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Research

Providing Information or Support Based on Cancer Worry Can Decrease Psychological Distress Among Daughters of Women with Breast Cancer

Van Du Phung[a,b], Susan J. Fetzer[a], Su-Ying Fang[a,c,*]

[a] Department of Nursing, College of Medicine, National Cheng Kung University, Tainan, Taiwan
[b] Department of Nursing, Hai Duong Medical Technical University, Hai Duong, Vietnam
[c] Department of Nursing, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan, Taiwan

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ABSTRACT

Background: Cancer Worry (CW) can shape the responses and behaviors of information or support-seeking of daughters of women with breast cancer.
Objective: This study aims to explore the roles of Cancer Worry (CW) as a moderator and mediator in the relationship between information needs, support needs, and psychological distress.
Methods: A cross-sectional and correlational design was used in conjunction with a convenience sampling strategy. Daughters of mothers with breast cancer were requested to complete the questionnaires Impact of Event Scale Chinese version (IES-C), Cancer Worry Scale for Genetic Counseling (CWS-GC), and Information and Support Needs Questionnaire (ISNQ). Hayes' PROCESS macro using SPSS for Windows were used to examine the mediator and moderator role of CW.
Results: A total of 194 daughters provided data. Cancer worry was significantly correlated with total IES ($r = 0.352$, $P < .01$), intrusion-IES ($r = 0.353$, $P < .01$), avoidance-IES ($r = 0.313$, $P < .01$), unmet support needs ($r = 0.226$, $P < .01$), and unmet information needs ($r = 0.17$, $P < .05$). Cancer worry mediated the relationship between unmet support needs and total IES ($\beta = 0.089$, 95% CI: 0.026, 0.171) and moderated the relationship between unmet information needs and total IES ($\beta = -0.395$, $P = .018$, 95% CI: −0.723, −0.066).
Conclusions: The role of cancer worry should be paid attention to when clinicians deliver information and provide support as well as tailoring psychological intervention for ameliorating distress in daughters of women with breast cancer.
Implications for nursing: Providing personalized information and support is essential to address the unmet needs of daughters of women with breast cancer. Healthcare professionals providing interventions to reduce distress and improve overall care should consider individual CW.
Plain English summary: This research looks at how worrying about cancer affects daughters of women who have breast cancer. It focuses on the degree of cancer worry changes the way they feel when they don't get the information and support. Researchers used surveys to gather data from these daughters, examining how their level of cancer worry influenced their needs for information and support and their psychological distress. They found that greater unmet support needs will intensify worry about cancer and then increase psychological stress. However, too much or too little worry about cancer will also heighten their psychological distress due to limited information. The findings suggest that healthcare providers, including nurses, should consider the level of worry about cancer when offering support and information to these individuals to help reduce their stress.
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Introduction

Breast cancer patients often suffer from psychological distress stemming from the trauma of diagnosis, treatment side effects, and altered body image. The psychological distress of women with breast cancer can have a direct impact on their daughters. Daughters deal with the stress related to their mothers' diagnosis and course of treatment.[1-4] Additional stressors that daughters face are the inherited nature of breast cancer and potential role changes between the mother and daughter. All of these stressors can complicate daughters' psychological well-being. Consequently, if a mother has had breast cancer, her adult daughters should be aware of their risk and may

* Address correspondence to: Su-Ying Fang, Department of Nursing, College of Medicine, National Cheng Kung University, 1 University Rd., Tainan 701401, Taiwan.
E-mail address: suying@ncku.edu.tw (S.-Y. Fang).

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Layperson Summary

What we investigated and why

This study explores how worry about cancer (referred to as Cancer Worry, CW) affects daughters of women with breast cancer, particularly in how CW influences their behaviors of seeking information and support, and how they deal with stress.

How we did our research

Researchers used surveys to gather data from these daughters, examining how their level of cancer worry influenced their needs for information and support, and their psychological distress.

What we have found

They found that greater unmet support needs will intensify worry about cancer, and then increase psychological stress. However, too much or too little worry about cancer will also heighten their psychological distress due to limited information.

What it means

The findings suggest that healthcare providers, including nurses, should consider the level of worry about cancer when offering support and information to these individuals to help reduce their stress.

need support from healthcare professionals.[5] Studies have revealed that daughters have information or support needs even if a gene mutation is not identified.[6-8] Needs include information about symptoms, causes, and possible risks of breast cancer, how to communicate and support family, preventive measures, and genetic screening. Support needs include how to deal with the mother's breast cancer, release distress, and facilitate behaviors for self-prevention.[9,10] Although the need for information and support among daughters has been recognized, studies suggested that they tend to postpone their health practices and undergo fewer diagnostic procedures to facilitate early detection while being concerned with their mothers' health.[1,4,10] Researchers have found that daughters' needs for information and support are not adequately satisfied creating inaccurate or distorted perceptions of their personal risk for breast cancer.[10-12] The limited resources to provide adequate information and support needs regarding health systems are the most common contributors to inaccurate or distorted perceptions. Unmet care needs may deprive daughters the opportunity to obtain psychological health care and specialty services earlier in their mothers' illness trajectory.[13]

Previous studies have demonstrated that daughters of mothers diagnosed with breast cancer exhibited greater distress, anxiety, and depression compared to women without such histories.[3,4,6,8,14] One study, conducted by Quillin, et al.[15] found that daughters' stress responses are not only influenced by the perceived risk of breast cancer but are also impacted by inadequate information and support. Other studies have highlighted the potential for distress when information about the cause of breast cancer, hereditary cancer screening and counseling, and treatment is provided in excess, while information on how to communicate with family members about risks and disease is omitted or minimized.[10,14,16]

Cancer Worry (CW) is a state of emotional reaction to the threat of cancer and can determine health behaviors.[17] CW is manifested by the level of worrying about the likelihood of getting breast cancer or future screening results, and the level of worry affects mood and performance of daily activities.[18,19] Recognizing cancer worry experienced by daughters is essential to provide optimal care. Assessing women's reactions to and approaches for obtaining information and support related to their perceived risk of developing cancer can help develop intervention programs.[20] Information needs are associated with cancer worry, with respondents who frequently worry about getting cancer being more likely to seek cancer-related information than those who do not worry.[21] Information can have negative effects on cancer worry by increasing perceived risk and concern about developing breast cancer.[3] However, several studies have found that greater support resulted in less cancer worry and could decrease psychological distress.[16,21,22]

Daughters and daughters-in-law are anticipated to assume the role of caregivers for their parents, as they were nurtured in their families as children in Chinese culture.[20] A qualitative study conducted in Taiwan revealed that, despite their own fears of developing cancer, daughters of mothers diagnosed with breast cancer prioritize caregiving for their mothers.[1] Given that witnessing their mothers' suffering exacerbates the daughters' distress, the approach to delivering information and support to the daughters should take into account the extent of their cancer worry.[23]

Furthermore, although several hospitals in Taiwan offer genetic testing and counseling services, most lack regular cancer risk assessment and specialized counseling channels for high-risk groups with a family history of breast cancer. Understanding information and support needs and their relationship with cancer worry is crucial to developing more tailored interventions for these daughters. The purpose of this study is to explore the role of cancer worry on the relationships among information needs, support needs, and psychological distress. The hypothesis guiding the study was that cancer worry moderates the relationship between information needs and psychological distress. In contrast, cancer worry mediates the relationship between support needs and psychological distress among daughters of women with breast cancer.

Methods

A cross-sectional correlational design was conducted between September 2020 and September 2021 at a medical center in southern Taiwan. A convenience sample of daughters of mothers with breast cancer was recruited when they accompanied their mothers to the breast cancer clinic or when they attended breast cancer surveillance appointments in the surgical outpatient clinic. To determine the appropriate sample size for this study, we utilized G*Power 3.1.9.4 software.[24] For multiple regression analysis, with a significance level set at 0.05, a statistical power of 80%, and an estimated moderate effect size ($f^2 = 0.1$), based on a previous study that found correlations of IES-C with ISNQ and cancer worry at .20 and .23 respectively ($P < .01$),[25] we inferred a moderate effect size. Consequently, a sample size of approximately 194 participants was appropriate. Criteria for inclusion were at least 20 years old, a biological daughter of a mother with breast cancer, and willing to participate in the study. Daughters were excluded if they were diagnosed with cancer, had a history of psychiatric disease, or were unable to read or speak in Mandarin.

Instruments

Sociodemographic information self-reported by daughters included age, employment status, level of education, primary maternal caregiver, and knowledge of genetic testing. Clinical information on the mothers' age, cancer stage, and cancer treatment was obtained from the medical record.

The daughters' needs were measured by the Information and Support Needs Questionnaire (ISNQ).[9] The original ISNQ with 29 items evaluates the need for information and support among women who have a family history of breast cancer.[9] Each item uses a 4 Likert scale.

Responses range from met fully (0), met somewhat (1), met a little (2), or not met at all (3). Information needs include 18 items, while the support needs subscale includes 11 items. Scores range from 0 to 54 for information needs and 0 to 33 for support needs. A higher score represents greater unmet needs. The internal consistency of the ISNQ was evaluated using Cronbach's alpha, which showed a score of 0.92 for the English version.[9] In this study, standardized translation was conducted[25] and further examined reliability by Cronbach's alpha values, which were 0.94 for the overall ISNQ, 0.93 for the Information Needs subscale and 0.88 for the Support Needs subscale.

Daughters' concern for breast cancer was measured by using the Cancer Worry Scale revised for the breast Cancer Genetic Counseling (CWS-GC).[18] The scale evaluates both cancer-related worry and risk perception. Five items in the cancer worry domain measures the intensity of worry about developing breast cancer, anxiety about future mammograms, the impact of their worry on mood, daily functioning, and the frequency of worry about developing breast cancer. Items use a 5-point Likert scale (from 0 = not at all/never to 4 = very much/very often). A higher score indicates a higher level of cancer worry. To facilitate data manipulation, scores were rescaled to a 0 to 100 basis according to the percentage of scale maximum scores [% SM = (score) x 100/ (number of scale points - 1)]. The total score was calculated as the average of the five items. The CW groups were classified using the mean +/- standard deviation as the high, moderate, and low cut-off points. The internal consistency of CWS-GC examined by a Cronbach's coefficient is 0.90,[18] and 0.89 for the Chinese version.[25]

The Impact Event Scale-Chinese (IES-C), including intrusion (7 items) and avoidance (8 items) domains, was used to measure daughters' psychological distress. Responses are scored on a Likert scale ranging from 0 to 5 (0 = not at all, 1 = rarely, 3= sometimes, and 5= often). Scores range from 0-75, with higher scores indicating more intrusive feelings of worry and a greater tendency toward avoidance. In this study, the Cronbach's alpha were 0.88, 0.79, and 0.78 for the total IES-C, intrusion subscale, and avoidance subscale, respectively.

Procedure

Approval was obtained from the institutional review boards (IRBs) of National Cheng Kung University Hospital, Taiwan (Protocol number B-ER-109-170). Upon obtaining approval adult females accompanying a breast clinic patient were approached and invited to participate. While waiting at the clinic, Daughters who agreed to participate were requested to sign a written informed consent form and then provided questionnaires to complete. A small gift was provided when the daughters completed the questionnaires.

Statistical Analysis

Descriptive statistics were used to analyze the demographic characteristics. Pearson's correlations, ANOVA, and linear regression were used to determine the relationship among variables. Confounding variables were controlled as covariates. The moderator and mediator roles of cancer worry were tested by Bootstrap analysis with PROCESS Macro.[26] All statistical analyses were performed using SPSS for Windows, version 24.0 (SPSS Inc., Chicago, Illinois, USA).

Results

Demographics

One hundred and ninety-four daughters of mothers with breast cancer provided study data. The sociodemographic and clinical information of their mother were presented in Table 1. The mean age was 36.7 years. Most were employed, and around 90% had at least 12 years of formal education. Nearly 70% of the daughters knew their mothers' genetic testing experience. More than half of the daughters had a family history of breast cancer except their mothers. The mean score of involving cancer caring was 6.67, with around one-third of daughters reporting they were involved at a maximum level of cancer caring. In addition, over 50% of the mothers received chemotherapy, and more than half were in cancer remission.

TABLE 1
Samples Characteristics

Characteristics	N = 194
Age (Mean±SD/ range)	36.7± 11.53 / (20-73)
Educational level	
Basic education <12 years	27 (13.9%)
Higher education ≥ 12 years	167 (86.1%)
Involved cancer caring (Mean±SD)	6.67 ± 3.19
Known about whether their mother had undergone genetic testing	
Yes	135 (69.1%)
No	59 (30.9%)
Employment status	
Yes	150 (77.3%)
No	44 (22.7%)
Time from mother diagnosis breast cancer (Mean±SD)	6.7 ± 5.3
Cancer Status of mother	
Initial diagnosis/ undergoing treatment	43 (22.2%)
Remission	104 (53.6%)
Recurrent	21 (10.8%)
Death	26 (13.4%)
Breast cancer pathology stage of mother	
0	29 (14.9%)
I	36 (18.6%)
II	65 (33.5%)
III /IV	42 (21.6%)
Unknown	22 (11.3%)
Adjuvant therapy of mother	
Yes	174 (89.7%)
No	20(10.3%)
Family history with breast cancer	
Yes	108 (55.7%)
No	78 (40.2%)
Unknown	8 (4.1)

Information Needs, Support Needs, Cancer Worry, and Psychological Distress

The daughter's ISNQ information needs and support needs mean score shown in Table 2. The level of expressed needs in each domain was calculated by summing up the items and dividing by the number of items. The mean item scores in the support and information domains were 1.6 and 1.4, respectively, indicating a higher level of unmet needs in the support domain than in the information domain ($t = 4.5$, $P < .001$).

Almost two-thirds of the daughters (n = 124) reported a moderate level of cancer worry. Additionally, significant differences in unmet information needs were found based on the level of cancer

TABLE 2
Descriptive Statistics of Information Needs, Support Needs, Cancer Worry, and Psychological Distress

	Possible range	Actual range	Mean	SD	n	%
ISNQ information needs	0-54	0-51	24.8	12.46	194	100
ISNQ support needs	0-33	0-33	17.3	9.27	194	100
Cancer worry	0-100	0-100	46.5	24.77	194	100
Total IES	0-75	0-56	16.3	12.2	194	100
Intrusion IES	0-35	0-35	7.7	6.01	194	100
Avoidance IES	0-40	0-31	7.0	6.93	194	100

worry ($P = .001$). Posthoc analysis revealed a significant difference when comparing low levels of cancer worry to high and moderate levels of cancer worry for unmet information needs ($P = .001$; .007), respectively. However, unmet information needs were not significantly different between moderate and high levels of cancer worry.

Table 2 also shows the total mean score for the Impact Event Scale and IES subscale scores for intrusion and avoidance.

Predictive Factors of Psychological Outcomes

The correlations between demographic characteristics and total mean score and mean subscale score of the IES (Supplement Table) revealed that daughters whose mothers were diagnosed with breast cancer stage II, III, or IV, were deceased, experienced cancer recurrence, or were currently undergoing treatment reported higher levels of distress than daughters whose mothers were diagnosed with stage 0 cancer or were in remission ($P < .05$). The correlations between total score, and subscales score of IES with cancer worry, information needs, and support needs are presented in Table 3. Cancer worry positively correlated with mean score total IES, support, and information needs.

Mediating Effect of Cancer Worry on the Relationship Between Unmet Support Need and Psychological Distress

Following the guiding hypothesis, three mediation models were tested (Fig. 1). The initial mediation model examines the indirect influence of unmet support needs on total IES score through cancer worry after controlling for mothers' stage of cancer and status of cancer. The Standardized coefficients paths from unmet support needs to cancer worry (a = 0.219, $P < .01$), from cancer worry to total IES (b = 0.308, $P < .001$), and the unmediated path, or the total effect, from unmet support needs to total IES (c = 0.2161, $P < .01$) were significant. The inclusion of cancer worry in the model indicated a significant indirect effect from unmet support needs to total IES through cancer worry (Bootstrapped Mediated Effect, BMED = 0.089, 95% Bias-Corrected and accelerated bootstrap Confidence Interval, BCa CI [0.0267-0.1710]). The direct effect of unmet support needs on total IES was significant (c' = 0.148, $P < .05$), demonstrating a partial mediating effect of unmet support needs on total IES through cancer worry. For every unit increase in reported unmet support needs, there was an increase of .089 in the predicted value of total IES score through cancer worry. Specifically, a one standard deviation increase in unmet support needs (SD = 9.27) predicts a 0.83 unit increase in total IES score (Table 4).

The second mediation model examined the indirect effect of unmet support needs on intrusion IES score through cancer worry. The Standardized coefficients paths from unmet support needs to cancer worry (a = 0.219, $P < .01$), from cancer worry to intrusion IES (b = 0.306, $P < .001$), and the unmediated path, or the total effect, from unmet support needs to intrusion IES (c = 0.1662, $P < .05$) were significant. When the model accounted for cancer worry, a notable indirect effect was evident from unmet support needs to the intrusion IES score (BMED = 0.044, with a 95% BCa CI [0.012-0.086]). With the direct effect of unmet support needs on intrusion IES becoming nonsignificant (c' = 0.098, $P > .05$), the full mediator effect of unmet support needs on intrusion IES through cancer worry was demonstrated. Each unit increase in unmet support needs was associated with a 0.044 increase in the predicted value of intrusion IES due to cancer worry. Specifically, a one standard deviation increase in unmet support needs (SD = 9.27) predicts a 0.4 unit increase in intrusion IES.

The third mediation model tested the indirect effect of unmet support needs on avoidance IES score through cancer worry. The Standardized coefficients paths from unmet support needs to cancer worry (a = 0.219, $P < .01$), from cancer worry to total IES (b = 0.277, $P < .001$), and the unmediated path, or the total effect, from unmet support needs to avoidance IES (c = 0.236, $P < .01$) were significant. The inclusion of cancer worry in the model revealed a substantial indirect effect of unmet support needs on the avoidance IES score through cancer worry (BMED = 0.045, 95% BCa CI [0.012-0.090]). The significant direct effect of unmet support needs on the avoidance IES score (c' = 0.175, $P < .05$) confirmed that cancer worry is a partial mediator in the effect of unmet support needs on the avoidance IES scores. Each unit increase in reported unmet support needs resulted in a 0.05 increase in the predicted value of avoidance IES through cancer worry. More specifically, a one standard deviation increase in unmet support needs (SD = 9.27) predicted a 0.5 unit increase in avoidance IES.

Moderation Effect of CW on the Relationship Between Unmet Information Needs and Psychological Distress

There was a significant relationship between information needs, level of cancer worries, total IES score, and avoidance subscale score of IES. Specifically, significant moderator effects were observed in the relationship between information needs and total IES, as well as avoidance IES. The interaction between information needs and moderate cancer worry was significant (β=2212.395; $P = .018$) for the model with total IES as outcome and ($\beta = -0.242$; $P = .012$) for the model avoidance IES as outcome (Table 5). Given the interaction between unmet information needs and moderate cancer worry was significant ($P = .018$), there was a difference in the unmet information needs between the low anxiety and the moderate anxiety groups. Fig. 2 illustrates that the daughters with lower and higher levels of cancer worry demonstrate a consistent positive relationship between unmet information needs and total IES. The more unmet information needs are reported, the more psychological distress of IES is experienced. In contrast, the more unmet information needs are reported, the less psychological distress of IES is experienced by the daughters with a moderate level of cancer worry.

TABLE 3
Correlation of IES and Independence Variables

	Factors	1	2	3	4	5	6
1	Cancer worry	1					
2	Total IES	0.352[b]	1				
3	Intrusion IES	0.353[b]	0.933[b]	1			
4	Avoidance IES	0.313[b]	0.950[b]	0.775[b]	1		
5	Information needs (ISNQ 18)	0.170[a]	0.119	0.088	0.134	1	
6	Support needs (ISNQ 11)	0.226[b]	0.212[b]	0.161[a]	0.234[b]	0.707[b]	1

[a] Values $P < .05$.
[b] Values $P < .01$.

Discussion

For mothers with breast cancer, the findings indicate that most daughters had moderate levels of CW. The level of unmet support needs was greater than unmet information needs, and almost all daughters suffered distress caused by the mother's breast cancer diagnosis. These findings are in line with previous studies that concluded that a moderate level of CW was reported by most of the daughters.[15,18] Previous studies have also shown that the degree of unmet support was greater than unmet information needs.[11,16] Most daughters with moderate levels of cancer worry can be explained by the fact that the daughters (86.1%, n = 167) had a high school education or above and were involved in their mothers' cancer care. A similar finding in previous studies involving cancer care and high

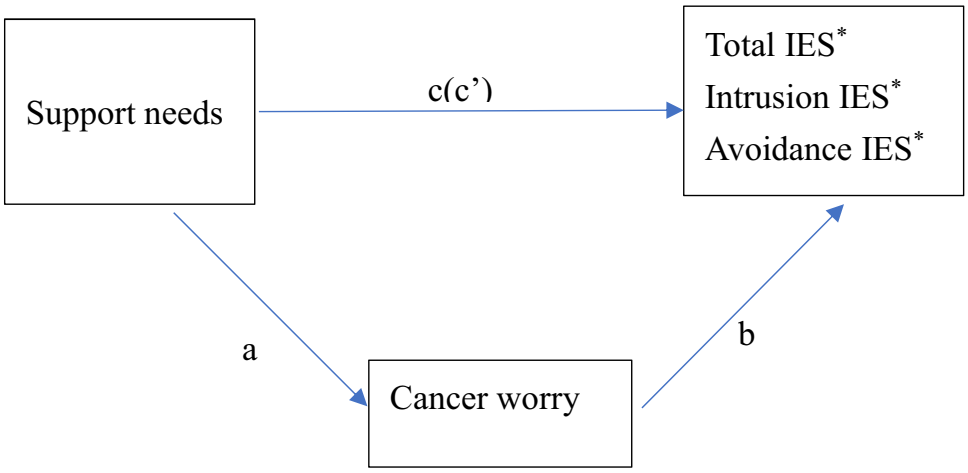

FIG 1. Three mediation models were tested including support needs as predictors (IV), total IES, intrusion IES, avoidance IES as outcomes (DVs), and cancer worry as a mediator (M). IES = Impact Event Scale; a = the direct effect of IV on mediator (M); b = the direct effect of M on DV when IV is controlled; c = the direct effect of IV on DV when M is not controlled (total effect); c' = the direct effect IV to DV when M is controlled. [a]Tested in separate models and full mediation was indicated when c' not significant ($P>0.05$).

education level found a reduction in CW and kept the daughter at a moderate level of worry related to cancer.[6,12,15,27]

The unmet support needs were higher than information needs in the current study. Healthcare providers and daughters may place information needs as a priority.[10,11,14] As a result, information needs were more likely to be fulfilled than support needs. A study by Pinkert and Holtgrawe[16] reported that healthcare providers tended to overestimate the level of met needs and just focus on providing which needs they perceived to be important. Thus, information needs dominate, and daughters may have felt inadequate support needs and reported less satisfaction.

The study found that the mean score of daughters' distress symptoms from the mother's breast cancer diagnosis was 16.3 (SD = 12.20), which was in line with previous studies that found that the mean score of IES with a stressor is cancer or being at risk of developing cancer, varied from 7.3 to 17.7[28,29] in similar populations. However, a study conducted in 2013 on sisters of patients newly diagnosed with breast cancer showed a mean IES score of 25.6[30] higher than our current study. Metcalfe, et al.[30] found that the more involved in cancer care and the longer time from breast cancer diagnosis, the less distress was reported. Since most of the daughters were involved in their mothers' cancer care for over one year in this study, perhaps the stress of the situation had been alleviated.

The study revealed significant associations between the cancer stage, treatment status of mothers, and distress symptoms reported by their daughters, consistent with previous research findings. The study suggests that daughters who witness their mother's experience with cancer and the treatment side effects may be more likely to experience psychological distress.[7,14] Similarly, all daughters in the current study reported involvement in their mother's cancer care, with nearly one-third of daughters reporting being the primary caregiver for their mother.

TABLE 4
Standardized Coefficients and Bootstrap Mediated Effects with Confidence Intervals for Model

Mediation models	a	b	c	c'	BMED	BcaCI
Total IES						
Support needs	**0.219**[b]	**0.308**[c]	**0.216**[b]	**0.148**[a]	0.089	0.026, 0.171
Intrusion IES						
Support needs	**0.219**[b]	**0.306**[c]	**0.166**[a]	0.098	0.044	0.012, 0.086
Avoidance IES						
Support needs	**0.219**[b]	**0.277**[c]	**0.236**[b]	**0.175**[a]	0.045	0.012, 0.090

Note. The bootstrapped effect was based on 5,000 bootstrap samples. Analyses were adjusted for status cancer of mother, and stage cancer of mother. a = path from predictor (support needs) to cancer worry; b = path from cancer worry to outcome (total IES, intrusion IES, avoidance IES); c = unmediated path from predictor to outcome (total effect); c' = direct effect from predictor to outcome after accounting for the mediated effect; BMED = bootstrapped mediated effect (indirect effect); BCaCI = bias-corrected and accelerated bootstrap confidence interval

[a] $P < .05$.
[b] $P < .01$.
[c] $p < .001$.

After controlling for the stage of tumor, and cancer status of the mother, this study found CW partially mediated the relationship between unmet support needs and psychological distress. The results suggest that fulfilling support needs reduces psychological distress symptoms through an impact on cancer worry. The fulfilled needs of support enhanced positive emotions by releasing distress. Support facilitates behavior such as following cancer screening, providing motivation to do more adapting behaviors, and maintaining interpersonal relationships.[4,10] Accordingly, the findings of CW facilitated the relationship between unmet support needs and psychological distress demonstrated that the more the level of support needs are met and, the more likely decreasing CW and then reducing psychological distress.

Cancer worry influenced the relationship between information needs and psychological distress. High and low levels of cancer worry would enhance the effect of unmet information needs on psychological distress. In contrast, moderate levels of CW may buffer the effect of unmet information needs on psychological distress. Unmet information needs influence the daughters' perceptions and interpretations of risks and probability of getting breast cancer, which can lead to cancer worry. The association of unmet information needs with CW and psychological distress has been reported in previous studies.[14,18,27] The studies suggested that unmet information needs might bias the daughters' interpretations of the risk of developing breast cancer and result in additional worry and distress. However, the current study found that only moderate levels of CW played an important role in protecting the effect of unmet information needs on psychological distress. The study's finding suggests that healthcare providers should tailor information provided to daughters based on their level of cancer worry. The recommendation aligns with a study by Quillin, et al.,[15] which found that daughters at high risk of breast cancer had difficulty communicating about cancer risk and highlighted the need for individualized information to facilitate such communication. Similarly, Himes and Clayton[27] emphasized the importance of providing daughters with specific and tailored information based on their perceived risk.

Daughters with moderate levels of CW demonstrated that the more information they received, the more distress they suffered.

TABLE 5
Cancer Worry in The Moderating Effect of Relationship Information Need and Psychological Distress

Independent variable	Total IES			Intrusion IES			Avoidance IES		
	β	*P*	CI	*β*	*P*	CI	*β*	*P*	*CI*
Predictive variables									
Information needs	**0.315**	.027	0.035, 0.594	0.114	.105	−0.024, 0.252	**0.202**	.013	0.042, 0.363
Low cancer worry (r)									
Moderate cancer worry	3.031	.203	−1.653, 7.716	0.835	.477	−1.480, 3.151	2.065	.131	−0.627, 4.758
High Cancer worry	**9.037**	.002	3.293, 14.780	**4.474**	.002	1.625, 7.323	**4.618**	.006	1.317, 7.919
Interaction term									
Information needs x moderate cancer worry	−**0.395**	.018	−0.723, −0.066	−0.159	.054	−0.321, 0.002	−**0.242**	.012	−0.431, −0.053
Information needs x high cancer worry	−0.093	.676	−0.528, .343	−0.018	.864	−0.234, 0.197	−0.085	.503	−0.336, 0.165
R^2		.244			0.231			0.223	
ΔR^2		.029			0.021			0.031	

Note. *β*, standardized coefficients; SE, standard error; CI, 95% confidence interval; r, reference group; R2 (R-squared) coefficient of determination; ΔR2 (Delta R-squared) is the change in R^2.

Therefore, healthcare providers need to focus on delivering information that helps daughters communicate and share information about breast cancer risk with their relatives. When providing information on the etiology, hereditary cancer screening, and treatment side effects, healthcare providers need to consider potential misunderstandings and avoid triggering distress caused by providing too much information. The study provides preliminary evidence for healthcare professionals to provide care based on the level of cancer worry. Determining the appropriate type of information for different groups based on a cancer worry level is necessary in the future.

Strengths of the Study

The strengths of this study include its targeted focus on daughters of women with breast cancer, providing critical insights into the relationships among cancer worry, unmet support needs, and psychological distress. Furthermore, the findings emphasize the necessity for healthcare providers to consider individual levels of cancer worry when delivering support, thereby informing tailored interventions aimed at reducing stress and effectively addressing the emotional and informational needs of daughters affected by their mothers' breast cancer diagnosis.

Limitations

Findings are based on analyzing correlational data, the presence of a cause-and-effect relationship cannot be determined. Future studies using longitudinal designs or interventional approaches may help to better establish causal relationships among the variables. The present study relied on self-reported measures, which may be subject to response or social desirability bias. Participants may tend to respond in socially desirable ways, resulting in possible underreporting of their distress symptoms or overreporting of their information and support needs. Additionally, this study was limited by the impact of the COVID-19 pandemic, which may have affected patients' psychological well-being and unmet needs, potentially skewing the results.

All authors have read and approved the final version of the manuscript.

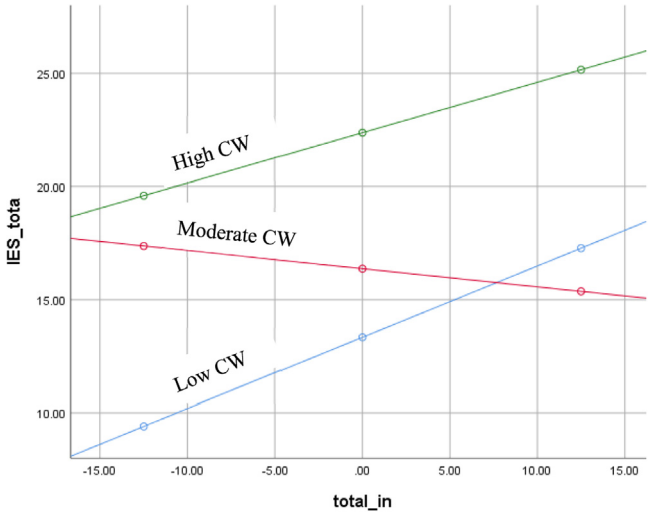

FIG 2. Influence of cancer worry on the relationship total IES and information needs. Note: IES total (total score of Impact Event Scale); total in (total score of information need).

Implications for Practice

The findings of this study indicate that daughters with different levels of CW require a tailored approach in the amount and type of information about breast cancer. Assessing the CW of the daughters before providing information is critical.

Compliance with Ethical Standards

Ethical Approval Ethical approval was obtained from the committee of National Cheng Kung University Hospital (Taiwan) (IRB number B-ER-109-170). All procedures involving human participants were performed in accordance with the ethical standards of the institutional and/or national research committee and the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The authors have full control of all primary data and agree to allow the journal to review their data if requested.

Consent to Participate

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

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Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Su-Ying Fang reports financial support was provided by National Science and Technology Council. If there are other authors, they

declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Van Du Phung: Writing – original draft, Methodology, Formal analysis, Conceptualization. **Susan J. Fetzer:** Writing – review & editing. **Su-Ying Fang:** Writing – review & editing, Supervision, Investigation, Funding acquisition, Data curation.

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Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.soncn.2024.151760.

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