PREDICTING THE NEEDS OF EMOTIONAL SUPPORT AMONG FAMILY CAREGIVERS BY ANALYZING THE DEMANDED HEALTHCARE INFORMATION: INSIGHTS FROM FEMALE CANCER CAREGIVING

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Abstract

In the last decade, the cases of breast and cervical cancer have been positioned at the top rank of cancer statistics worldwide. Consequently, many husbands become family caregivers (FCGs) and get the burden of cancer caregiving. Being blind and incompetent, they need supportive care from healthcare professionals (HCPs). To support them, HCPs provide various healthcare information to meet their needs. Further, their demand for a specific type of healthcare information may reflect their need for emotional support from the HCPs to reduce the burden. This study aims to examine the predictors of the need for emotional support among FCGs of female cancer patients by analyzing the demanded healthcare information. The mindsponge theory was used in conceptual development and interpretation. Bayesian Mindsponge Framework (BMF) analytics were used for statistical analysis on a dataset of 48 husbands and 12 significant others in five congested communities of Surabaya, Indonesia. Results showed that among the six types of healthcare information, the demanded cancer-specific information and information on cancer physical needs significantly predict the need for emotional support among respondents. Meanwhile, FCGs with a higher demand for information on alternative therapies are less likely to need emotional support. Other types of information have ambiguous effects on the need for emotional support. This study reveals that the demanded cancer-specific information, e.g., cancer prognosis or likely outcome, and information on cancer physical needs must be prioritized in information disclosure to meet the needs for emotional support among FCGs of female cancer patients.

Keywords: female cancer; cancer caregiving; emotional support; family caregiver; healthcare information; Bayesian Mindsponge Framework.

> "In the age of information, things are buzzing all over the Earth.
> Humans have abundant information to keep them entertained all day...*
> With words of encouragement, a few birds pluck up courage..."**
> — In: 'Titles of Nobility'* and 'The Virtue of Sacrifice'**; *The Kingfisher Story Collection* (2022).

1. Introduction

Cancer is a significant public health concern in Indonesia due to its high incidence and mortality rate. According to the data from the Global Cancer Observatory (GLOBOCAN) in 2022, there were approximately 220,266 new cancer cases in females, which is more than in males. The top three leading cancer cases in females are breast (66,271 cases), cervical (36.954 cases), and ovarian (15,130 cases) cancers. In addition, the following types of cancer exclusively affect females, namely corpus uteri (8,384 cases), vulva (1,307 cases), and vaginal (462 cases) cancers. Female cancers are indeed a serious health problem; breast cancer, in particular, is ranked as the third leading cause of cancer-related deaths (Ferlay et al., 2024). Treating the disease effectively requires long-term care, continuous attention, and effort.

The cancer care landscape has been gradually changing from clinical-based to home-based care nowadays. This landscape shift has put a big responsibility of cancer caregiving on the family caregivers (FCGs) at home. Husbands who become FCGs for their wives with cancer often face significant challenges in performing their roles. They often experience a role reversal. They should manage the patient's care, make medical appointments, and handle financial and logistical responsibilities. These responsibilities can be overwhelming, especially if the male caregiver is not prepared or does not have a support network; raising the issue of caregiver burden and emotional support needs.

Many husbands who become FCGs of female cancer patients reported extensive burdens due to cancer caregiving. Over the past two decades, an increasing number of studies have been conducted to measure caregiver burden or to explore multidimensional factors associated with this phenomenon among FCGs of cancer patients (Belgacem et al., 2013; Girgis et al., 2017; Rha et al., 2015; Wasner et al., 2013). Evidence showed that mild-to-moderate burden was found in 70.22% of FCGs and the other 21.38% of FCGs reported moderate-to-severe burden (Mishra et al., 2021). FCGs who were at younger ages, caring for solid tumor patients, and assisting the patients in doing daily activities experience high caregiver burden (Ge & Mordiffi, 2017).

Men may struggle with the emotional and practical demands of caregiving (Limonero et al., 2023; Pribadi & Lin, 2022). The emotional symptoms are some observable indicators of caregiver burden which include depression, sleep disturbance, and fatigue (Johansen et al., 2018). These symptoms are increased in caregivers with pre-existing comorbidities, young age, close relation to the patient, and higher levels of education (Mishra et al., 2021).

Understanding the challenges and difficulties FCGs face in providing cancer care at home is critical in developing effective strategies for reducing the caregiver burden and providing emotional support (Liang et al., 2019). FCGs require support so that they can be effective and maintain their own well-being while caring for patients with cancer (Berry et al., 2016). The supportive care needs of partners and caregivers of cancer patients are categorized into four domains, namely: health care service needs, psychological and emotional needs, work and social needs, and information needs (Girgis et al., 2011). The emotional needs of FCGs are multifaceted and include feelings of anxiety, depression, and stress, which are associated with different caregiver unmet needs in areas of healthcare services, psychological support, financial resources, communication, and personal daily activities (Yang et al., 2021). Predicting the need for emotional support is important to develop strategies for meeting these needs. Providing emotional support and resources to FCGs in need may help them manage the demands of caregiving, better cope with caregiving challenges, and improve their overall well-being which in turn can enhance the quality of care they provide to their ill loved ones (Ferrell et al., 2019).

Based on a four-part framework for supporting FCGs of cancer patients (Berry et al., 2016), we found that educating caregivers about their caregiving roles is an important part of this framework. Educating caregivers is usually done by conducting health education activities in the field by using media. Health education activities provided by the HCPs involve extensive usage of healthcare information; some may get the attention of audiences, patients, and their families, and some others may be considered less important. It depends on individual needs and roles in cancer caregiving. To support FCGs, the HCPs provide various healthcare information to meet their information needs exclusively. This healthcare information consists of cancer-specific information, caregiver-specific information, therapy-specific information, information on cancer physical needs, information on alternative therapies, and information on support services (CHeRP, 2009). FCGs' demand for a specific type of healthcare information may reflect their specific needs, one of which is their emotional support needs.

Currently, predictors of emotional support needs among FCGs of cancer patients have not been studied specifically. We found some similar studies but utilizing different target populations and unidentical variables. A study aimed at predicting social support needs in online health social networks found that emotional support seeking was best predicting the social support needs among users, followed by experience-based information and medical facts (Choi et al., 2017). Another study in an online health forum for HIV (POZ) aimed at predicting the degree of emotional support articulated that social support was available in two forms: emotional and informational support. It was found that emotional support is more in the messages of the forum whose degree of influence could be modeled by regression algorithms (Naveen et al., 2020). From the alcoholism support group, another study aimed at predicting changes in giving-receiving emotional support found that gender & previous treatment and coping strategy are time-invariant and time-variant predictors of receiving support, respectively (Yoo et al., 2018).

To the best of our knowledge, this is the first study conducted to examine the predictors of emotional support needs among FCGs of cancer patients by analyzing the demanded healthcare information. This study aims to examine the predictors of the need for emotional support among FCGs of female cancer patients by analyzing the demanded cancer-specific information, caregiver-specific information, therapy-specific information, information on cancer physical needs, information on alternative therapies, and information on support services.

2. Methodology

2.1. Theoretical Foundation

The mindsponge theory (MT) was utilized during the study conception, being the basis for constructing the parsimonious models, and strengthening the scientific reasonings behind the study findings (Vuong, 2023). MT is capable of explaining the complexity of human behavior shaped by various mental products that influence actual actions (Davies & Gregersen, 2014). It is the human mind's information-processing theory that considers the mind and the environment as two main spectrums (Vuong, 2023). MT views the human mind as a collection-cum-processor of information that filters, processes, and accepts or rejects new information or values into or out of the mindset or core values, while the environment is the broader information processing system. MT constitutes the human mind into the mindset, buffer zone, and multi-filtering system (Vuong, Nguyen, & La., 2022). The core of MT is the mindsponge mechanism which emphasizes the role of the human mind in processing various information by using the subjective cost-benefit judgments as the multi-filtering system which is the key factor (Vuong & Napier, 2015; Mantello et al., 2023). Thus, the human mind actively absorbs the mindset-suitable information and ejects the unsuitable ones. The subjective cost-benefit judgments play an important role in the mindsponge mechanism, and these may be influenced and be meaningful only if considering the sociocultural context of the individuals (Vaughn, 2019).

According to MT, mindset is a collection of highly trusted information; a buffer zone is a conceptual area in which information is temporarily stored before undergoing evaluation by the multi-filtering system; the multi-filtering system is the mind's subjective evaluation system of information (Vuong, 2023). In this study, the mental processes of FCGs involve inputs from the surrounding information or memory. At the same time, outputs are the mental products, such as thinking (i.e., perceptions of emotional support needs) and behavior (i.e., demanding a specific type of healthcare information).

In a mindsponge mind, for information to be absorbed and persist in becoming a mindset, there are at least two primary conditions that need to be met (Vuong, 2023). In this study, the first condition is that cancer-related information must be available and accessible in the social environment. Second, this information must be justified as beneficial so it can pass the multifiltering system to become a mindset. The subjective cost-benefit judgments depend on the existing mindset's contents useful for future new information benchmarking. Here, we put our focus on the second condition to analyze the predictors of emotional support needs among FCGs by utilizing the demanded healthcare information as indicators.

Based on the information-processing mechanism above, it can be deemed that for the ideations of demanding healthcare information and then demanding emotional support to emerge in the FCGs' minds, healthcare information and emotional support from the professionals need to be individually considered as beneficial. The healthcare information provided by community nurses working in the PHC has a high possibility of being trusted by FCG, increasing the possibility of being accepted in FCG's mind to become a new caregiving mindset. Trust is the key to enhancing effective communication with stakeholders (Tanemura et al., 2022). If community nurses adequately assess the unmet needs of demanded healthcare information in FCGs of female cancer patients, it will be beneficial for predicting their needs for emotional support during cancer caregiving.

2.2. Study Design and Samples

This was a cross-sectional study. Five communities in Surabaya, Indonesia, were involved as study sites among 63 communities under the health management of a respectable PHC across the city. Firstly, cluster random sampling was implemented to select the five communities. Secondly, simple random sampling was implemented to select the respondents. 60 FCGs of female cancer patients, consisting of 48 spouses (husbands) and 12 other family members, participated in this study. There were no specific sample criteria required in this study. As long as the in-site PHC confirmed the cancer diagnosis of care recipients and the cancer patients confirmed that the prospective respondents were the primary FCG at home, these individuals were eligible to be study respondents.

2.3. Data Collection Procedure

All respondents were well-informed about this study's purposes, benefit-risk potencies, data collection procedure, and incentives prior to study participation. Exclusion criteria were rejection on filling out the consent form. This study protocol was reviewed by the Ethical Committee of the Faculty of Medicine, Widya Mandala Surabaya Catholic University, Indonesia, with an ethical clearance registered certificate of

082/WM12/KEPK/DOSEN/T/2020. Data were collected in February-March 2020. Enumerators collected the data by door-to-door approach. Respondents were asked to read and answer the question/statement in the instrument themselves, but assistance was provided for those in need. No conflict of interest between the authors and study funder was declared regarding this study and publication.

2.4. Study Instrument

The demography questionnaire was used to collect data on demography characteristics. It consisted of seven items identifying personal information of age, gender, marital status, education level, occupation, Gross Domestic Product (GDP) in Indonesian Rupiah (IDR), and housemate. The instrument SCNS-P&C45 (Supportive Care Needs Survey – Partners and Caregivers 45) was used to collect the data on FCG's supportive care needs. This is a specific instrument for assessing the unmet needs of partners and caregivers of people diagnosed with cancer (CHeRP, 2009). It could comprehensively assess the range of caregivers' supportive needs across the cancer trajectory. Researchers and clinicians can use it to determine caregivers' unmet needs, prioritize healthcare resources, and tailor supportive cancer care services accordingly.

SCNS-P&C45 comprises four domains in 45 items. Factor analysis revealed four domains of supportive care needs, such as 1) health care and illness-related needs (11 items), 2) emotional and relational needs (16 items), 3) work and social needs (11 items), and 4) practical needs (7 items). For each item of SCNS-P&C45, respondents were asked to indicate their level of supportive care needs over the last month as a result of caring for people with cancer by using the following response options:

1. No need: consists of "not applicable" (score 1) and "satisfied" (score 2).
2. Some need: consist of "low need" (score 3), "moderate need" (score 4), and "high need" (score 5).

Based on the Likert scale above, the unmet needs of FCG were divided into four categories, such as no need (total score: 45-90), low need (total score: 91-135), moderate need (total score: 136-180), and high need (total score: 181-225). Based on the results of instrument testing on 30 FCG of female cancer patients in different communities, SCNS-P&C45 was proved to be a valid and reliable instrument for this study ($r = 0.277–0.761$; Chronbach Alpha = 0.965).

2.5. Model Construction

2.5.1. Variable selection and rationale

Among all aspects, the demanded healthcare information from the domain of healthcare and illness-related needs may predict the FCG's emotional support needs from the domain of emotional and relational needs. In the current study, seven variables were employed for statistical analysis. To measure the FCG's needs for emotional support, we employed the *EmotionalSupport* variable, which reflects the FCG's emotional support needs during cancer caregiving. The six types of demanded healthcare information that may predict the FCG's emotional support needs (i.e., cancer-specific information, caregiver-specific information, therapy-specific information, information on cancer physical needs, information on alternative therapies, and information on support services) were represented by variables of *Information_Caregiver, Information_Cancer, Information_SupportServices, Information_AlternativeThe, Information_PhysicalNeed,* and *Information_SideEffects.*

Table 1. Variable Description

Variable's Name	Description	Data Type	Value
EmotionalSupport	The emotional support needs among FCGs of female cancer patients during cancer caregiving	Numerical	1 = not applicable 2 = satisfied 3 = low need 4 = moderate need 5 = high need
Information_Caregiver	The need for accessing information relevant to your needs as a carer/partner	Numerical	
Information_Cancer	The need for accessing information about the person with cancer's prognosis or likely outcome	Numerical	
Information_SupportServices	The need for accessing information about support services for carers/partners of people with cancer	Numerical	
Information_AlternativeThe	The need for accessing information about alternative therapies	Numerical	
Information_PhysicalNeed	The need for accessing information on what the person with cancer's physical needs are likely to be	Numerical	
Information_SideEffects	The need for accessing information about the benefits and side effects of treatments	Numerical	

2.5.2. Statistical Model

In this study, we positioned the types of demanded healthcare information as predictors of the FCG's needs in reducing the stress of female cancer patients. We constructed the analytical model based on the theoretical foundation of MT as presented below:

$$EmotionalSupport \sim normal(\mu, \sigma) \tag{1}$$

$$\begin{aligned}\mu_i = \beta_0 &+ \beta_{Information\_Caregiver\_EmotionalSupport} * Information\_Caregiver_i + \\ &\beta_{Information\_Cancer\_EmotionalSupport} * Information\_Cancer_i + \\ &\beta_{Information\_SupportServices\_EmotionalSupport} * Information\_SupportServices_i + \\ &\beta_{Information\_AlternativeThe\_EmotionalSupport} * Information\_AlternativeThe_i + \\ &\beta_{Information\_PhysicalNeed\_EmotionalSupport} * Information\_PhysicalNeed_i + \\ &\beta_{Information\_SideEffects\_EmotionalSupport} * Information\_SideEffects_i\end{aligned} \tag{2}$$

$$\beta \sim normal(M, S) \tag{3}$$

The probability around μ is determined by the form of normal distribution, with the standard deviation σ. The degree of emotional support needs of FCG i is indicated by μ_i. $Information\_Caregiver_i$, $Information\_Cancer_i$, $Information\_SupportServices_i$, $Information\_AlternativeThe_i$, $Information\_PhysicalNeed_i$, and $Information\_SideEffects_i$ are the types of demanded healthcare information of FCG i.

The model has an intercept β_0 and six coefficients of $\beta_{Information\_Caregiver\_EmotionalSupport}$, $\beta_{Information\_Cancer\_EmotionalSupport}$, $\beta_{Information\_SupportServices\_EmotionalSupport}$, $\beta_{Information\_AlternativeThe\_EmotionalSupport}$, $\beta_{Information\_PhysicalNeed\_EmotionalSupport}$, and $\beta_{Information\_SideEffects\_EmotionalSupport}$. The probability around β is also in the form of a normal distribution.

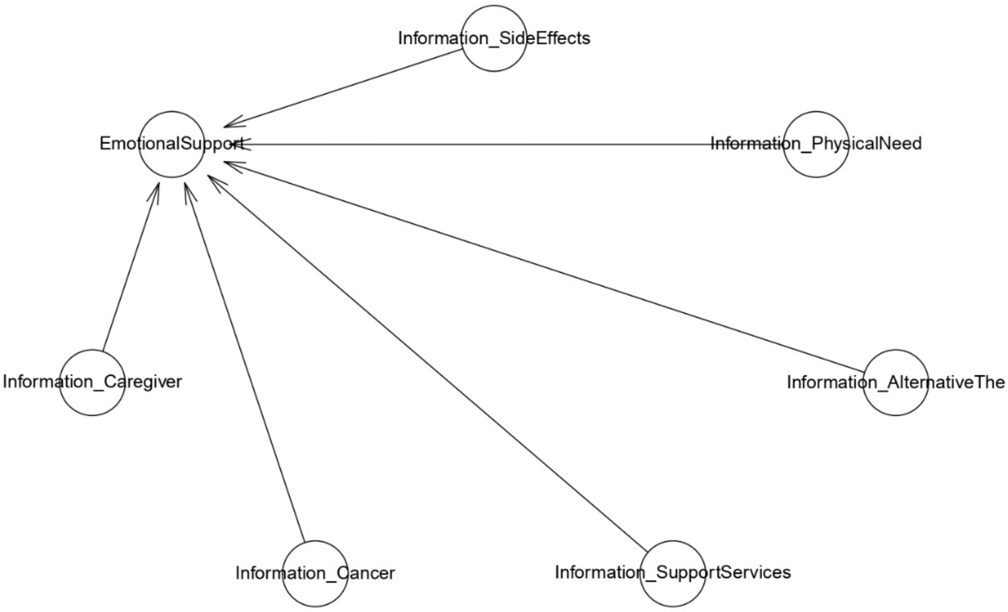

Figure 1. Model 1’s logical network

2.6. Data Analysis and Validation

Bayesian Mindsponge Framework (BMF) analytics was employed in the current study for several reasons (Nguyen et al., 2022; Vuong, Nguyen, & La., 2022). First, the analytical method integrates the logical reasoning capabilities of MT with the inferential advantages of Bayesian analysis, exhibiting a high degree of compatibility (Nguyen et al., 2022). Second, Bayesian inference is a statistical approach that treats all the properties (including the known and unknown ones) probabilistically (Csilléry et al., 2010; Gill, 2015), enabling reliable prediction of parsimonious models. Nevertheless, utilizing the Markov chain Monte Carlo (MCMC) technique still allows Bayesian analysis to deal effectively with various intricate models, such as multilevel and nonlinear regression frameworks (Dunson, 2001). Third, Bayesian inference has various advantages in comparison to the frequentist approach. One notable advantage is the ability to utilize credible intervals for result interpretation instead of relying solely on the dichotomous decision based on *p*-values (Halsey et al., 2015; Wagenmakers et al., 2018). The Bayesian analysis was performed on R using the **bayesvl** open-access package, which provides good visualization capabilities (La & Vuong, 2019).

In Bayesian analysis, selecting the appropriate prior is required during the model construction process. Due to the exploratory nature of this study, uninformative priors or a flat prior distribution were used to provide as little prior information as possible for model estimation (Diaconis & Ylvisaker, 1985). The Pareto-smoothed importance sampling leave-one-out (PSIS-LOO) diagnostics were employed to check the models' goodness of fit (Vehtari & Gabry, 2019; Vehtari, Gelman, & Gabry, 2017). LOO is computed as follows:

$$LOO = -2LPPD_{loo} = -2\sum_{i=1}^{n} \log \int p(y_i|\theta)p_{post(-i)}(\theta)d\theta$$

$p_{post(-i)}(\theta)$ is the posterior distribution calculated through the data minus data point i. The k-Pareto values are used in the PSIS method for computing the LOO cross-validation in the R **loo** package. Observations with k-Pareto values greater than 0.7 are often considered influential and problematic for accurately estimating LOO cross-validation. When a model's k values are less than 0.5, it is typically regarded as being fit.

If the model fits well with the data, we will proceed with the convergence diagnoses and results interpretation. In the current study, we validated the convergence of Markov chains using statistical values and visual illustrations. Statistically, the effective sample size (*n_eff*) and the Gelman–Rubin shrink factor (*Rhat*) can be used to assess the convergence. The *n_eff* value represents the number of iterative samples that are not auto-correlated during stochastic simulation, while the *Rhat* value is referred to as the potential scale reduction factor (Brooks & Gelman, 1998). If *n_eff* is larger than 1000, it is generally considered that the Markov chains are convergent, and the effective samples are sufficient for reliable inference (McElreath, 2018). As for the *Rhat* value, if the value exceeds 1.1, the model does not converge. The model is considered convergent if *Rhat* = 1. Visually, the Markov chains' convergence was also validated using trace plots, Gelman–Rubin–Brooks plots, and autocorrelation plots.

3. Results

Most respondents were middle-aged (41-50 years old: 36.67%), male (80%), married (78.33%), high school graduated (63.33%), private employee (60%), living with a spouse (cancer patients) and children (80%) with maximum GDP of IDR 5 million per month (68.34%).

Table 2. Demography Characteristic

No.	Characteristic	Frequency	Percentage
1	Age (years old):		
	a. <21	2	3.33
	b. 21-30	7	11.67
	c. 31-40	15	25.00
	d. 41-50	22	36.67

	e. 51-60	10	16.67
	f. 61-70	4	6.67
2	Gender:		
	a. Male	48	80.00
	b. Female	12	20.00
3	Marital status:		
	a. Single	4	6.67
	b. Married	47	78.33
	c. Separated	2	3.33
	d. Divorced	1	1.67
	e. Widowed	6	10.00
4	Education level:		
	a. Primary school	6	10.00
	b. Secondary school	8	13.33
	c. High school	38	63.33
	d. University graduates	8	13.33
5	Occupation:		
	a. Housewife	12	20.00
	b. Entrepreneur	2	3.33
	c. Civil servant	6	10.00
	d. Private employee	36	60.00
	e. Jobless/retire	4	6.67
6	Gross Domestic Product (GDP) [IDR]:		
	a. Less than minimum wage	16	26.67
	b. Minimum wage – 5 million	25	41.67
	c. More than 5 million	15	25.00
	d. No income	4	6.67
7	Housemate:		
	a. Spouse	48	80.00
	b. Child	48	80.00
	c. Sibling	8	13.33
	d. Parents	9	15

Almost all respondents reported unmet needs at various levels (98.33%), but the majority reported a lower level of unmet needs (46.67%).

Table 3. The Level of Unmet Needs among FCG

No.	Categories	Frequency	Percentage
1	No need (45-90)	1	1.67
2	Low need (91-135)	28	46.67
3	Moderate need (136-180)	21	35.00
4	High need (181-225)	10	16.67

Before interpreting the results of BMF analytics, it is necessary to evaluate how well Model 1 fits the data. As can be seen in Figure 1, We found only one value that exceeded the 0.5 threshold but is still below the 0.7 threshold (i.e., the 'ok' threshold). This indicates a good fit signal between the model and the data.

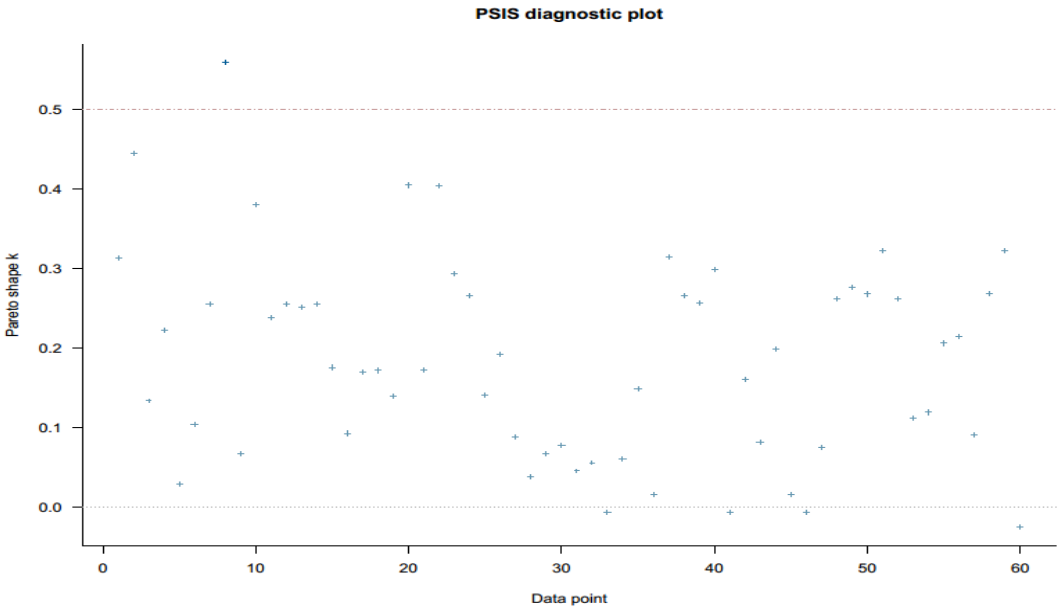

Figure 1. Model 1's PSIS-LOO diagnosis

The posterior distribution statistics of Model 1 are shown in Table 4. All *n_eff* values are greater than 1000 and *Rhat* values are equal to 1, so it can be assumed that Model 1's Markov chains are well-convergent. The convergence of Markov chains is also reflected in the trace plots of Figure 2. In particular, after the 2000th iteration, all chains' values fluctuate around the central equilibrium.

Table 4. Estimated results of Model 1

Parameters	Mean	SD	n_eff	Rhat
a_EmotionalSupport	1.05	0.55	11959	1
b_Information_Caregiver_ EmotionalSupport	0.25	0.25	9579	1
b_Information_Cancer_ EmotionalSupport	0.46	0.25	9355	1
b_Information_SupportServices_ EmotionalSupport	-0.22	0.22	10721	1
b_Information_AlternativeThe_ EmotionalSupport	-0.27	0.21	10840	1
b_Information_PhysicalNeed_ EmotionalSupport	0.40	0.21	11198	1
b_Information_SideEffects_ EmotionalSupport	0.00	0.19	10817	1

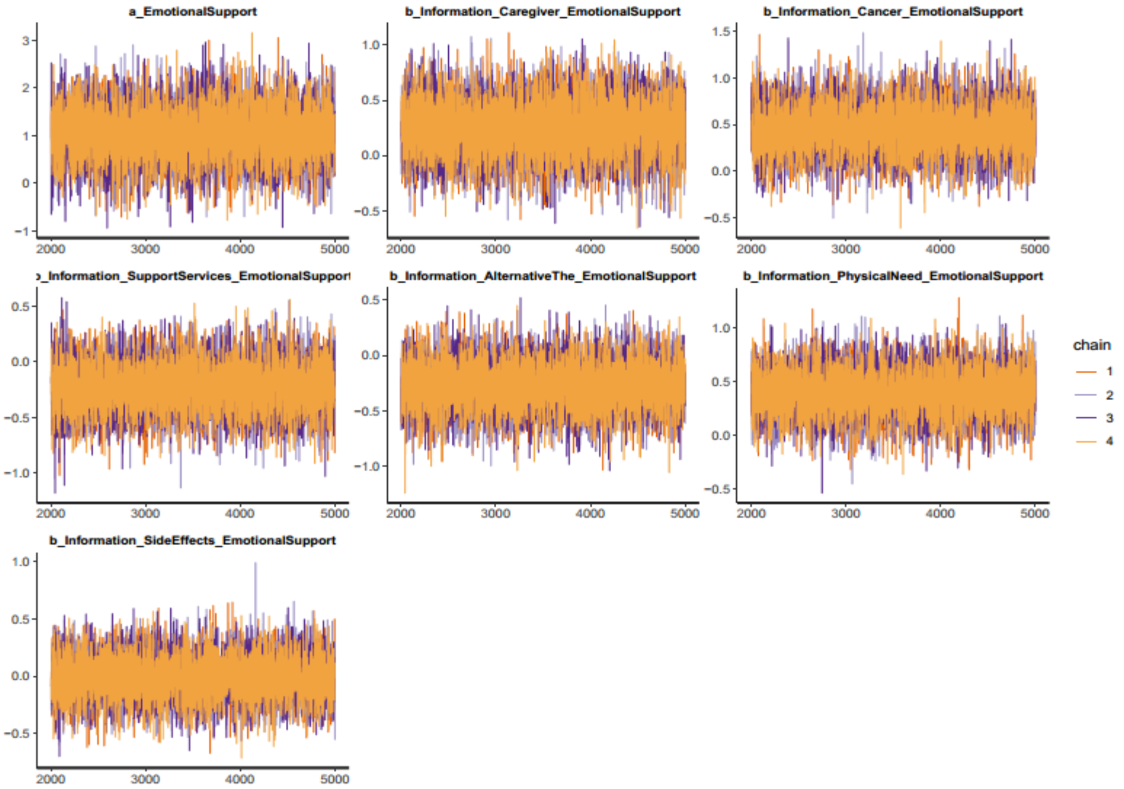

Figure 2. Model 1’s trace plots

The Gelman-Rubin-Brooks plots and autocorrelation plots also show that the Markov chains have good convergence. Gelman-Rubin-Brooks plots are used to evaluate the ratio between the variance between Markov chains and the variance within chains. The y-axis demonstrates the shrinkage factor (or Gelman-Rubin factor), while the x-axis illustrates the iteration order of the simulation. In Figure 3, the shrinkage factors of all parameters rapidly decrease to 1 before the 2000th iteration (during warm-up). This manifestation indicates that there are no divergences between Markov chains.

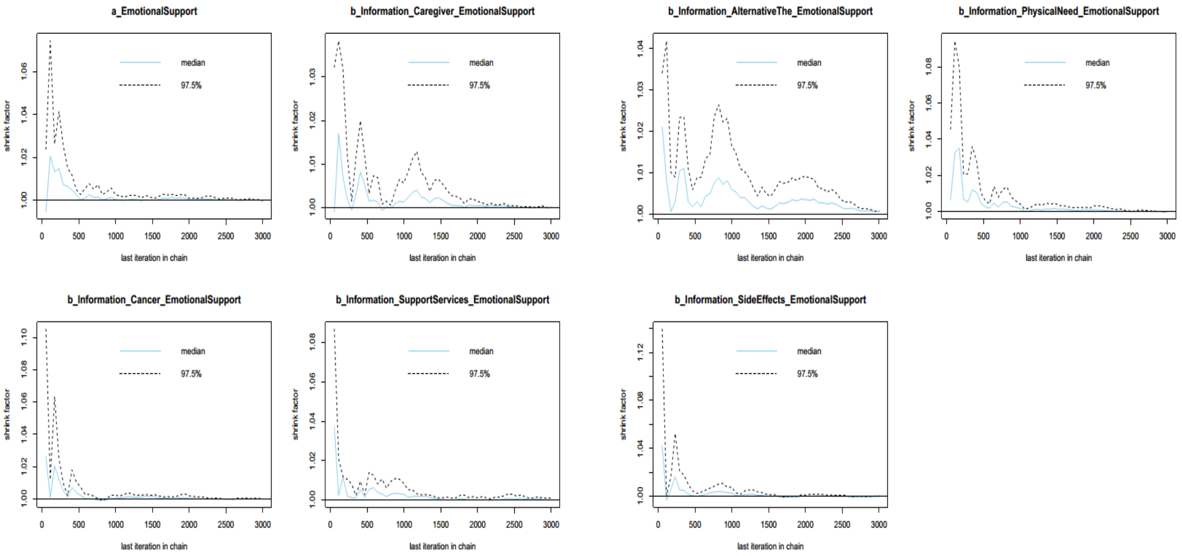

Figure 3. Model 1’s Gelman-Rubin-Brooks plots

The Markov property refers to the memory-less property of a stochastic process. In other words, iteration values are not auto-correlated with the past iteration values. Autocorrelation plots are used to evaluate the level of autocorrelation between iteration values. The plots in Figure 4 show the average autocorrelation of each Markov chain along the y-axis and the delay of these chains along the x-axis. Visually, after several delays (before 5), the autocorrelation levels of all Markov chains swiftly drop to 0, indicating that the Markov properties are preserved and the Markov chains converge well.

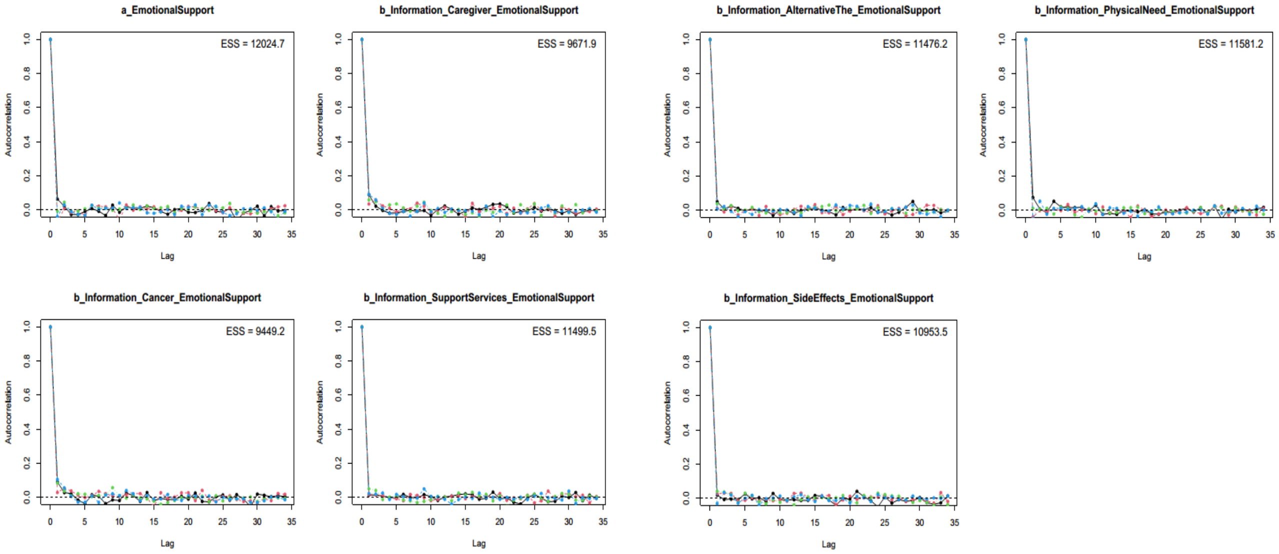

Figure 4. Model 1’s autocorrelation plots

Since all the diagnostics confirm the convergence of Markov chains, the simulated results are eligible for interpretation. The estimated results of Model 1 show that among the six types of healthcare information, the demanded cancer-specific information and information on cancer physical needs positively predict the need for emotional support among FCGs of female cancer patients. Meanwhile, FCGs with a higher demand for information on alternative therapies and support services are less likely to need emotional support from professionals. Other types of information have ambiguous effects on the need for emotional support. The posterior distributions of the two coefficients in Figure 5 lie entirely on the negative or positive side of the x-axis, indicating the high reliability of the results.

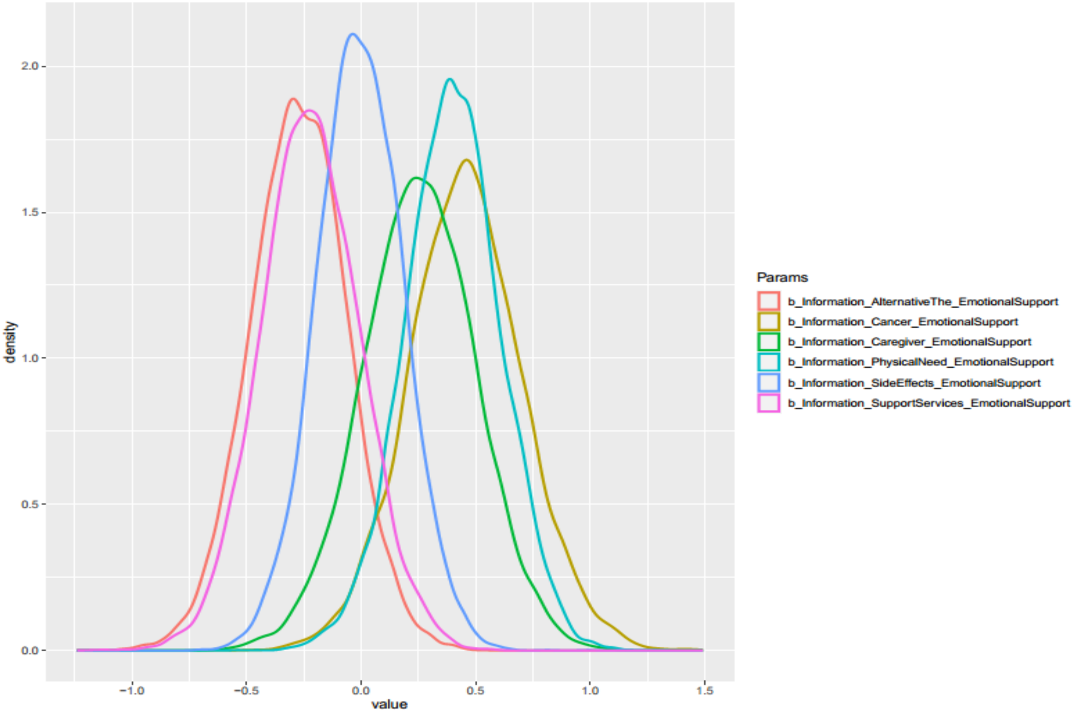

Figure 5. Model 1's posterior distributions

Figure 6 shows the posterior distribution with Highest Posterior Density Intervals (HPDIs) at 95%. The found effects are clear, which suggests that the results are reliable.

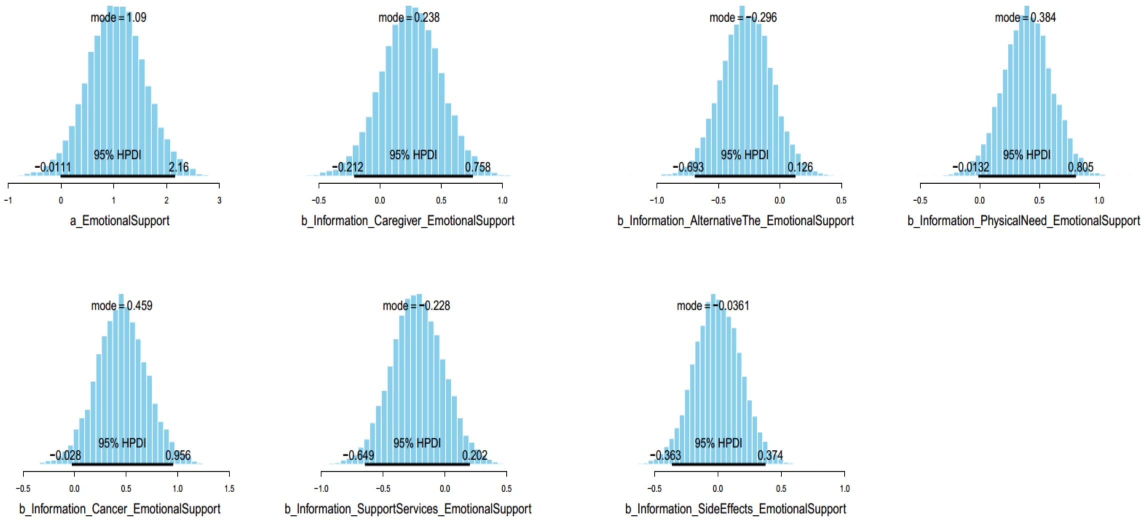

Figure 6. Distributions of posterior coefficients with HPDI at 95%

To aid result interpretation, Figure 7 illustrates the estimated outcomes based on estimated coefficients (using Mean values for computation, for they have the highest probability of occurrence). The distribution of *b_Information_Cancer_EmotionalSupport* and *b_Information_PhysicalNeed_EmotionalSupport* are fully located on the positive side, while the distribution of *b_Information_AlternativeThe_EmotionalSupport*'s is wholly situated on the negative side. These distributions signify the reliable positive effect of *Information_Cancer* and *Information_PhysicalNeed*, and the negative effect of *Information_AlternativeThe* on *EmotionalSupport*.

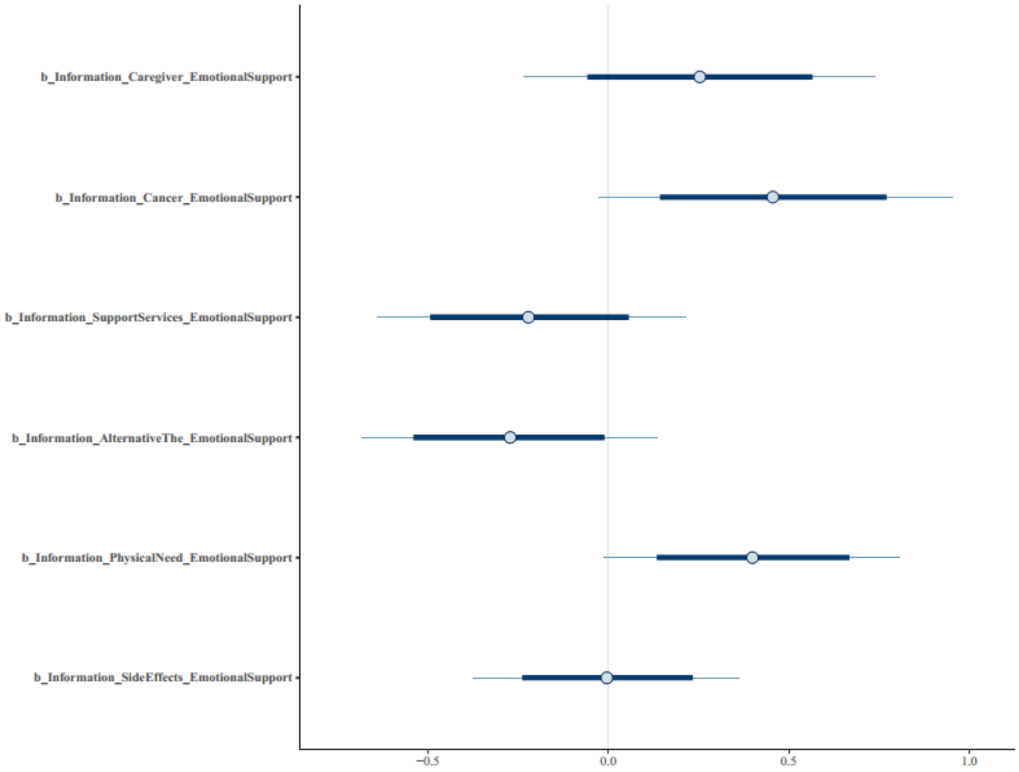

Figure 7. Estimated coefficients

4. Discussion

In our study, we aimed to investigate the predictors of emotional support needs among FCGs of female cancer patients by analyzing the demanded healthcare information. Our findings revealed several key insights into the relationship between healthcare information and emotional support needs. Initially, we identified positive predictors, where the sought-after cancer-specific information and details on cancer-related physical needs positively correlated with the need for emotional support among FCGs. The study found that FCGs who actively seek out detailed information about the cancer prognosis and likely outcome and cancer impacts on physical health (such as symptoms, treatments' side effects, etc.) are more likely to experience increased emotional distress. As a result, they may require increased emotional support from the professionals to cope with cancer caregiving challenges they face at home.

Conversely, we discovered negative predictors, as FCGs who showed a greater propensity to seek information on alternative therapies were less likely to require emotional support. The study found that FCGs who showed a higher inclination to seek information on alternative therapies were less likely to require emotional support. This finding challenges the assumption that seeking information is always associated with increased emotional support needs and highlights the potential benefits of proactive information-seeking behavior among FCGs. Additionally, our analysis revealed ambiguous effects, indicating that other types of sought-after healthcare information had unclear impacts on the need for emotional support among FCGs. This complexity suggests that the relationship between certain information types and emotional support needs may be multifaceted, emphasizing the necessity for further investigation.

Our findings resonate with previous research emphasizing the significant emotional burden faced by FCGs of cancer patients. Previous studies consistently highlight the emotional burden experienced by FCGs of cancer patients, encompassing factors such as compassion fatigue and caregiver burden, along with associated distress like stress, depression, and rumination, all shaping the caregiving experience (Najjuka et al., 2023; Özönder Ünal and Ordu, 2023; Qiu and Wu, 2024). The high levels of stress and burden experienced by cancer caregivers can significantly impact their physiological and emotional health, leading to a reduced quality of life and increased psychological distress, with symptoms such as anxiety and depression affecting their overall well-being (Abazari et al., 2023; Özönder Ünal and Ordu, 2023).

These findings highlight the importance of comprehensive support for cancer caregivers, recognizing the necessity of addressing FCGs' emotional needs alongside those of the patients. Addressing the emotional needs of FCGs is crucial for supporting them in their caregiving duties, highlighting the importance of promoting adaptive coping mechanisms for improved outcomes. However, for this support to be perceived as meaningful, it must be aligned with the needs and preferences of the care receiver (Babaei and Abolhasani, 2020).

Our study extends previous research by examining how different types of demanded healthcare information influence the emotional support needs among FCGs. Recognizing the significance of emotional support for cancer caregivers, our study investigates the complex relationship between healthcare information and emotional support needs. By delineating this relationship, we gain deeper insights into caregiver distress and resilience, considering factors such as the perceived importance of the issue, anxiety levels, and expectations within close relationships like with family members. This understanding is important for developing effective support systems and appropriate interventions to support FCGs in their caregiving role. Furthermore, our findings highlight the complexity of the caregiving experience, revealing mixed effects for different types of demanded healthcare information. This highlights the multifaceted nature of caregiving and emphasizes the need for interventions that consider various factors, including information-seeking behavior and coping strategies.

Addressing help-seeking behavior in mental health interventions can significantly enhance outcomes for FCGs, including destigmatizing mental health, providing information on support services, and facilitating access to professional help. Moreover, the caregiver-patient relationship plays a crucial role in cancer care, impacting both caregiver well-being and patient outcomes. Coping strategies adopted by caregivers significantly influence their well-being and the quality of care provided (Wang et al., 2022). Recognizing and addressing the needs of FCGs is important (Cui et al., 2024), as their ability to cope effectively greatly influences the quality of care provided to the patient. By addressing FCGs' needs such as fear management and emotional support, overall quality of care can be enhanced (Hawken et al., 2018; Sun et al., 2021).

Considering the multifaceted nature of FCGs' needs, MT offers valuable insights into understanding the observed associations between demanded healthcare information and emotional support needs. According to this theory, FCGs absorb vast amounts of information from their environment, particularly in response to significant stressors like a loved one's cancer diagnosis. However, this absorption can lead to cognitive and emotional strain, as FCGs become overwhelmed by the sheer volume of information, resulting in heightened anxiety, worry, and a sense of helplessness. Additionally, anticipatory emotional stress complicates matters as FCGs seek information to prepare for future challenges, potentially worsening their emotional distress. Conversely, FCGs who actively seek information on alternative therapies may feel empowered and in control, reducing their need for emotional support. This behavior may indicate adaptive coping strategies, as FCGs view alternative therapies as supplementary tools to alleviate patient symptoms and reduce emotional distress. Moreover, seeking information on alternative therapies may provide a temporary distraction from the emotional challenges associated with conventional medical treatments, offering FCGs a sense of relief. This multifaceted perspective underscores the intricate interaction between information absorption and emotional support needs, providing valuable insights for developing more effective interventions to comprehensively address FCGs' needs.

5. Clinical Implications

Our study's findings have significant implications for the design and implementation of supportive care interventions aimed at addressing the emotional support needs among FCGs of cancer patients. By understanding the relationship between demanded healthcare information and emotional support needs, healthcare professionals and support organizations can adjust their services to better meet the unique needs of FCGs. Education and training programs designed for FCGs should focus on enhancing their understanding of cancer-specific information and knowledge related to the physical needs associated with cancer. By equipping caregivers with better knowledge about the disease and its management, these programs can help alleviate anxiety and uncertainty, reducing the need for emotional support (Padrnos et al., 2018). Additionally, providing readily accessible informational resources, such as pamphlets, websites, or online forums, that offer evidence-based information on cancer care and management is crucial. These resources should cover a wide range of topics, including treatment options, symptom management, and available support services, empowering caregivers to make informed decisions and seek appropriate support when needed (Thiessen et al., 2020). Furthermore, offering personalized psychosocial support services aimed at meeting the emotional needs of FCGs is essential. This may include individual counseling, support groups, or peer mentoring programs where caregivers can share experiences, receive validation, and learn coping strategies from others in similar situations (Fisher et al., 2020). Finally, ensuring that supportive care interventions are culturally sensitive and linguistically accessible to meet the diverse needs of caregivers from different backgrounds is important. This may involve providing information in multiple languages and adapting interventions to align with cultural beliefs and practices related to caregiving and illness (Stubbe, 2020).

To address the emotional support needs of FCGs of cancer patients, fostering collaboration among healthcare professionals, support organizations, and community resources is important. By consolidating resources, exchanging knowledge, and synchronizing initiatives, these stakeholders can establish an all-encompassing support network spanning the entirety of the cancer care journey (Deshields et al., 2012). This might entail integrating supportive care services into oncology clinics, primary care facilities, or community-based organizations to ensure caregivers can access assistance easily (Scotté et al., 2023). By implementing these customized interventions and promoting collaboration among stakeholders, we can effectively target the emotional support needs identified in our study, thereby enhancing the overall well-being of FCGs caring for cancer patients.

Considering the limitations and methodological considerations of our study, as well as the insights gained, several avenues for future research can be proposed. Firstly, addressing the limitations, such as the sample size and geographical scope, is essential to ensure the broader generalizability of the findings. Additionally, acknowledging potential biases, such as self-reporting biases or selection biases, and implementing strategies to mitigate them could enhance the robustness of future studies. Future research could also explore longitudinal assessments to examine how these needs change over time and conduct comparative analyses across different caregiving contexts to identify context-specific predictors. Additionally, exploring the efficacy of personalized interventions rooted in identified predictors could provide valuable insights for enhancing support systems for FCGs of cancer patients, ultimately improving their well-being and caregiving experience.

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