive Concerns After Cancer scale for breast cancer patients of childbearing age			
	Mean	SD	Cutoff 4n,%
Fertility potential	2.32	0.77	5(2.0%)
Child's health	3.75	0.97	83(32.9%)
Partner disclosure	2.27	0.71	0(0.0%)
Personal health	3.10	0.74	20(7.9%)
Acceptance	2.04	0.70	0(0.0%)
Becoming pregnant	2.40	0.68	3(2.0%)
≥ 1 dimension above cutoff	-	-	91(36.1%)
≥ 2 dimension above cutoff	-	-	15(4.8%)

Correlation analysis

The mean scores of reproductive concerns and its dimensions, self-disclosure, and mental resilience, and the results of the Pearson's coefficient correlation analysis of these variables are shown in Table 3. It can be observed that organizational self-disclosure was positively associated with mental resilience and negatively associated with reproductive concerns and its dimensions except for acceptance. Notably, mental resilience was negatively associated with reproductive concerns and its dimensions (becoming pregnant, concerns about fertility potential, partner disclosure, child's health, personal health) except acceptance.

Table 3 Means, standard deviation (SD) and correlations of reproductive concerns, self-disclosure and mental resilience											
	Mean	SD	1	2	3	4	5	6	7	8	9
1.RCAC	47.63	9.10	1								
2.DDI	39.75	7.64	-.417**	1							
3.RS-14	62.44	12.11	-.383**	.301**	1						
4.Fertility potential	6.96	2.32	.779**	-.318**	-.235**	1					
5.Child's health	11.26	2.91	.511**	-.272**	-.227**	.116	1				
6.Partner disclosure	6.81	2.12	.756**	-.355**	-.279**	.620**	.191**	1			
7.Personal health	9.29	2.22	.781**	-.351**	-.380**	.408**	.555**	.444**	1		
8.Acceptance	6.12	2.10	.361**	-.057	-.120	.436**	-.318**	.241**	.005	1	
9.Becoming pregnant	7.19	2.05	.839**	-.301**	-.293**	.637**	.243**	.625**	.670**	.285**	1
** $P < .001$.											

Mediation analysis

Sociodemographic characteristics, including age, marital status, education, fertility intention after diagnosis, the number of children, family history of cancer, and occupation were associated with reproductive concerns in univariable regression analyses. After controlling for them, self-disclosure had a significant effect on mental resilience and reproductive concerns ($P \leq 0.05$), and mental resilience had a significant effect on reproductive concerns ($P \leq 0.05$), as presented in Table 4. The indirect effect of self-disclosure → on mental resilience → reproductive concerns was -0.096 (95%CI: -0.630, -0.329). The details of direct and indirect effects for the model are shown in Table 5.

Table 4 Regression analysis between variables						
	Mental resilience		Reproductive concerns		Reproductive concerns	
	t	p	t	p	t	p
Age	0.059	0.953	-2.415	0.017	-2.529	0.012
Marital status	0.312	0.755	-0.571	0.569	-0.495	0.621
The number of children	0.503	0.615	1.403	0.162	1.653	0.100
Education	0.047	0.963	-0.627	0.531	-0.646	0.519
Occupation	-0.344	0.731	-3.295	0.001	-3.595	0.001
Family history of cancer	-0.039	0.969	-1.837	0.067	-1.953	0.052
Fertility intention after cancer diagnosis	0.252	0.802	-3.637	0.001	-3.752	0.001
Self-disclosure	4.484	0.001	-6.956	0.001	-5.574	0.001
Mental resilience					-5.360	0.001
R-sq	0.095		0.347		0.416	
F	3.173		16.150		19.185	

Table 5 Bootstrap analysis of the significance test of mediating effect and its effect size					
	Effect	BootSE	BootLLCI	BootULCI	Proportion of effect
Indirect	-0.096	0.030	-0.163	-0.043	21.0%
Direct	-0.362	0.076	-0.522	-0.223	79.0%
Total	-0.458	0.076	-0.630	-0.329	

Discussion

In this study, the reproductive concerns score of breast cancer patients of childbearing age was 47.63 ± 9.10 , which is in line with the result of Ba'rtolo et al...^[13] 36.1% of the participants reported a high level of reproductive concerns in ≥ 1 dimension of the RCAC, and at least two dimensions of high levels were reported by 4.8%, significantly lower than the results reported by Ljungman et al.: 58% scored high in at least one dimension, and 22% scored high in at least two.^[7] This may be because our participants were older, and the percentage of patients without children is small (8.7%). While, when it comes to types of concerns, our results are consistent with those of Ljungman et al.^[7] Child's health and Personal health are the two dimensions that get the most attention. This gives clinical workers a clue that even if patients do not want to have more children, they still have high-level concerns about Child's health and Personal health, which means that some aspects of reproductive concerns are common among women of childbearing age with breast cancer.

To our surprise, none of the participants showed a high level of concern in terms of Partner disclosure and Acceptance, even among patients who had fertility intentions after diagnosis. The reason may be that most of the patients are in the early stage of treatment, and the patients and their families may pay more attention to the treatment of the disease, thus temporarily reducing the need for fertility.

The results of correlation analysis in this study showed that self-disclosure of breast cancer patients of childbearing age was negatively correlated with reproductive concerns ($r=-.417$, $P=0.01$).^[24] Breast cancer patients of childbearing age face unique physical and mental challenges. Changes in menstruation, decreased fertility, potential health-related problems after pregnancy, and genetic risks for offspring can all be of concern to patients.^[41, 42] Self-disclosure can not only help patients gain insight into their inner feelings and enhance their self-knowledge but also help them obtain more social support.^[32] There was a significant negative correlation between reproductive concerns and social support in breast cancer patients.^[43] From this perspective, we proposed that social support helps alleviate reproductive concerns. It means that self-disclosure might indirectly affect patients' reproductive concerns by increasing their social support. Therefore, clinicians should be aware that patients with breast cancer of childbearing age may face psychological distress caused by reproductive, and it is of great significance for them to express their inner feelings and information. While, in this study, the score of self-disclosure of breast cancer patients of childbearing age was 39.75 ± 7.64 , lower than the average level of female self-disclosure of 42.21 ± 9.16 ,^[44] and this result is supported by the research of Wang et al.^[45] To our knowledge, few studies have investigated the factors that influence self-disclosure in breast cancer patients. The psychological trauma caused by cancer, the change of body image brought by treatment, or the fear of aggravating the psychological burden on the family may all be factors that lead to the disorder of disclosure. We suggest that the influencing factors and intervention measures of self-disclosure in breast cancer patients of childbearing age should be further explored in future studies.

Mediating analysis was used to clarify the relationships among mental resilience, self-disclosure, and reproductive concerns, and the results confirmed that mental resilience mediated the relationship between self-disclosure and reproductive concerns. Among them, self-disclosure can have a direct impact on mental resilience, which means that the higher the degree of self-disclosure, the better the mental resilience, which is consistent with the result of Yamashita.^[46] The self-disclosure process model proposed by Chaudoir et al.^[47] indicates that positive self-disclosure not only enables patients to release their repressed emotions but also can increase others' understanding of them, promote intimate relationships, obtain social support, and other beneficial resources. And these are all good factors for improving mental resilience. Individuals with a high level of mental resilience have strong adaptability and can adopt more positive coping styles when faced with adversity and pressure.^[48] Therefore, breast cancer patients with high mental resilience may have a higher psychological tolerance to stress events such as decreased fertility and poor disease progression and are more likely to adopt an optimistic attitude and positive coping style to relieve their inner pressure.

Taken together, high levels of self-disclosure and good mental resilience can help to relieve the reproductive concerns of patients, and self-disclosure can also help to strengthen mental resilience.

Study limitations

This study is a cross-sectional observational study, unable to determine the causal relationship between self-disclosure and mental resilience, and the use of convenient sampling in this study may make the sample less representative.

Clinical implications

This study suggests that self-disclosure may play a role in improving patients' mental resilience and alleviating their reproductive concerns. But breast cancer patients may tend to hide and be reluctant to disclose under the influence of multiple factors, which is not a good phenomenon. In total, this study provides a theoretical basis for the development of self-disclosure interventions for breast cancer patients with fertility concerns, but how to make interventions more effective is challenging. Clinical staff may need to consider personalization factors when developing self-disclosure measures.

Conclusion

This study preliminarily elucidated that self-disclosure is beneficial to relieve and improve mental resilience in breast cancer patients, this study preliminarily clarified that self-disclosure is beneficial to relieve reproductive concerns and improve mental resilience of breast cancer patients, which provides a reference basis for the development of fertility care for breast cancer patients. As reproductive concerns are common among cancer patients of all kinds, similar studies should be conducted in patients with other cancer types.

Declarations

Acknowledgments The authors would like to thank all the participants of this research for their time and efforts.

Author Disclosure Statement No competing financial interests exist.

Funding This work was supported by Southern Medical University Nursing Research Projects (Q2019001,PI:Zhao Yang), Guangdong Provincial Science and Technology Project (2017A020215093,PI:Zhang Lili), and Guangzhou Science and Technology Project (201904010129,PI:Zhang Lili).

Conflicts of interest/Competing interests The authors declare that they have no conflicts of interest.

Ethics approval This study is in full compliance with institutional review board guidelines for the protection of human subjects.

Consent to participate Informed consent was obtained from all individual participants included in the study.

Consent for publication Informed consent for publication was obtained from all participants.

Availability of data and material The datasets used or analysed during the current study are available from the corresponding author on reasonable request.

Code availability Not applicable.

Authors' contributions Conceptualization and design:Zhang Lili, Yu Ya and Liu Suting;

data curation: Yu Ya,Liu Suting and Ye Yanxin; manuscript writing and editing: Yu Ya and Zhang Lili. All authors have read and approved the final manuscript.

References

- [1] Feng R, Zong Y, Cao S et al. Current cancer situation in China: good or bad news from the 2018 Global Cancer Statistics? [J]. *Cancer communications (London, England)* 2019; 39(1): 22.
- [2] Anonymous. ASCO Recommendations on Fertility Preservation in Cancer Patients: Guideline Summary. [J]. *Journal of oncology practice* 2006; 2(3): 143-146.
- [3] Zhang L. A survey of the reproductive needs of young women with breast cancer [D]. 2015.
- [4] Shen F, Yang L, Guo D. Advances in research on fertility-related issues in young breast cancer patients [J]. *J Mod Med Health* 2018; 34(10): 1498-1501.
- [5] Gorman J R, Pan Weisz T M, Drizin J H et al. Revisiting the Reproductive Concerns After Cancer (RCAC) scale [J]. *Psycho-Oncology* 2019; 28(7): 1544-1550.
- [6] Carter J, Sonoda Y, Aburustum N. Reproductive concerns of women treated with radical trachelectomy for cervical cancer [J]. *Gynecologic Oncology* 2007; 105(1): 13-16.
- [7] Ljungman L, Ahlgren J, Petersson L M et al. Sexual dysfunction and reproductive concerns in young women with breast cancer: Type, prevalence, and predictors of problems [J]. *Psychooncology* 2018; 27(12): 2770-2777.
- [8] Connell S, Patterson C, Newman B. A qualitative analysis of reproductive issues raised by young Australian women with breast cancer [J]. *Health Care Women Int* 2006; 27(1): 94-110.
- [9] Thewes B, Meiser B, Rickard J et al. The fertility- and menopause-related information needs of younger women with a diagnosis of breast cancer: A qualitative study [J]. *Psycho-Oncology* 2003; 12(5): 500-511.
- [10] Gorman J R, Malcarne V L, Roesch S C et al. Depressive symptoms among young breast cancer survivors: the importance of reproductive concerns [J]. *BREAST CANCER RESEARCH AND TREATMENT* 2010; 123(2): 477-485.
- [11] Gorman J R, Su H, Roberts S C et al. Experiencing reproductive concerns as a female cancer survivor is associated with depression [J]. *Cancer* 2015; 121(6): 935-942.
- [12] Benedict C, Thom B, Friedman D N et al. Fertility information needs and concerns post-treatment contribute to lowered quality of life among young adult female cancer survivors [J]. *Supportive Care in Cancer* 2018; 26(7): 2209-2215.
- [13] Bartolo A, Santos I M, Valerio E et al. Depression and Health-Related Quality of Life Among Young Adult Breast Cancer Patients: The Mediating Role of Reproductive Concerns [J]. *J Adolesc Young Adult Oncol* 2020; 9(3): 431-435.
- [14] Letourneau J M, Ebbel E, Katz P P et al. Pretreatment fertility counseling and fertility preservation improve quality of life in reproductive age women with cancer [J]. *Cancer* 2012; 118(6): 1710-1717.
- [15] Runco D V, Taylor J F, Helft P R. Ethical Barriers in Adolescent Oncofertility Counseling [J]. *JOURNAL OF PEDIATRIC HEMATOLOGY ONCOLOGY* 2017; 39(1): 56-61.
- [16] Kent E, Arora N K, Rowland J H et al. Health information needs and health-related quality of life in a diverse population of long-term cancer survivors [J]. *PATIENT EDUCATION AND COUNSELING* 2012; 89(2): 345-352.

- [17] Stark S S Natarajan L Chingos D et al. Design of a randomized controlled trial on the efficacy of a reproductive health survivorship care plan in young breast cancer survivors[J]. *Contemporary Clinical Trials* 2019 77: 27-36.
- [18] Sinha N Letourneau J Chan S et al. Improvement in quality of life with fertility preservation begins after cancer treatment and persists one year after cancer treatment[J]. *Fertility and Sterility* 2017 108(3, Supplement): e90.
- [19] Young K Shliakhtsitsava K Natarajan L et al. Fertility counseling before cancer treatment and subsequent reproductive concerns among female adolescent and young adult cancer survivors[J]. *Cancer* 2019 125(6): 980-989.
- [20] Manne S Ostroff J Rini C et al. The Interpersonal Process Model of Intimacy: The Role of Self-Disclosure, Partner Disclosure, and Partner Responsiveness in Interactions Between Breast Cancer Patients and Their Partners. [J]. *Journal of Family Psychology* 2004 18(4): 589-599.
- [21] Zhen R Quan L Zhou X. How does social support relieve depression among flood victims? The contribution of feelings of safety, self-disclosure, and negative cognition[J]. *Journal of Affective Disorders* 2018 229: 186-192.
- [22] Park C L Bharadwaj A K Blank T O. Illness centrality, disclosure, and well-being in younger and middle-aged adult cancer survivors[J]. *British Journal of Health Psychology* 2011 16(4): 880-889.
- [23] Li H Zhang M Zhang T et al. Formulation and preliminary validation of a self-disclosure oriented benefit finding intervention protocol for breast cancer patient[J]. *Journal of Nursing Science* 2020 35(11): 75-79.
- [24] Li X Sheng L Zhao Q et al. Correlation between fertility anxiety and self-disclosure in young female cancer patients[J]. *Journal of Nursing Science* 2020 35(8): 84-86.
- [25] Lutha S S Cicchetti D. The construct of resilience: implications for interventions and social policies[J]. *Dev Psychopathol* 2000 12(4): 857-885.
- [26] Ungar M Theron L. Resilience and mental health: how multisystemic processes contribute to positive outcomes[J]. *The Lancet Psychiatry* 2020 7(5): 441-448.
- [27] Li Y Zhang X Shi M et al. Resilience acts as a moderator in the relationship between infertility-related stress and fertility quality of life among women with infertility: a cross-sectional study[J]. *Health and Quality of Life Outcomes* 2019 17(1).
- [28] Matzka M Mayer H Koeck-Hodi S et al. Relationship between Resilience, Psychological Distress and Physical Activity in Cancer Patients: A Cross-Sectional Observation Study[J]. *PLOS ONE* 2016 11(e01544964).
- [29] Min J Yoon S Lee C et al. Psychological resilience contributes to low emotional distress in cancer patients[J]. *SUPPORTIVE CARE IN CANCER* 2013 21(9): 2469-2476.
- [30] Sharpley C F Bitsika V Wootten A C et al. Does resilience 'buffer' against depression in prostate cancer patients? A multi-site replication study[J]. *EUROPEAN JOURNAL OF CANCER CARE* 2014 23(4): 545-552.
- [31] Bae J. The Effects of Self-Disclosure, Social Support and Intentional Rumination on Posttraumatic Growth[J]. 2013 34(2): 215-228.

- [32] Kennedy-Moore E, Watson J C. How and when does emotional expression help?[J]. *Review of General Psychology* 2001; 5(3): 187-212.
- [33] Wang Y, Zhao Y, Xie S, et al. Resilience Mediates the Relationship Between Social Support and Quality of Life in Patients With Primary Glaucoma[J]. *FRONTIERS IN PSYCHIATRY* 2019; 10(22).
- [34] Wilks S, Croom B. Perceived stress and resilience in Alzheimer's disease caregivers: Testing moderation and mediation models of social support[J]. *AGING & MENTAL HEALTH* 2008; 12(3): 357-365.
- [35] Gorman J R, Su H, Pierce J P, et al. A multidimensional scale to measure the reproductive concerns of young adult female cancer survivors[J]. *JOURNAL OF CANCER SURVIVORSHIP* 2014; 8(2): 218-228.
- [36] Qiao T, Zheng W, Xing W, et al. Psychometric properties of the Chinese version of the Reproductive Concerns After Cancer Scale (RCAC) for young female cancer survivors[J]. *Support Care Cancer* 2017; 25(4): 1263-1270.
- [37] Kahn J H, Hessling R M. Measuring the Tendency to Conceal Versus Disclose Psychological Distress[J]. *Journal of Social and Clinical Psychology* 2001; 20(1).
- [38] Li X. A Study on the relationship between adult attachment, self-disclosure and depression in college students[D]. 2009.
- [39] Tian J, Hong J S. Validation of the Chinese version of the Resilience Scale and its cutoff score for detecting low resilience in Chinese cancer patients[J]. *Supportive care in cancer* 2012; 21(5): 1497-1502.
- [40] Zhou H, Long L R. Statistical test and control method of common method deviation[J]. *Advances in Psychological Science* 2004(06): 942-950.
- [41] Sobota A, Ozakinci G. Fertility and parenthood issues in young female cancer patients—a systematic review[J]. *J Cancer Surviv* 2014; 8(4): 707-721.
- [42] Howard-Anderson J, Ganz P A, Bower J E, et al. Quality of Life, Fertility Concerns, and Behavioral Health Outcomes in Younger Breast Cancer Survivors: A Systematic Review[J]. *JNCI Journal of the National Cancer Institute* 2012; 104(5): 386-405.
- [43] Wang L, Li X, Li Y, et al. Status quo of reproductive concerns in patients with breast cancer receiving postoperative chemotherapy and its influencing factors[J]. *Chin J Mod Nurs* 2019; 25(1): 58-62.
- [44] Jia C. Research on the Influence of the use of social networking sites on college Students' Self-identity[D]. 2014.
- [45] Wang Z, Tang L, Wu C. The Self - disclosure and its influencing factors in patients with breast cancer during treatment[J]. *Chin Prev Med* 2019; 20(11): 1076-1080.
- [46] Yamashita A, Yoshioka S I. Resilience Associated with Self-Disclosure and Relapse Risks in Patients with Alcohol Use Disorders[J]. *Yonago Acta Med* 2016; 59(4): 279-287.
- [47] Chaudoir S R, Fisher J D. The disclosure processes model: Understanding disclosure decision making and postdisclosure outcomes among people living with a concealable stigmatized identity.[J]. *Psychological Bulletin* 2010; 136(2): 236-256.

[48] Wang X,Chen J,Lei W,et al. Relationship between social support and negative emotions in adolescent girls: the mediating role of psychological resilience[J]. JOURNAL OF SHANDONG UNIVERSITY(HEALTH SCIENCES) 2020 06(58): 110-114.

Figures

Figure 1

Hypothesis model diagram