Examining the demanded healthcare information among family caregivers for catalyzing adaptation in female cancer: Insights from home-based cancer care

Ni Putu Wulan Purnama Sari [1], Adrino Mazenda [2,*], Made Mahaguna Putra [3], Abigael Grace Prasetiani [1], Minh-Hoang Nguyen [4], Quan-Hoang Vuong [4,5]

[1] Faculty of Nursing, Widya Mandala Surabaya Catholic University, East Java, Indonesia

[2] Faculty of Economic and Management Sciences, School of Public Management and Administration, University of Pretoria, Pretoria, South Africa

[3] Faculty of Medicine, Universitas Sebelas Maret, Surakarta, Central Java, Indonesia

[4] Centre for Interdisciplinary Social Research, Phenikaa University, Hanoi, Vietnam

[5] A.I. for Social Data Lab (AISDL), Vuong & Associates, Hanoi, Vietnam

*Corresponding Email: adrino.mazenda@up.ac.za (Adrino Mazenda)

Abstract

Adaptation and stress are two main concepts useful for better understanding the phases of illness and health-related human behavior. The two faces of adaptation, adaptation as a process and adaptation as a product, have raised the question of how long the adaptation process will take in cancer trajectories. The care setting transition from clinical-based into home-based cancer care has stressed the role of family caregivers (FCG) in cancer management. This study examines how types of demanded healthcare information affect the FCG's role in catalyzing the adaptation of female cancer patients. The mindsponge theory was used in conceptual development and results interpretation. Bayesian Mindsponge Framework (BMF) analytics was used for statistical analysis on a dataset of 48 spouses (husbands) and 12 other family members in five congested communities of Surabaya, Indonesia. Results showed that among the six types of demanded healthcare information, FCGs with a higher tendency to demand cancer-specific information are more likely to need support in catalyzing the adaptation of female cancer patients. Meanwhile, FCGs with a higher demand for information on alternative therapies are less likely to need support in catalyzing cancer adaptation. Other types of healthcare information have ambiguous effects on the need for support in cancer adaptation assistance. This study reveals that the demanded cancer-specific information, e.g., cancer's prognosis or likely outcome, must be prioritized to assist FCG's role in catalyzing adaptation among female cancer patients. Cancer prognosis and outcomes reflect the future of cancer care results.

Keywords: adaptation; cancer; family caregiver; healthcare information; mindsponge theory; Bayesian Mindsponge Framework.

> "[...] under good care and continuing using the panacea, Kingfisher's appetite for fish had returned. The birds brought tasty fat carp, and so he recovered quickly."
>
> In: "Kingfisher's No-Fish Dietary"; *The Kingfisher Story Collection* (2022)

1. Introduction

Breast cancer is the most common cancer among Indonesian women, accounting for 19.2% of the population. Unfortunately, around 73% of women with breast cancer are diagnosed in the late stages of the disease (Gautama, 2022). Cancer can deeply impact women who are diagnosed with it, affecting not only their physical health but also their emotional well-being and social relationships (Yang et al., 2022). Being diagnosed with cancer and undergoing treatment can trigger anxiety and depression. The diagnosis of cancer can be a traumatic and life-changing experience, causing feelings of fear, anxiety, and uncertainty (Gieseler et al., 2018). Approximately 48.2% of women diagnosed with breast cancer experience severe stress, while 80.8% of severe stress is also experienced by women with cervical cancer (Sari, 2020). Stress and adaptation are two main concepts useful for better understanding the phases of illness and health-related human behavior. The two faces of adaptation, adaptation as a process and adaptation as a product, have raised a big question on how long the adaptation process will take in cancer trajectories.

The survivorship in cancer is categorized into three stages: acute (< 1 year), short-term (1-5 years), and long-term survivorship (> 5 years) [Campo et al., 2016]. Following improved breast cancer early detection rates and improvements in its treatment, approximately 90% of patients now survive at least five years after diagnosis, and 80% survive for 10 years (Siegel, Miller, and Jemal 2017). Breast cancer survivors should receive regular screenings to screen for recurrence, manage long-term and late effects, and encourage healthy lifestyles that reduce the risk of second or comorbid cancers. If needed, they should receive mental health services and participate in rehabilitation programs (Kyriakides 2015). Therefore, breast cancer survivors may require lifelong monitoring and long-term care planning.

An ongoing collaborative relationship between cancer survivors and healthcare providers in long-term care planning is essential to enable survivors to achieve their care goals during the survivorship period. According to the Chronic Care Model, one of the most influential chronic disease management models, a collaborative partnership between patients and providers can be enhanced by several factors. Among these, self-management support is essential (McCorkle et al. 2011).

Family caregivers (FCGs) are essential in providing their loved ones home care and psychological support. FCGs must manage the daily care needs of their sick family members and ensure that health services support the need for care. Thus, FCGs often face complex challenges in caring for cancer patients at home, especially during the period immediately after surgery. Understanding the challenges and difficulties FCGs face in providing care at home is critical in developing effective strategies for reducing the burden on FCGs and their family members with cancer (Liang et al. 2019).

Healthcare professionals have a duty to provide supportive care to FCGs of cancer patients to facilitate their caregiving roles. The supportive care needs of partners and caregivers of cancer patients are categorized into four domains, namely: 1) emotional and relational needs, 2) practical needs, 3) work and social needs, and 4) healthcare and illness-related needs (Centre for Health Research and Psycho-oncology (CHeRP), The Cancer Council New South Wales, Australia, 2009). Among all aspects, the unmet needs of healthcare information from the healthcare and illness-related domains may affect FCGs' role in catalyzing adaptation among female cancer patients from the domain of emotional and relational needs.

The current study aims to examine how types of demanded healthcare information affect the FCG's role in catalyzing the adaptation of female cancer patients (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).

2. Method

2.1. Theoretical Foundation

The theoretical foundation of this study was based on the mindsponge theory (MT) (Vuong, 2023). MT was used in the study conception and interpretation of results. MT uses the human mind's information-processing approach to explain various mental products, such as adaptation in cancer. MT views the human mind as an information collection-cum-processor that helps explain how humans think, perceive, believe, behave, and establish social constructs (Vuong & Napier, 2015). MT considers the human mind's filtering system the key factor of the whole information-processing mechanism (Mantello et al., 2023). MT can explain various complex psychological or behavioral problems because it recognizes the temporal dimension of the natural renewal of human psychology and society associated with information-processing activities in the human mind (Nguyen et al., 2022).

Human behavior may be influenced and meaningful only if considering the sociocultural context of the individuals (Vaughn, 2019). Therefore, subjective cost-benefit judgments are mainly driven by the value system according to the mindset and the observed information available in the infosphere or environment on time in need. MT views mindset as a set of highly trusted information (or core values) stored in the human mind (Vuong, 2023). A new information/value may become a new mindset if the result of cost-benefit judgments is positive or conclusively beneficial in the end. Old information that existed in the mindset may be ejected from the human mind if the result of cost-benefit judgments on a new information/value is more positive or better so that the new information/value forms a new mindset because it replaces the existing one. In case the result of cost-benefit judgments of a new information/value is negative or perceived as costly by the individual, it will be more likely to be ejected from the start by the human mind, making the old mindset stay still in its existing position, proving that it is a highly reliable information/value.

Adaptation and stress are two important concepts for better understanding the illness phases and individual behavior. Adaptation has two faces. We may see it as a product and as a process as well. Adaptation as a product means it cannot remain entirely faithful to its original form; as a process, it becomes an act of appropriating and salvaging while trying to give a new meaning (Kinney, 2013). The existing adaptation model views humans as adaptive systems (Roy, 2009). This model views humans as bio-psycho-social beings constantly interacting with a changing environment. A person or group who conducts adaptation (viewed as a product) uses conscious awareness, self-reflection, and choice to create human and environmental integration (Nursalam, 2013). The use of MT in this study may complement the existing adaptation model. From the mindsponge perspective, MT views the environment, one of its main spectrums, as an infosphere, a collection of information or resources (Vuong, 2023). When an individual attempts to adapt (viewed as a process), it means this person filters the new information or value and tries to adjust, i.e., appropriating and salvaging the existing core values with the renewal or updates of information/value from the infosphere. Finally, when an individual completes an adaptation (viewed as a product), they have renewed or updated the related core values previously existing in their mind with the new information/value, making them possess a new mindset. This new mindset will be used for subsequent information-processing activities in the human mind, which will help the person cope with the new bio-psycho-social state.

A prior study on female cancer patients showed that adaptation remains a process in the long run of cancer trajectories (Sari, 2020). A longer duration of cancer illness or being a long-term cancer survivor does not guarantee adaptation achievement (viewed as a product). This prior study reveals that cancer adaptation is a continuous process or limitless in women living with cancer because it was found that there was no significant difference in cancer stress and fear between survivorship stages, especially in breast and cervical cancer cases. How long the adaptation process happens in female cancer patients remains a big question. By knowing this, female cancer patients are in a static condition of adjusting, appropriating, and salvaging the existing core values with the renewal or updates on the new information/value from the infosphere in the long run of cancer survivorship. Therefore, the updates on healthcare information provided by FCG in home-based cancer care settings are highly recommended to assist the adaptation process in female cancer patients. By attempting to catalyze cancer adaptation, this study emphasizes the critical role of FCG in providing healthcare information to patients. Due to limited health-related knowledge, FCGs will be more likely to demand cancer-specific information from healthcare professionals to assist their role in catalyzing adaptation among female cancer patients. This study also underscores the critical role of healthcare professionals in providing healthcare information to FCG of cancer patients and the bridging role of FCG in healthcare professionals' and patients' communication.

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 respectable Public Health Centre (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. There were 60 FCG of female cancer patients participating in this study, totaling 48 spouses (husbands) and 12 other family members. 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, in accordance with the Declaration of Helsinki, with 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.

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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 house-mate. The instrument SCNS-P&C45 (Supportive Care Needs Survey – Partners and Caregivers 45) was used to collect 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 (Centre for Health Research & Psycho-Oncology / CHeRP, The Cancer Council New South Wales, Australia, 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: consists 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, namely: i) no need (total score: 45-90), ii) low need (total score: 91-135), iii) moderate need (total score: 136-180), and, iv) 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 and Analysis

2.5.1. Variable selection and rationale

Among all aspects, the unmet needs of healthcare information from the domain of healthcare and illness-related needs may affect FCG's role in catalyzing the patient's adaptation to changes in working life or usual activities after cancer from the domain of emotional and relational needs. In the current study, seven variables were employed for statistical analysis, namely: *Adaptation, Information_Caregiver, Information_Cancer, Information_SupportServices, Information_AlternativeThe, Information_PhysicalNeed,* and *Information_SideEffects.* To measure the FCG's supportive care needs in catalyzing adaptation of female cancer patients, we employed the *Adaptation* variable, which reflects the FCG's unmet needs of emotional and relational needs in catalyzing adaptation in the person with cancer's life. The six types of demanded healthcare information that may affect the FCG's role in catalyzing adaptation of female cancer patients (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
Adaptation	The need for catalyzing	Numerical	1 = not applicable

	patient's adaptation to changes in working life or usual activities after cancer		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 catalyzing the adaptation of female cancer patients. We constructed the analytical model based on the theoretical foundation of MT as presented below:

$$Adaptation \sim normal(\mu, \sigma) \quad (1)$$

$$\mu_i = \beta_0 + \beta_{Information\_Caregiver\_Adaptation} * Information\_Caregiver_i + \beta_{Information\_Cancer\_Adaptation} * Information\_Cancer_i + \beta_{Information\_SupportServices\_Adaptation} * Information\_SupportServices_i + \beta_{Information\_AlternativeThe\_Adaptation} * Information\_AlternativeThe_i +$$

$$\beta_{Information\_PhysicalNeed\_Adaptation} * Information\_PhysicalNeed_i + \beta_{Information\_SideEffects\_Adaptation} * Information\_SideEffects_i \quad (2)$$

$$\beta \sim normal(M, S) \quad (3)$$

The probability around μ is determined by the form of normal distribution, with the standard deviation σ. The degree of unmet needs in catalyzing adaptation of female cancer patients 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 $\beta_{Information\_Caregiver\_Adaptation}$, $\beta_{Information\_Cancer\_Adaptation}$, $\beta_{Information\_SupportServices\_Adaptation}$, $\beta_{Information\_AlternativeThe\_Adaptation}$, $\beta_{Information\_PhysicalNeed\_Adaptation}$, and $\beta_{Information\_SideEffects\_Adaptation}$. The probability around β is also in the form of a normal distribution.

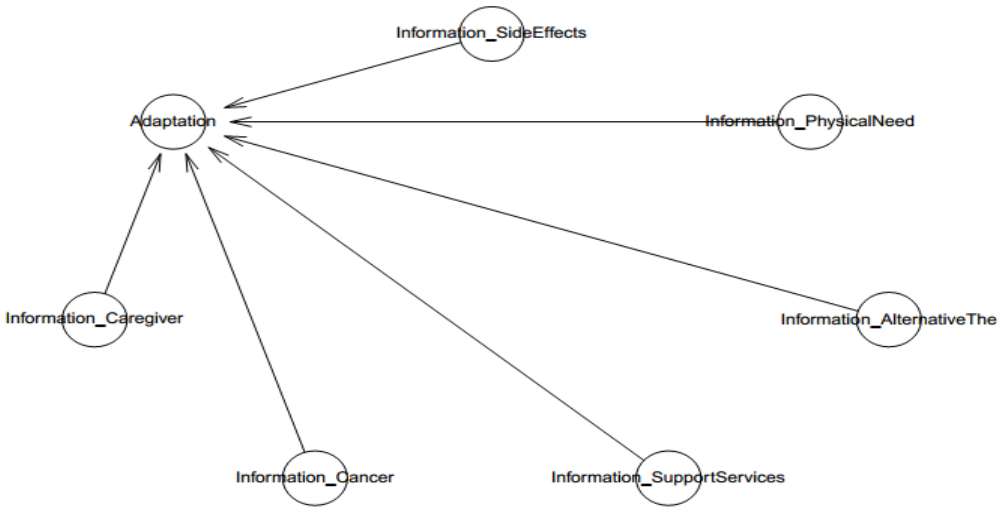

Figure 1. Model 1's logical network

2.5.3. 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 was 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 result 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

Before interpreting the results, evaluating how well Model 1's fits the data is necessary. As can be seen in Figure 1, all estimated *k*-values are below the 0.5 threshold, indicating a good fit signal between the model and the data.

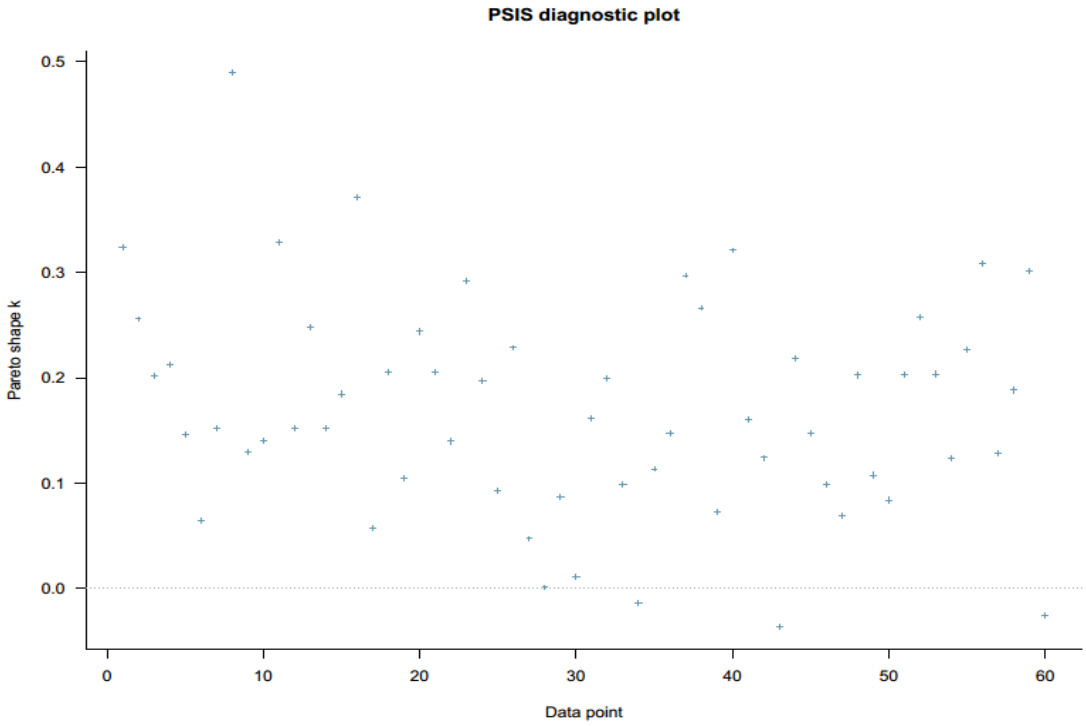

Figure 1. Model 1's PSIS-LOO diagnosis

The posterior distribution statistics of Model 1 are shown in Table 1. 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 1: Estimated results of Model 1

Parameters	Mean	SD	n_eff	Rhat
a_Adaptation	2.64	0.55	11414	1
b_Information_Caregiver_ Adaptation	0.09	0.23	9887	1
b_Information_Cancer_ Adaptation	0.28	0.24	10241	1
b_Information_SupportServices_ Adaptation	-0.07	0.21	11263	1
b_Information_AlternativeThe_ Adaptation	-0.38	0.20	10832	1
b_Information_PhysicalNeed_ Adaptation	0.08	0.20	11213	1
b_Information_SideEffects_ Adaptation	0.10	0.18	11281	1

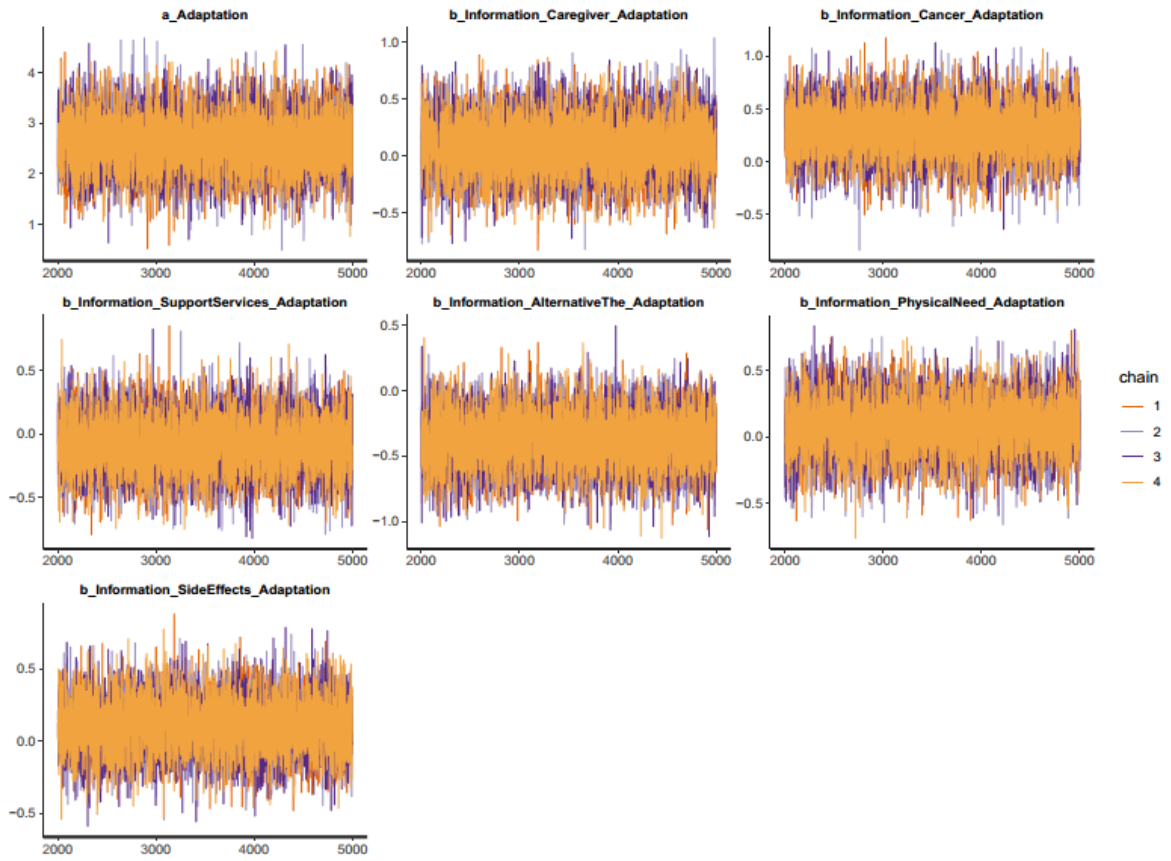

Figure 2. Model 1's trace plots

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.

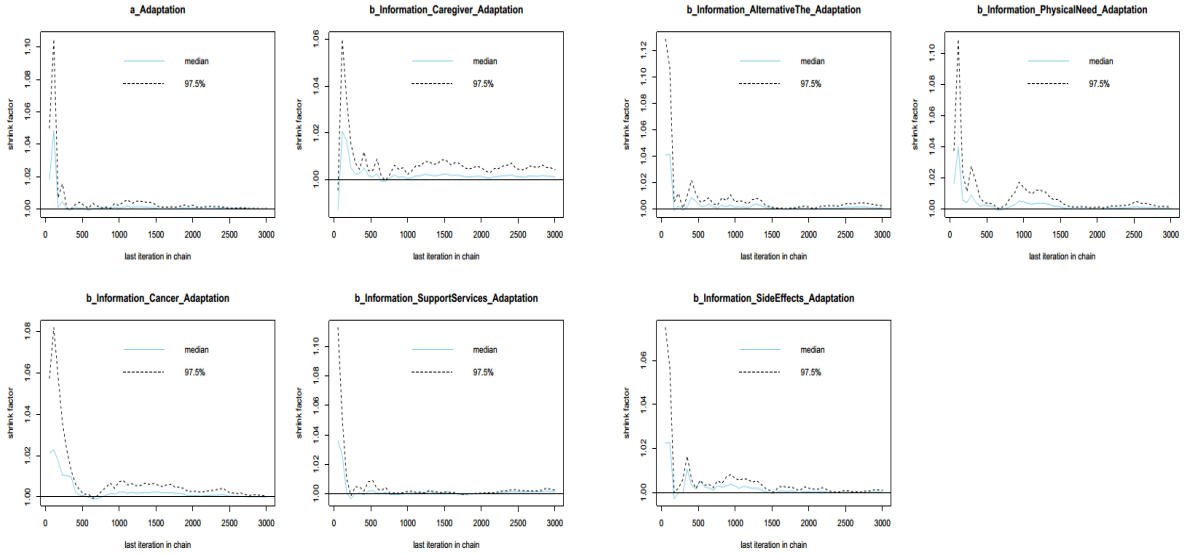

Figure 3. Model 1's Gelman-Rubin-Brooks plots

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.

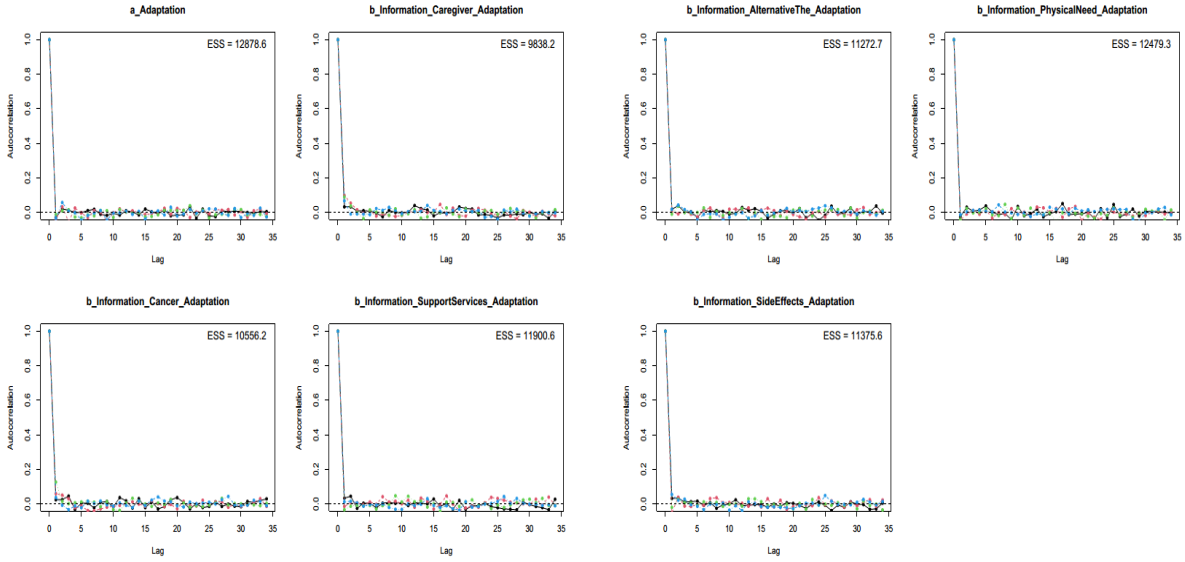

Figure 4. Model 1's autocorrelation plots

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, FCGs with a higher tendency to demand cancer-specific information are

more likely to need support in catalyzing the adaptation of female cancer patients. Meanwhile, FCGs with a higher demand for information on alternative therapies are less likely to need support in catalyzing cancer adaptation. Other types of information have ambiguous effects on the need for support in cancer adaptation. The posterior distributions of the two coefficients in Figure 5 lie almost entirely on the negative or positive side of the *x*-axis, indicating the high reliability of the results.

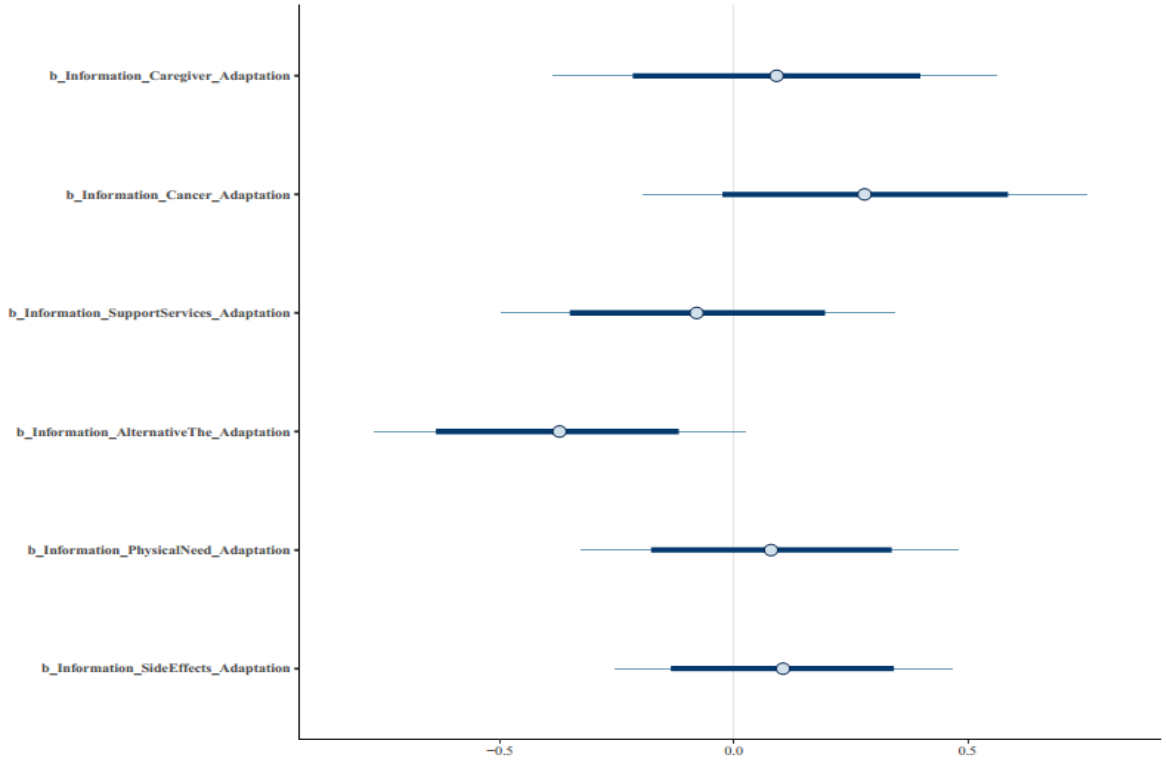

Figure 5. Estimated coefficients

4. Discussion

The use of the BMF analytics in examining how types of demanded healthcare information affect the FCG's role in catalyzing the adaptation of female cancer patients showed that among the six types of healthcare information, FCGs with a higher tendency to demand cancer-specific information are more likely to need support in catalyzing the adaptation of female cancer patients. Meanwhile, FCGs with a higher demand for information on alternative therapies are less likely to need support in catalyzing cancer adaptation.

These findings on the cancer-specific information corroborate with (Eheman et al., 2009), who highlighted that the availability of sufficient knowledge improves communication and coping mechanisms, decreases anxiety, enhances satisfaction with treatment options, and fosters higher participation in decision-making. FCGs greatly aid cancer patients' care and support, and the findings on caregiver-specific information align with (Chua et al., 2020). Support is crucial, and FCGs provide essential support throughout the journey with the disease and its treatments (Alexander et al., 2019). For FCGs to provide effective transition and adaptation mechanisms to cancer patients, they may assist with financial, emotional, social, physical, and spiritual care (Chua et al., 2020; Hopkinson, 2023). However, it is important to note that long-term caregiving is an emotionally and physically taxing undertaking, particularly when dealing with people who have advanced cancer (Chua et al., 2020). Excessive exhaustion or burden experienced by FCGs can lower the quality of life (Liu et al., 2020).

In line with the current findings on therapy-specific information, information on cancer physical needs, and information on support services, a study by (Niedzwiedz et al., 2019) showed that estimates of anxiety and depression prevalence vary depending on a number of factors, including the type and stage of cancer. It is common knowledge that individuals with cancer have greater rates of these conditions, and they frequently do not receive therapy or psychological support (Niedzwiedz et al., 2019; Zhu et al., 2023). Furthermore, the lack of knowledge and recognition of mental health symptoms, the stigma associated with mental health issues, the lack of data supporting successful treatments, and patient preferences are likely some of the contributing causes to such scenarios (Hopkinson, 2023; Niedzwiedz et al., 2019). In addition, a study (Sari, 2020) found that the long-term survival period for cancer patients is low. This could be attributed to adaptation challenges, in which adaptation is regarded as an infinite process, particularly in terms of psychological stress and fear (Kim & Hong, 2023; Sari, 2020). Throughout their survival period, women with cancer require ongoing psychological care to lessen their stress and fear responses, which require FCGs to work in concert with their families, psychologists, and even psychiatrists to some degree (Sari, 2020).

The observation that FCGs with a higher demand for information on alternative therapies are less likely to need support in catalyzing cancer adaptation, and this could be attributed to the extensive knowledge and use of alternative methods for cancer treatment (Ashrafizadeh & Rassouli, 2024). This concurs with (Tangkiatkumjai et al., 2020), who noted that the primary drivers of the use of alternative medicine were perceived safety and benefits of the treatment, control over one's treatment, alignment of needs and sociocultural norms, influence from friends, family, and the media, accessibility, and availability of alternative medicine, and dissatisfaction with traditional medicine.

Other types of information have ambiguous effects on the need for support in cancer adaptation. This could be attributed to cancer decision challenges and individual psychological limitations (Reyna et al., 2017). A study by Zhu et al. (2023) highlighted that the experience of caring for patients with terminal cancer is distinct, culturally specific, and fraught with hardship. To improve the experience of FCGs caring for patients with advanced disease, adequate professional support, including early palliative care, should be considered(Zhu et al., 2023). In order to comprehend and create effective ways to assist FCGs, cultural attitudes must be taken into account (Zhu et al., 2023). In support, (Kim & Hong, 2023) revealed that patients must manage their own care and get ongoing medical treatment for successful cancer adaptation. The FCGs' contribution to adaptation should include a bio-psycho-social approach. This may involve creating comprehensive survival programs for patients, which will benefit them by understanding the interplay between biological, psychological, and social components and how they affect health (Kim & Hong, 2023).

Though the study offers valuable insights, it is crucial to recognize certain limitations. The cross-sectional design imposes constraints on establishing causal relationships, and longitudinal studies could offer a more nuanced understanding of the dynamic caregiving process. Furthermore, the study's focus on a specific geographical location may limit the generalizability of the findings. Future research endeavors could explore cultural variations in healthcare information needs and the need to catalyze adaptation among FCGs of cancer patients, further enriching our understanding of this complex and evolving phenomenon.

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