

The influence of family function and resilience to self-efficacy and self-esteem mediating by family role in breast cancer patients: A PLS-SEM

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Abstract

Background: Breast cancer is known as one of the most dangerous types of cancer in the world. Managing self-efficacy and self-esteem in breast cancer patients presents a major challenge.

Purpose: This study aims to analyze the influence of family function and family resilience on self-efficacy and self-esteem in breast cancer patients by positioning family role as a mediator variable in a structural model based on the Family Centered Empowerment Model.

Methods: This study used a cross-sectional design. The population consists of breast cancer patients, with a sample size of 102 respondents using total sampling. The independent variables are family functioning and resilience, while the dependent variables are self-efficacy and self-esteem, with family role as the intervening variable. The inferential analysis used was Structural Equation Modelling Partial Least Squares by evaluating the measurement model (outer model), evaluating the structural model (inner model), and testing hypotheses.

Results: Family function and family resilience significantly predicted family role ($p = 0.007$) and ($p = 0.012$), respectively. Family role, in turn, significantly predicted self-efficacy ($p < 0.001$) and self-esteem ($p < 0.001$). The model explained 30.8% of the variance in family role, 52.6% in self-efficacy, and 29.2% in self-esteem.

Conclusion: Family function and family resilience significantly influence family role, which subsequently predicts self-efficacy and self-esteem among breast cancer patients. Longitudinal studies are warranted to further clarify causal pathways and validate the stability of this structural model.

Keywords: breast cancer; family centered empowerment model; family role; self-efficacy; self-esteem

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Introduction

Since ancient times, breast cancer has been known as one of the most dangerous types of cancer in the world. This is in line with the data attached by the Breast Cancer Research Foundation in 2022, which reached 2.2 million, more than 670,000 of those cases resulting in death (BCRF, 2023). The World Cancer Research Fund also reported that China ranks first in new cancer cases among women with 357,161 cases, followed by the United States with 274,375 cases, India with 192,020 cases, and Brazil and Japan with 94,728 and 91,916 cases, respectively (WCRF, 2022). Breast cancer in Indonesia is also the most common new cancer case among women, with 66,271 cases and 22,598 deaths in 2022. This figure places Indonesia eighth in the world.

Breast cancer, or Carcinoma Mammae, is a malignant tumor in the form of an abnormal lump that grows in breast tissue. Tumor growth can occur in the mammary glands, glandular ducts, and supporting breast tissue such as fatty tissue and connective tissue (Iqmy et al., 2021). The exact cause of breast cancer is unknown, but a number of risk factors have been identified, namely modifiable and non-modifiable factors. Non-modifiable factors include age, genetics, reproductive history, and exposure to ionizing

Dewi, R., et al. (2026)

radiation at a young age. Modifiable factors include poor diet, obesity, hormonal contraceptive use, alcohol consumption, and hormone replacement therapy (Smolarz et al., 2022).

Breast cancer generally does not show symptoms in the early stages, but lumps are the most common physical symptom. Other less common symptoms may include discomfort or heaviness in the breast, permanent changes in the nipple, such as the nipple becoming detached (especially if it bleeds), scaly skin, or inward pulling (retraction) of the nipple (Alkareem et al., 2023). Breast cancer management is carried out in a multidisciplinary manner by combining locoregional therapies such as surgery and radiotherapy, as well as systemic therapies. Systemic therapies include hormone administration in cases with positive hormone receptors, chemotherapy, anti-HER2 targeted therapy in cancers with positive HER2 expression, and in recent developments also include the use of immunotherapy (Smolarz et al., 2022).

Given the dangerous nature of this disease and the complexity of the treatment required, including chemotherapy, breast cancer patients often exhibit negative psychological responses in their daily lives and in the long term, including decreased self-efficacy and self-esteem (Dewi et al., 2023; Haris et al., 2024). Breast cancer patients tend to have low self-efficacy and self-esteem due to poor mental adjustment caused by the effects of treatment, uncertainty regarding the healing process, and physical changes resulting from breast cancer. As a result, breast cancer patients often experience obstacles in achieving self-care goals and difficulty adapting to their illness (Ali et al., 2020; Dewi, et al., 2022; Tsai et al., 2021; Wulandari et al., 2024).

Managing self-esteem and self-efficacy in breast cancer patients presents a major challenge. To date, there is no universal therapy that is effective in addressing the long-term effects. Therefore, the role of the family becomes an alternative option for addressing this issue (Shi & Wu, 2023).

In the context of collective cultures such as families in Indonesia, the role of the family is a major source of support and has the potential to strengthen patients' adaptive mechanisms. The Family Centered Empowerment Model (FCEM) framework emphasizes that the components of family function and family resilience together form the operational role of the family in providing educational support, supervision, motivation, role modeling, friendship, and counseling to patients. This role is expected to increase patients' self-efficacy and self-esteem (Abedini et al., 2020; Shoghi et al., 2019). Preliminary empirical evidence indicates a relationship between family function, family resilience, and patients' psychosocial outcomes, but studies modeling the latent relationships between these three constructs and psychological outcomes in breast cancer patients are still limited (Alhani et al., 2022; Alzawahreh & Ozturk, 2024).

The role of the family can increase self-esteem

and self-efficacy through improved physical and mental functioning and self-capacity. The main thing in enhancing the role of the family is to pay attention to the role of family functioning and family resilience, so that it can help optimize the role of the family in dealing with difficult situations (Shoghi et al., 2019). Family function and resilience are determining factors in maximizing the roles played by family members as a foundation that strengthens relationships between family members. Family roles based on family function and strong family resilience can provide more active and appropriate support. This increases the chances of resolving self-esteem and self-efficacy issues in breast cancer patients (Cui et al., 2024).

Although various studies have identified the relationship between family outcome (such as family role, function or relationship) and psychological outcomes in breast cancer patients (Chang et al., 2022; Niveau et al., 2021; Seifyfard et al., 2025), few studies have simultaneously modeled family functioning and family resilience as exogenous constructs that influence self-efficacy and self-esteem through the role of family as a mediator in a theory-based structural framework. The novelty of this study lies in the development of a structural model that simultaneously positions family function and family resilience as exogenous constructs that influence self-efficacy and self-esteem through family role as a mediator in a Structural Equation Modeling-based analytical framework. Furthermore, this study expands the application of the Family Centered Empowerment Model by using it as a conceptual foundation to map the psychosocial mechanisms of families of adult breast cancer patients, which have previously been studied more in the context of caregiver interventions or pediatric populations.

This study aims to analyze the influence of family function and family resilience on self-efficacy and self-esteem in breast cancer patients by positioning family role as a mediator variable in a structural model based on the Family Centered Empowerment Model.

Materials and Methods

Design

This study employed a cross-sectional design to examine the structural relationships among family function, family resilience, family role, self-efficacy, and self-esteem in breast cancer patients. The Family Centered Empowerment Model (FCEM) was used as a conceptual framework to formulate the hypothesized structural relationships among the constructs, rather than as a measurement instrument.

Sample and setting

This study was conducted at a hospital in Sukabumi Regency, West Java, Indonesia. The inclusion criteria for this study were patients who could

Table 1. Distribution of characteristics breast cancer patient

Characteristics	Frequency	Percentage (%)
Age (Years)		
18-40	15	14.7
41-60	70	68.6
> 60	17	16.7
Education		
Elementary School	34	33.3
Junior High School	24	23.5
Senior High School	33	32.4
Higher Education	11	10.8
Marital Status		
Married	81	79.4
Widow or Widower	21	20.6
Employment Status		
Working	13	12.7
Not Working	89	87.3
Long-term Breast Cancer Sufferer		
< 6 months	22	21.6
6 months – 2 years	53	52.0
3-5 years	16	15.6
>5 years	11	10.8
Long-term Chemotherapy		
< 6 months	67	65.7
6 months – 2 years	30	29.4
3-5 years	4	3.9
>5 years	1	1.0

communicate verbally, patients who were willing to participate as respondents, and breast cancer patients undergoing their first cycle of chemotherapy. The population consists of breast cancer patients, with a sample size of 102 respondents using total sampling.

Variable

In this study, there are three independent variables, namely Family Functioning and Family Resilience with Family Role Factors as intervening variable which act as causes or influencing factors. The dependent variables are Self-Efficacy and Self-Esteem, which are the outcomes or effects of these independent variables. SEM allows researchers to understand and measure the cause-and-effect relationships among these variables in one model, including both direct and indirect effects, while accounting for measurement errors in the data.

Instruments

The tools used in this study included questionnaires adapted from various validated sources. The family function questionnaire was adapted from

Indonesian National Population and Family Planning Agency (BKKBN), the validity and reliability test results showed that all item loadings were > 0.70, AVE = 0.783, composite reliability = 0.947, and Cronbach's α = 0.93 (BKKBN, 2017). Meanwhile the family resilience questionnaire was adapted from Indonesian Ministry of Education and Culture with validity and reliability test results show that the instrument has adequate internal consistency with a Cronbach's alpha value of 0.659 and an item-total correlation coefficient ranging from 0.531 to 0.864 (Kemendikbud, 2017). Family role questionnaire based on the Parenting Sense of Competency Scale (PSOC) which demonstrated acceptable internal consistency reliability, as indicated by Cronbach's alpha coefficients of α = .85 exceeding the recommended threshold of 0.70, supporting its adequacy for measuring the intended construct (Uchiara, 2018), so that all indicators are considered sufficiently reliable and valid to measure the construct under study.

The self-efficacy questionnaire used the Symptom-Management Self-Efficacy Scale-Breast Cancer (SMSES-BC). The reliability of the SMSES-BC was indicated by a Cronbach's alpha value of

Table 2. Distribution of research variable

Variables	Indicators	Very Poor (%)	Poor (%)	Fair (%)	Good (%)	Very Good (%)
Family Function	Social Culture				81.13	
	Love and Compassion					82.72
	Protection					81.74
	Economy				78.06	
	Religion					81.86
Family Resilience	Physical				78.43	
	Social				81.13	
	Psychological				80.80	
The Role of the Family	Education					81.74
	Supervision					91.67
	Motivator					94.24
	Role Model					92.65
	Friend					89.83
	Counselor					90.56
Self-Esteem	Self-Acceptance				85.97	
	Self-Respect				77.27	
Variables	Indicators	Very Poor (%)	Poor (%)	Fair (%)	Good (%)	Very Good (%)
Self-Efficacy	Problem Solving					85.29
	Managing Chemotherapy Symptoms				83.97	
	Managing Emotional and Interpersonal Disturbances					85.44

0.96, while each subscale ranged from 0.88 to 0.95, and content validity ranged from 0.75 to 1.00 (Semiz & Sağlam Aksüt, 2022). Meanwhile, the self-esteem questionnaire used was the Rosenberg Self-Esteem Scale (RSE). Reliability test results showed that the RSE had excellent internal consistency, with a Guttman scale reproducibility coefficient of 0.92 and a retest within two weeks yielding a correlation of 0.85-0.88. In terms of validity, the RSE has been proven to have convergent, predictive, and construct validity, and is significantly correlated with other self-esteem instruments such as the Coopersmith Self-Esteem Inventory (Rosenberg, 1979).

Data collection

Data collection was conducted quantitatively using a survey approach with total sampling of breast cancer patients undergoing their first cycle of chemotherapy at the research hospital and meeting the inclusion criteria, namely being able to communicate verbally and willing to be respondents. After obtaining ethical approval and written informed consent, respondents completed a structured questionnaire covering variables of family function, family resilience, family role, self-efficacy, and self-esteem based on patient perceptions. The questionnaire was completed in

person in the chemotherapy unit with the assistance of researchers or trained enumerators to ensure the completeness and consistency of responses.

Data analysis

The data analysis in this study utilized both descriptive and inferential analysis. Descriptive analysis was employed to examine the characteristics of the respondents and each variable. Meanwhile, inferential analysis used Structural Equation Modelling Partial Least Square, involving the evaluation of the measurement model (outer model), the structural model (inner model), and hypothesis testing.

Ethical consideration

The Ethics Committee of the Sukabumi College of Health Sciences, with number: 004082/KEP STIKES SUKABUMI/2025, has approved the ethical considerations for this study. Potential respondents first received a thorough explanation of the objectives and procedures of the study, including notification that their participation was voluntary. After understanding this information, participants who were willing to participate in the research were given a written consent form and asked to sign it as proof of their willingness without coercion.

Table 3. Factor loading of the variables

	Family Function (X1)	Family Resilience (X2)	The Role of the Family (Y1)	Self-Efficacy (Y2)	Self-Esteem (Y3)
X1.1 Social Culture	0.878				
X1.2 Love and Compassion	0.915				
X1.3 Protection	0.899				
X1.4 Economy	0.839				
X1.5 Religion	0.893				
X2.1 Physical		0.842			
X2.2 Social		0.892			
X2.3 Psychological		0.885			
Y1.1 Education			0.714		
Y1.2 Supervision			0.874		
Y1.3 Motivator			0.891		
Y1.4 Role Model			0.872		
Y1.5 Friend			0.749		
Y1.6 Counselor			0.864		
Y2.1 Problem Solving				0.742	
Y2.2 Managing Chemotherapy Symptoms				0.858	
Y2.3 Managing Emotional and Interpersonal Disturbances				0.825	
Y3.1 Self-Acceptance					0.943
Y3.2 Self-Respect					0.815

Table 4. Convergent validity, composite reliability, and cronbach alpha of the variables

Variables	AVE	Composite Reliability	Cronbach Alpha
Family Function (X1)	0.783	0.947	0.931
Family Resilience (X2)	0.762	0.906	0.844
The Role of the Family (Y1)	0.667	0.922	0.896
Self-Efficacy (Y2)	0.656	0.851	0.736
Self-Esteem (Y3)	0.776	0.873	0.729

Table 5. R² of variable

Variables	R-Square
The Role of the Family (Y1)	0.308
Self-Efficacy (Y2)	0.526
Self-Esteem (Y3)	0.292

Table 6. F² of variable

Variables	The Role of the Family (Y1)	Self-Efficacy (Y2)	Self-Esteem (Y3)
Family Function (X1)	0.081		
Family Resilience (X2)	0.055		
The Role of the Family (Y1)		1.110	0.412

Table 7. Hypothesis test results

No.	Path	Original Sample (O)	T Statistics (O/STDEV)	p
H1	Family Function → The Role of the Family	0.330	2.727	0.007
H2	Family Resilience → The Role of the Family	0.272	2.531	0.012
H3	The Role of the Family → Self-Efficacy	0.725	14.583	0.0001
H4	The Role of the Family → Self-Esteem	0.540	5.941	0.0001

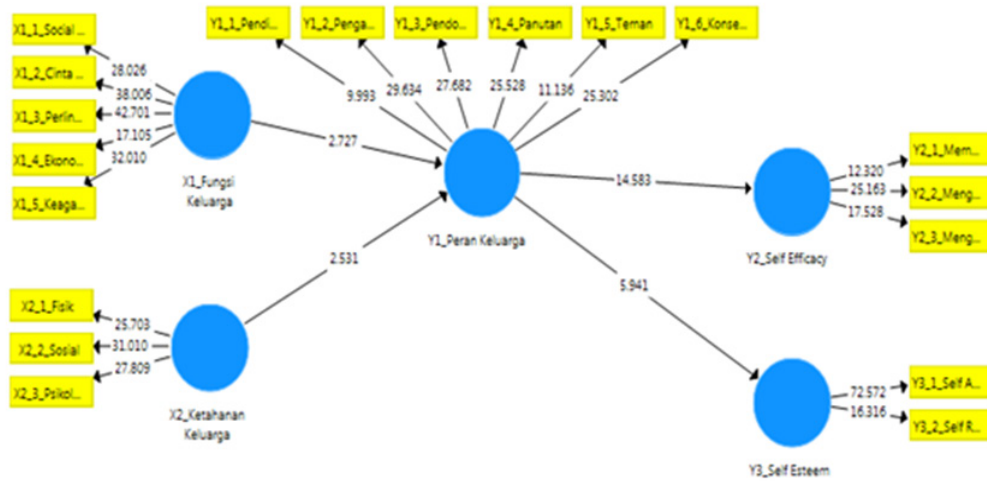


Figure 1. Determinants of Self-Efficacy and Self-Esteem in Breast Cancer Patients

Results

Table 1 shows that most respondents were aged 41-60 years, namely 70 people (68.6%), had a high school education, namely 33 people (32.4%), were married, namely 81 people (79.4%), were unemployed, namely 89 people (87.3%), had breast cancer for 6 months – 2 years, totaling 53 people (52.0%), and undergoing chemotherapy for < 6 months, totaling 67 people (65.7%).

Table 2 shows indicators of family function dimensions, including socio-cultural (81.13%), love and affection (82.72%), protection (81.74%), economic (78.06%), and religious (81.86%). Meanwhile, indicators of the family resilience dimension include physical (78.43%), social (81.13%), and psychological (80.80%). Meanwhile, indicators of the family role dimension include education (81.74%), supervision (91.67%), encouragement (94.24%), role model (92.65%), friend (89.83%), and counselor (90.56%). Then, indicators from the self-efficacy dimension include problem solving (85.29%), managing chemotherapy symptoms (83.97%), and managing emotional and interpersonal disorders (85.44%). Furthermore, indicators from the self-esteem dimension include self-acceptance (85.97%) and self-respect (77.27%).

The outer model is analyzed by measuring its

validity and reliability, namely convergent validity and composite reliability. Convergent validity is assessed from the loading factor. This value will be accepted if the loading factor value is above 0.7. Table 3 shows the loading factor values possessed by each indicator.

Table 4 presents the results of convergent validity testing, composite reliability, and Cronbach's alpha values for each variable. Convergent validity was analyzed using the Average Variance Extracted (AVE) value, where the AVE value must be ≥ 0.5. This means that the construct is able to explain at least 50% of the variance of its indicators (Sarstedt et al., 2021). All variables in this study showed an AVE value above 0.5. In addition, the composite reliability values for all constructs were above 0.70, while the Cronbach's alpha values were above 0.60. Thus, it can be concluded that all constructs used in this study have an adequate level of reliability.

Table 5 shows R2 and communalities to evaluate the internal model. R2 is also used to measure the contribution of exogenous variables to endogenous variables. The R2 for family role is 0.308. This means that 30.8% of family role is influenced by family function (X1) and family resilience (X2). The R2 for self-efficacy is 0.526. This means that family role factors influence self-efficacy by 52.6%. The R2 value for self-esteem is 0.292, which indicates that family role contributes 29.2% to self-esteem. The

factors of family function and family resilience have a small effect size on family role. Meanwhile, family role significantly influences self-efficacy and self-esteem with a large effect size (Table 6). This model fit test is used to determine whether a model fits the data. In the model fit test, there are three test indices, namely average path coefficient (APC), average R-square (ARS), and average variance factor (AVIF). APC and ARS are accepted if the p-value is <0.05 and AVIF is less than 5. In hypothesis testing, all hypotheses showed a significant effect on the dependent variable (Table 7).

Figure 1 shows that the role of the family is influenced by family function ($t = 2.727$, path coefficient: 0.330) and family resilience ($t = 2.531$, path coefficient: 0.272). In addition, the role of the family influences self-efficacy ($t = 14.583$, path coefficient: 0.725) and self-esteem ($t = 5.941$, path coefficient: 0.540). These findings indicate that the role of the family is a dominant factor in influencing self-efficacy.

Discussion

We examined the factors that influence self-efficacy and self-esteem in breast cancer patients, including family functioning, family resilience, and family role factors. All of these variables influence self-efficacy and self-esteem, except for family functioning and family resilience. However, family functioning and family resilience are predictors of family role.

It should be emphasized that the measurement of family functioning, family resilience, and family role factors in this study was based on the perceptions of breast cancer patients as respondents, not directly from family members. Therefore, the effects found describe the relationship between patients' perceptions of family function and family resilience factors with family role, including the relationship between patients' perceptions of family role with self-efficacy and self-esteem of breast cancer patients, which are conceptually interrelated.

Although family function factors, such as socio-cultural, love and affection, protection, economic, and religious factors, do not directly affect the self-efficacy and self-esteem of breast cancer patients, research findings show a significant influence of family function on the role of the family. This indicates that although family function indicators may not directly affect self-efficacy and self-esteem, these factors are very important for maintaining the role of the family. Family function refers to the way family members work together and interact to support mutual happiness and well-being (Agustin & Kudus, 2023).

Family functions, characterized by indicators such as affection, protection, and social support, play an important role in shaping and influencing the implementation of family roles, such as education, supervision, and encouragement for family members. Optimal family functioning supports the effective implementation of family roles in

maintaining the physical, mental, and social well-being of all family members. This is supported by previous studies that reveal that family functioning enables family members and those around them to carry out their roles in providing life support for breast cancer patients with a significant impact (Lubis et al., 2020). Furthermore, research by Dewi et al. (2024) also states that poor family functioning has a negative impact on overall family well-being, especially in terms of education and care for family members. Families with poor functioning tend to experience disharmony and conflict (Yan et al., 2025), as well as poor communication (Riskika et al., 2020), which directly hinders the family's ability to fulfill its role as protector, educator, and supporter of the mental and physical well-being of its members.

The same thing is shown by family resilience factors that indirectly affect the self-efficacy and self-esteem of breast cancer patients, where research shows a significant influence of family resilience on the role of the family. This shows that even though family resilience indicators do not directly affect self-efficacy and self-esteem, these aspects still play a crucial role in maintaining the continuity and optimization of the family's role. This is in line with the collective findings of Sabah et al. (2025), which emphasize the substantial role of family resilience as a mediator, offering valuable insights into its influence on mental health, behavioral outcomes, and overall well-being, including self-efficacy and self-esteem.

Family resilience is defined as characteristics that help people resist disruption and overcome difficulties, encouraging them to adapt positively, and has been confirmed to be related to the well-being of breast cancer patients (Chang et al., 2022). Physical resilience is reflected in locomotion, vitality, and cognition, which enable the fulfillment of basic daily activity needs (Grigoraş et al., 2025), such as nutrition and comfort, so that families can perform their roles as educators and supervisors more optimally. On the other hand, strong social resilience through social support (Sumarsih et al., 2024), open communication, and harmonious relationships among family members (Zamralita et al., 2024) strengthens the family's role as motivators and friends for patients in facing emotional challenges during the treatment process. Meanwhile, psychological resilience, characterized by problem-solving skills and emotional regulation, can reduce fear and help patients cope with stress related to cancer recurrence, contributing to the maintenance of the family's role as a role model and advisor capable of providing peace of mind, advice, and moral support to patients (Cui et al., 2023; Zamralita et al., 2024). Other studies show that family resilience, defined as the ability of families to recover from stress and adapt flexibly to challenges, is very important in situations where families are able to play a role in providing significant emotional and practical support to breast cancer patients (Melguizo-Garin et al., 2023; Opsomer et al., 2022).

The results of this study indicate that family role factors significantly influence self-efficacy. This study is in line with a previous study by Charos et al. (2025), which states that family roles contribute significantly to the formation of self-efficacy in breast cancer patients, because effective family communication and the family's ability to solve problems can increase the patient's self-efficacy. The family is the main source of emotional and social support during treatment (Aprilianto et al., 2021).

The family acts as educators who provide understanding (Yanni & Wijayanti, 2024), supervisors who ensure therapy compliance (Yaner et al., 2020), motivators who foster motivation (Lubis et al., 2020), and role models who demonstrate coping strategies in managing illness (Aprilianto et al., 2021). In addition, families also act as friends who help increase resilience (Ain et al., 2020), as well as counselors who help patients develop adaptive coping strategies (Udeze et al., 2025). This combination of roles strengthens patients' confidence in facing the physical and psychological challenges of breast cancer, thereby increasing self-confidence and optimizing the process of adjustment to the disease (Udeze et al., 2025).

The results of the study indicate that the role of the family has a significant influence on self-esteem. These findings are in line with the statement by Ding et al. (2024) that an empathetic and understanding family role can encourage sufferers to feel valued and meaningful, which has a positive impact on the formation of their self-esteem. The role of the family appears to play an important role in helping patients maintain their self-esteem (Pardede et al., 2020). Patients can feel valued as individuals regardless of their physical limitations if their families accept their condition without judgment, show empathy, and provide consistent attention (Mcdonnell et al., 2021). This helps patients build a more positive self-perception and reduce feelings of inferiority or worthlessness.

The assessment of factors influencing self-efficacy and self-esteem in this study was based on the Family Centered Empowerment Model (FCEM) developed by (Alhani et al., 2022). FCEM is designed to strengthen the capacity of patients and their families by identifying key components that play a role in improving chronic disease care outcomes, in this case breast cancer. This model is based on a family-oriented care approach, which views the family as the core of the capacity building process. FCEM is implemented through four main stages. The first stage focuses on increasing knowledge. The second stage emphasizes strengthening self-efficacy, followed by the third stage, which aims to increase self-esteem. The final stage is a comprehensive evaluation of the entire series (Alhani et al., 2022). In this study, the implementation of the model was also linked to the strengthening of family functioning, family resilience,

and the role of the family as important components in supporting the process of increasing self-efficacy and self-esteem in breast cancer patients.

This study has several limitations. The use of a cross-sectional design limits the researchers' ability to draw causal conclusions between all variables, although the statistical analysis used is able to describe the direction and strength of the relationship between variables. In addition, data collection was conducted through questionnaires, which had the potential to cause response bias, as respondents may have given answers that they considered most appropriate or socially desirable. This study was also conducted in a limited setting, so the results should be generalized to a wider population with caution. Despite these limitations, this study was still able to identify family factors that contribute to increasing self-efficacy and self-esteem in breast cancer patients.

Conclusion

This study shows that family function and family resilience directly influence the role of the family and indirectly contribute to increased self-efficacy and self-esteem in breast cancer patients through the optimization of the family's role. These findings confirm that the self-efficacy and self-esteem of patients are the result of a multifactorial process, which is influenced not only by individual factors but also by the dynamics and quality of the family system. Therefore, strengthening family function and resilience is an important strategy in enhancing the role of the family so that it can provide effective support for patients. Further research is recommended to use a longitudinal design to clarify the causal relationship between variables, as well as to consider other factors such as the characteristics of individual patients and broader social support in order to enrich our understanding of the determinants of self-efficacy and self-esteem in breast cancer patients.

Declaration of Interest

The authors declare that they have no conflicts of interest.

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Data Availability

No data are associated with this article.

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Dewi, R., et al. (2026)

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