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ORIGINAL ARTICLE

Predictors of the relationship between the duration of cancer and care time with the supportive care needs of patients and the quality of life of their caregivers: a path analysis

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Abstract

Background Breast cancer (BC) patients face various physical and psychological challenges. The mutual impacts of patients and caregivers on each other show the need for further supportive care from the community and family. This study aimed to identify the predictors of the direct and indirect relationships of the duration of cancer (CANCERT) and care time (CARET) with the supportive care needs (SCN) of the patients and the quality of life (QOL) of their family caregivers.

Methods This descriptive study included 150 patients and their caregivers in Iran. Data were collected using the Supportive Care Needs Survey-Short Form (SCNS-SF34), the Caregiver Quality of Life Index-Cancer (CQOLC) scale, and a socio-demographic checklist. The data were then analyzed in SPSS-24 and Lisrel-8.8 software using descriptive statistics and path analysis.

Results The mean age of the patients and caregivers was 45.76 ± 10.44 and 43.46 ± 9.5, respectively. The majority of patients (96%) were in stages II and III of the disease. There was no statistically significant relationship between cancer stages with SCN of the patients and also caregivers' QOL ($P > 0.05$). Based on the test results, the CANCERT was positively correlated with the patients' care and support needs (SN) in total effect ($\beta = 0.24$). The patients' sexuality needs had the highest negative correlation with their CANCERT in the direct path ($\beta = -0.27$) and had the highest negative correlation with psychological needs in the indirect path ($\beta = -0.174$). The CARET (hours per day) had positive correlation with health systems and information needs in both the direct ($\beta = 0.26$) and indirect paths ($\beta = 0.15$). The highest positive correlation with physical needs was in the direct path ($\beta = 0.34$). The caregivers' QOL had a negative and direct relationship with the CANCERT ($\beta = -0.19$), and there was a positive and direct relationship between CARET and the caregivers' QOL ($\beta = 0.18$).

Conclusions The correlations obtained from this study are not necessarily strong, yet they are important and should be noticed and tested in the future studies. The present findings reveal the need to provide comprehensive care, planning to provide supportive care, and counseling to both BC patients and their family caregivers, especially when the duration of the disease is prolonged.

Keywords Breast cancer · Supportive care needs · Quality of life · Caregiver

Abbreviations

CANCERT	Cancer time, duration of cancer
CARET	Care time (hours per day)
QOL	Quality of life
SCN	Supportive care needs
SEXN	Sexual needs
PHSYN	Psychological needs
SN	Patient care and support needs
HEALTN	Health system and information needs
PHN	Physical needs
SCNS-SF34	Supportive Care Needs Survey-Short Form
CQOLC	Caregiver Quality of Life Index-Cancer

Introduction

Breast cancer (BC) is the most common cancer [1, 2]. Global statistics indicate an increase in the incidence of BC and its faster rise in developing countries [3], including

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Iran [2, 4], and have predicted a threefold increase in the incidence of breast cancer by 2030 [5]. The age of onset of this disease in Iran is almost a decade earlier than in developed countries [1, 4]. Breast cancer patients face various physical and psychological challenges; however, due to the delays in their timely visits, they are usually in the advanced stages of the disease when they begin seeking treatment [6], which necessitates the need for more supportive care from the community, healthcare centers, and families. Patients who receive greater social support have less risk of morbidity (disability) and mortality [6].

The concept of supportive care needs has been introduced in the field of cancer patient care. The term "supportive care" is defined as a comprehensive and essential service for improving the lives of patients with or affected by cancer. The Fitch's supportive care needs' conceptual framework [7] defines the general needs of cancer patients or their caregivers in seven domains, including physical, informational, social, emotional, psychological, practical, and spiritual from the onset of the diagnosis to treatment, survival, palliative care, and the grief process [7, 8]. In other words, these cares provide a support system to help patients live an active life until death, improve their quality of life, and may affect their period of illness [7, 9].

Supportive care needs are defined as care requirements that are essential for managing and controlling symptoms and adverse events, adaptation, optimizing informed perception and decision-making, and minimizing reduced patient activities [10].

Supportive care needs can arise at any stage of illness (from diagnosis to treatment and even palliative care) [11]. A greater number individuals reported unmet needs in the post-treatment stage of their cancer [12]. Failure to pay attention to supportive care during cancer treatment may lead to reduced compliance and worsening outcomes, thereby reducing the value of therapeutic interventions [13].

Unmet supportive care needs indicate the difference between the needed services and support with the actual services and support received [14, 15]. Evidence show nearly half of women with breast cancer had unmet needs after their diagnosis of cancer [16]. Identifying unmet needs and unresolved demands of cancer patients and their families help to prioritize nursing interventions [14]. Also, identifying and meeting these needs help control the symptoms and complications of the disease, increase the ability to adapt, better understand the situation, make informed decisions, and minimize dysfunction in patients [10]. Nevertheless, the patients and their families don't tend to express their psychosocial problems or inconveniences because they assume those problems as inevitable issues caused by the illness. Therefore, accurate identification of patients' needs is difficult [17].

According to studies, most unmet care needs in this group of patients revolve around health system and information, physical and daily living, psychological factors, patient care and support, and sexuality needs [8, 18, 19].

A significant proportion of women with BC express an unmet supportive need, indicating that they would like more help. The prevalence of specific needs may reach up to 70% in these patients [7, 20]. With cancer progression, patients became physically and psychologically weaker, so their dependency on family increases [21]. Asian breast cancer patients have more demand for supportive care than their counterparts in American and European countries [22]. According to a study by Hashemian et al. (2017), in most cases, breast cancer patients need the support and care of their family members [2].

Several factors have been suggested as predictors of increased need, including the patient's age, stage of disease progression, time since diagnosis, and level of anxiety, depression, and distress [20]. Identifying these characteristics is very important in identifying vulnerable subgroups who need more care [16].

The focus of services in the supportive care system is on the patient, the patient's family, and caregivers [17]. Patients and their caregivers are involved in the whole process of treatment. The goal is not only to treat but also to increase the quality of life of the patients and their caregivers [9].

As the family caregivers of cancer patients, family members play an important role in their disease management and home care delivery. Family caregivers are the main adult members caring for cancer patients [17], and they have the major responsibility for implementing cares at home [23]. The primary caregivers of women with breast cancer can play a crucial role in their adaptation to and coping with the disease at any stage of treatment as well as in supporting them in making the right decisions [24, 25]. If caregivers are under stress and experience difficulties, family care and support will be severely hampered [26].

Cancer affects not only the quality of patients' life but also the quality of their caregivers' life [2, 27, 28]. The quality of life of caregivers as a result of their caregiving duties varies from the time of initial diagnosis to 1 and 2 years after diagnosis, and during this period, caregivers tend to experience greater mental burden. In care instances where more than 2 years have elapsed since the diagnosis, the patients and their caregivers have better adapted to the disease and enjoy a higher quality of life [28]. Caregivers focus more on the well-being of the patients, often meaning that their own health and needs are ignored [29–31]. The negative impact of care responsibilities is manifested in various forms, especially as mental and economic burdens [29, 31]. The prevalence, severity, and persistence of the burden of caregiving have a profound effect on the quality of life of the patients and the caregivers themselves [25]. Therefore, due to the close interactions between patients and family members, it is necessary to investigate the effect of the unmet needs on the QOL of the patient–family dyads [17]. The patient–caregiver dyad must be considered as the unit of care. Also, to provide comprehensive care, planning must be done to provide supportive and informational care to both patients and carers [23]. In general, there is an inverse correlation between patients' quality of life and their needs [26]. Maintaining the quality of life of caregivers is associated with their ability to provide better care to patients and meet their needs [32].

The growing trend of breast cancer in Iran, patients' presenting in the advanced stages of the disease [6], and patient–caregiver interactions necessitate more supportive care to be provided by the community and families. Due to the lack of a special social organization to support family caregivers and reduce their problems in Iran, compared to caregivers in developed countries, they are at greater risk of psychological disorders [9].

Understanding the needs of caregivers is a step toward empowering patients and their caregivers. The review of literature did not yield any comprehensive studies on the direct and indirect relationship of the duration of cancer and care time with the supportive needs and quality of life of patients and caregivers both in one model.

Therefore, this study was conducted to identify the predictors of the relationship of the duration of cancer and care time with the supportive needs of the patients and the quality of life of their family caregivers in southern Iran, so that the results can be used in plans for improving services, meeting these needs and increasing the quality of life of patients and their caregivers.

Questions

This study aimed to answer the following questions:

- What is the (direct/indirect) relationship between disease duration and patients' supportive needs?
- What is the (direct/indirect) relationship between daily care hours and patients' supportive needs?
- What is the (direct/indirect) relationship between caregivers' quality of life and disease duration?
- What is the (direct/indirect) relationship between caregivers' quality of life and daily care hours?

Methods

Type of study

This descriptive study examined 150 patients and 150 of their caregivers in 2019. Omid Chemotherapy and Radiotherapy Center in Bandar Abbas, Iran, was selected as the research setting. This center is the only referral center in Hormozgan province. It covers all the patients in the cities of the province and provides them with all the relevant services, including initial diagnosis, treatment, and follow-up.

Participants

The sample size for the patients with breast cancer was determined as 140 people based on a study by Abdollahzadeh et al. [33] and considering the standard deviation of the mean score (σ) and the error (d) ($z = 1.96$, $\alpha = 0.05$, $d = 1$, $\sigma = 6$). According to the following formula and a study by Sajadian et al. [34], the sample size for the family caregivers of patients with breast cancer was also determined as 140 ($z = 1.96$, $\alpha = 0.05$, $d = 1$, $\sigma = 7$). Finally, to take account of potential sample loss, 150 samples were allocated each to the groups of patients and caregivers. The formula for sample size is shown in Eq. 1 as follows:

$$n = \frac{z_{\alpha}^{2} / 2^{\sigma^{2}}}{d^{2}} \tag{1}$$

The eligible women with breast cancer were selected to participate in the study.

The inclusion criteria for the patients were being 18 or older and having a definitive diagnosis of breast cancer (in any of the stages, from 1 to 4), with at least 3 months since the diagnosis, no underlying diseases, not having a known mental disorder based on the patient's records, having a main family caregiver, and the ability to cooperate and answer the questions.

The inclusion criteria for the family caregivers of breast cancer patients included no self-reported history of physical and mental problems requiring treatment and being able to cooperate and answer the questions.

Data collection tools

Data were collected using the Supportive Care Needs Survey-Short Form (SCNS-SF34), the Caregiver Quality of Life Index-Cancer (CQOLC) scale, and a socio-demographic information checklist.

Family caregivers' data collection tools were as follows:

1. Demographic information checklist of patients' family caregivers included age, marital status, educational level, occupation status, duration of care from the onset of the disease (months), caregiver's kinship with the patient, and mean daily care hours.
2. The Caregiver Quality of Life Index-Cancer scale has 35 items; that 34 items of all are in four dimensions, and one of question doesn't belong to any domains and

its score calculated in the total score, so we have to use the total score because of the importance of all questions. Items are scored based on a 5-point Likert scale and have four dimensions: mental/emotional burden, lifestyle disruption, positive adaptation, and financial concerns. The scale scores range from 0 to 140, with higher scores denoting better quality of life. CQOLC questionnaire was designed by Weitzner et al. [35]. This questionnaire was translated into Persian by Khanjari et al. [36] using the forward–backward translation method and validated using face, content, and construct validity methods. The scale reliability using Cronbach's alpha method was reported to be 89%. In this study, the alpha coefficient was calculated to assess internal consistency and the test–retest coefficient to assess reliability. The Cronbach's alpha for the different dimensions of the scale was 0.76–0.84, and ICC was 0.93–0.98.

Patients' data collection tools were as follows:

1. Demographic information checklist of women with breast cancer included age, marital status, educational level, occupation status, disease duration (months), care provision duration from the onset of the disease (months), disease stage, caregiver's kinship with the patient, and mean daily care hours.

   The main family care caregiver was identified by asking the patient who provides the most home care for you (sister, brother, father, mother, husband, daughter, son).

2. The Supportive Care Needs Survey-Short form (SCNS-SF34): This questionnaire consists of 34 items scored based on a Likert scale and has five domains, including psychological needs (10 items related to emotions and coping: 6–14, 17), system and information (11 items related to the treatment center and obtaining information about the disease, diagnosis, treatment, and follow-up: 23–30, 32–34), physical and daily living (5 items related to coping with physical symptoms and side effects of treatment and performing usual physical tasks and activities: 1–5), patient care and support needs (5 items related to healthcare providers shoring sensitivity to physical and emotional needs, privacy, and choice: 18–22), and sexuality needs (3 items related to relationships: 15, 16, 31). The scale scores range from 0 to 100, and a higher score denotes more unmet needs.

   SCNS-SF34 was designed by Bonowski et al. [37]. Abdollahzadeh et al. [33] translated the English version of the questionnaire into Persian using the forward–backward translation method. The content validity of the questionnaire was approved by a panel of 12 experts, and its reliability was confirmed with Cronbach's alpha coefficient of 0.9 [33]. In this study, the alpha coefficient was calculated for internal consistency and the test–retest coefficient for reliability. The Cronbach's alpha for the different dimensions of the questionnaire was 0.74–0.87, and ICC was 0.99.

Study procedures

After obtaining the necessary permits and the code of ethics for the study, the researcher visited the mentioned center and extracted the names of all the people with breast cancer who visited every day from the reception desk. Each patient and their family caregiver were separately consulted about the research subject. At first, we explained the aim of the study for both, patients and care providers, and if they had interested to participate in the study, informed written consent was obtained from them.

Data were collected through self-report questionnaires, interviews, and reviewing patients' medical records. Information on the duration and stage of the disease was extracted from the patients' medical records.

The questionnaires were then distributed among the women with breast cancer and their family caregivers to complete. In the next step, the researcher reviewed the completed questionnaires, and if some parts were not completed, she talked to the patient or caregiver. Therefore, there was no sample loss or missing data.

Sampling continued among patients, until the desired sample size was reached (150 patient–caregiver pairs).

Data analysis

Data were extracted using SPSS-24 and Lisrel-8.8 software, and descriptive–analytical statistical tests and path analysis were used for the data analysis. According to the path analysis model, variables that are both endogenous and exogenous can moderate the variable that they affect. In the present study, variables (PHSYN, psychological needs; SN, patient care and support needs; HEALTN, health system and information needs; sexuality needs; PHN, physical needs) had a moderating role for the variables which they affect. The path analysis results as regression coefficient, standardized beta with a significance level of T value > 1.96.

All SEM/path analysis programs produce a variety of statistics pertaining to the fit of the model like Chi-square, GFI (goodness of fit index), CFI (comparative fit index), NFI (Bentler–Bonett normed fit index), and RMSEA (root mean squared error of approximation).

Results

The mean age of the patients and the caregivers was 45.76 ± 10.44 and 43.46 ± 9.5 years, respectively; the mean duration of cancer was 16.3 ± 9.3 months; and the mean care time was 6.18 ± 2.23 h per day. The majority of patients (96%) were in stages II and III of the disease (45% and 51%, respectively). There was no statistically significant relationship between cancer stages and supportive care needs of the patients (*P* value = 0.627) and also no statistically significant relationship between cancer stages and caregivers' quality of life (*P* value = 0.990). Since the primary care was provided by one person from the beginning of diagnosis and treatment (and most of the time by patients' husbands), care duration was equal to disease duration (16.3 ± 9.3 months) (Table 1).

Table 2 shows the direct and indirect effect of variables. Path coefficients are produced by the various regression analyses used in the path analysis. The use of the standardized coefficient allows comparison of the magnitude of one path in the model with that of other paths in the model.

Table 1 The sociodemographic characteristics of the patients and their caregivers

Variable		Patient Mean ± SD min–max)	Caregiver Mean ± SD (min–max)
Age (years)		45.76 ± 10.44 (27–78)	43.46 ± 9.5 (21–68)
Duration of cancer (months)		16.3 ± 9.3 (4–40)	-
Care time (hours per day)		-	6.18 ± 2.23 (2–12)
		N (%)	*N* (%)
Gender of caregivers	Female	-	38 (25.3)
	Male	-	112 (74.7)
Stage of cancer	Stage 1	2 (1.3)	-
	Stage 2	67 (45)	-
	Stage 3	77 (51)	-
	Stage 4	4 (2.7)	-
Relationship with the patient	Husband	-	99 (66)
	Sister	-	13 (8.7)
	Daughter	-	24 (16)
	Son/Brother	-	8 (5.3)
	Mother/Father	-	6 (4)

Table 2 The direct and indirect effects of cancer duration and care time on the patients' supportive needs and their caregivers' quality of life

Variable			Direct effect Standard (unstandard)	Indirect effect Standard (unstandard)	Total effect Standard (unstandard)	*T* value (for direct)
Duration of cancer (cancer time)	Patients' supportive care needs	Physical and daily living	−0.24 (0.61)*	-	−0.24 (0.61)*	3.22
		Psychological	−0.04 (−0.07)	−0.174 (0.32)*	−0.174 (0.32)*	
		Sexuality	−0.27 (0.87)*	-	−0.27 (0.87)*	3.31
		Health systems and information	0.03 (0.05)	−0.11 (0.219*	−.11 (0.219)*	0.38
		Patient care & support	0.29 (1)*	−0.05 (.201)*	0.24 (0.799)	3.67
	Quality of life of the caregivers		−0.19 (0.27)*	-	−0.19 (0.27)*	2.40
Care time	Patients' supportive care needs	Physical and daily living	0.34 (10.65)*	-	0.34 (10.65)*	4.51
		Psychological	0.14 (3.12)*	0.17 (3.94)*	0.31 (7.06)*	1.98
		Sexuality	0.07 (2.66)	-	0.07 (2.66)	0.77
		Health systems and information	0.26 (6.36)*	0.15 (3.83)*	0.41 (10.19)*	3.58
		Patient care & support	0.28 (12.09)*	0.081 (3.51)*	0.36(15.6)*	3.43
	Quality of life of the caregivers		0.18 (3.09)*	-	0.18 (3.09)*	2.19

*= significant, *T* value > 1.96

Direct and indirect effect = standardized coefficients (unstandardized coefficients)

Path analysis of relationships between disease duration and the supportive care needs of patients showed that the duration of cancer had a positive relationship in both the direct and indirect paths with the patient care and support needs (total effect β = 0.24). In other words, as the duration of cancer increased, the patients' care and support needs also increased. Among the variables that were related to the duration of cancer only in one path, sexuality needs had the highest negative relationship with the duration of cancer in the direct path (β = −0.27) and psychological needs in the indirect path (β = −0.174). In other words, when the duration of cancer was shorter, the patients had more unmet sexual and psychological needs.

Path analysis showed a causal relationship between daily care hours and the patient care and support needs. They had positive correlation in both direct and indirect paths (total effect β = 0.36). Among the components of support needs, in the indirect path, the most positive correlation was observed between physical needs and daily care hours (β = 0.34). In other words, the greater the supportive care needs, and especially the physical needs, the higher the daily care hours.

The quality of life of the caregivers had a direct negative correlation with the duration of cancer (β = −0.19). In other words, the longer was the duration of cancer; the worse would be the quality of life of the caregivers. Also, there was a positive and direct correlation between care time and the quality of life of the caregivers (β = 0.18) (Table 2).

Table 3 is the model fit statistics. Software programs produce a variety of statistics pertaining to the fit of the model. In the table, we show the acceptable range according Munro's statistical methods for healthcare research [38]. Assessing the fit indices of the model indicate the desirability and high fit of the model and the rationality of the relationships between the variables based on the conceptual model. Accordingly, the fitted model does not have a significant difference with the conceptual model (Table 3).

In Fig. 1, the significance of the paths is based on *T* value > 1.96. Based on whether the path was significant or not, the β coefficient for direct paths and the product of significant path coefficients for indirect paths were calculated.

Discussion

This descriptive study was conducted to investigate the relationship between the duration of cancer and daily care hours with the supportive care needs of patients with cancer and the quality of life of their family caregivers.

Based on the results of the path analysis, the duration of cancer and daily care hours were most closely related with the total score of the patients' supportive care needs in both direct and indirect paths. Also, the caregivers' quality of life had a negative relationship with the duration of cancer and a positive relationship with daily care hours.

Table 3 Model fit indices

Fit index	X^2	df	X^2/df	CFI	GFI	NFI	RMSEA
Model index	22.04	14	1.57	0.97	0.97	0.94	0.0063
Acceptable range	$X^2/df < 5$			> 0.9	> 0.9	> 0.9	< 0.05

GFI, goodness of fit index; *CFI*, comparative fit index; *NFI*, Bentler–Bonett normed fit index; *RMSEA*, root mean squared error of approximation

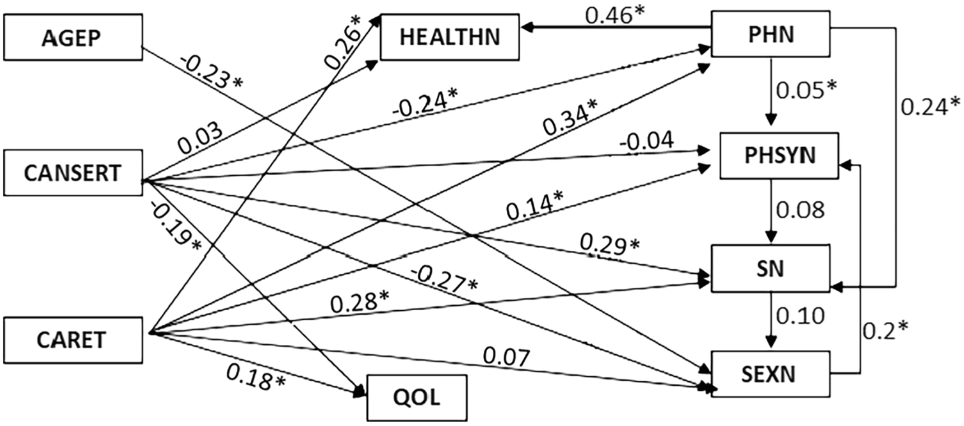

Fig. 1 The path analysis model of the relationship of cancer duration and care time with the patients' supportive care needs and the caregivers' quality of life. According standardized coefficients. AGEP, age of patients; CANCERT, cancer time; CARET, care time; QOL, quality of life; SEXN, sexuality need; PHSYN, psychological needs; SN, patient care and support needs; HEALTN, health system and information needs; PHN, physical needs. **T* value > 1.96. Chi-square = 22.04, df = 14, *P* value = 0.07774, RMSEA = 0.0063

The path analysis further examined the relationship between the duration of cancer and the patients' supportive needs and showed that disease duration has a positive relationship with the patients' general needs in both direct and indirect paths. In other words, the longer was the duration of cancer, the higher were the patients' supportive needs.

Although these correlations are not necessarily strong in our study, they are important and should be noticed and tested in the future studies.

The physical changes due to cancer, such as weakness, pain, and chronic fatigue, and the side effects of the anticancer treatments, the multiple hospitalizations, and the impaired interpersonal interactions and disrupted ability to perform social and marital roles [13, 27, 33, 39, 40] are exacerbated as the disease duration increases and lead to further needs of various kinds [17].

Among the components of supportive needs, a negative relationship was observed between the disease duration and sexual needs (in the direct path) and psychological needs (in the indirect path). In other words, the shorter was the duration of the disease, the more disadvantaged were the patients in terms of their need for sexual and psychological care. This finding is consistent with the results of study of Chen et al. [41], which found that disease duration (from the time of diagnosis) is negatively correlated with the patients' sexual care needs.

Physical changes along with the psychological distress caused by the disease burden and fear of a vague future and the treatment costs alongside chronic physical and mental fatigue increase the patients' psychological needs. These patients face some unique short-term or long-term challenges to their physical and mental health and family functioning and struggle to maintain a healthy lifestyle. According to studies, physical health directly affects the mental health of these patients [42]. Reactions caused by grief or trauma may occur at the onset of a chronic and incurable disease such as breast cancer. Reactions such as anger, rage, and denial and even anxiety and depression might be more severe at the beginning of the illness, thus increasing the patients' needs [43]. Studies have shown that patients and their caregivers gradually adapt to the disease [28], thus explaining the negative relationship between psychological needs and disease duration.

The present findings suggest that sexual need is negatively correlated with the disease duration. In their sexual relations, women seek intimacy and the meeting of their emotional needs to achieve peace and well-being [44]. A patient with breast cancer experiences sexual dysfunction, has unmet support and informational needs, and undergoes an emotional crisis — all leading to an unfulfilled sex life [45]. It appears that as the duration of disease increases, sexual life and sexual needs become more neglected and other needs take center stage. It should be noted, however, that the issue of unexpressed sexual needs might have cultural roots [46, 47]. For instance, Asian women are often reluctant to talk about their sexual issues and consider talking about these issues embarrassing and unreasonable [48]. It appears that taboos around sexual issues in the Iranian society can justify the unaddressed role of sexual needs in relation to breast cancer. In addition, the social culture might have influenced patients' responses to the items concerning their sexual needs.

Based on the present findings, daily care hours had a positive causal relationship with the total score of the patients' support needs in both direct and indirect paths. Among the components of supportive needs, the most positive correlation in the direct path was observed between physical needs and daily care hours. In other words, when the total supportive needs, especially the patients' physical needs, were greater, the daily care hours increased. The reason is that as physical problems increase, so do physical needs and the need to invest more hours in caregiving [49].

Another finding of the present study was the existence of a negative causal relationship between disease duration and the caregivers' quality of life; that is, the quality of life of the caregivers decreased as the duration of cancer increased. In one study, Lv et al. (2021) also found a negative direct relationship between caregivers' quality of life and the disease duration. Unmet supportive care needs can lead to psychological distress and reduced quality of life for family caregivers by increasing the burden of care [50]. A study in China found that the care burden on caregivers has an adverse effect on their quality of life, especially their mental health [51].

In the present study, the caregivers of breast cancer patients were mostly their spouses (66%). In the study of Wolf et al.(2021), 60.2% of the caregivers of breast cancer patients were patients' spouses [52]. Having a wife with cancer can affect all the aspects of the spousal caregiver's quality of life. The long time spent caring for the spouse can lead to physical and mental fatigue for the caregiver. At the same time, the ill spouse may not be able to properly perform their spousal role, which leads to the possibility of marital disruption. High treatment expenditures also have a negative effect on the family finances. Physical weakness combined with other disease-related engagements, such as frequent doctor's visits and hospitalizations and the effect of the medications, could reduce the couple's chance of spending their leisure time in a bright mood [39]. Constant worries about health and fear of losing the spouse along with the other noted factors can reduce the caregiver's quality of life [42, 49]. The longer is the disease duration, the more unfavorable will be the dimensions of quality of life for the caregiver.

The present findings differed with the results of some studies [53, 54]. Since demographic characteristics such as age and sex are the most important predictors of quality of life for patient caregivers[53], the disparity in the results of the present study and these other studies could be because most caregivers in those studies (60–80%) were female, while in the present study, most of the caregivers were the patients' husbands. Another likely cause of this disparity is the different disease durations, which ranged from 2 weeks to 6 months in those studies and was above 7 months on average in the present study.

Lv et al. (2021) reported in their study that when the hours of caregiving for cancer patients increase, the score of mental and psychological suffering decreases in the caregivers. This unexpected finding could be explained by noting that although unmet supportive care needs can lead to psychological distress by increasing the care burden, in times of hardship, the caregiver learns to focus on the positive aspects of caregiving and seeks more social support, which help reduce the care burden and psychological distress. Interventions aimed at meeting supportive care needs, reducing care burden, and promoting social support can improve family caregivers' mental health [50]. Appropriate interventions to meet the supportive needs of the studied population thus appear more than essential.

Conclusion

The results of this study showed the patients' care time (hours per day) had a positive correlation with the patients' supportive care needs and caregivers' quality of life. Patients' duration of cancer had a negative correlation with 4 out of 5 domains of supportive care needs including physical and daily living, psychological, sexuality, health systems and information and positive correlation with the patient care and support domain, in other words, the longer the duration cancer, the less supportive care does the patient need in most domains. Also, the duration of cancer has negative correlation with the caregivers' quality of life. The clinical use of the result is to provide not only the patient, but also the caregiver with supportive care and counseling, who is less prioritized; especially when the duration of the disease is prolonged.

Strengths

In the present study, the supportive care needs of patients with breast cancer and the quality of life of their family caregivers were assessed simultaneously. The novelty of this study is illustrating effects of all variables in a path analysis model; the results coming from it comply with other studies, yet these results are derived using advanced statistics.

Limitations

Since this research was carried out in Bandar Abbas, its results should be generalized to other parts of Iran only with caution. Also, due to the high impact of disease periods (chemotherapy, radiotherapy, and follow-up) on the supportive needs of patients, further studies with larger sample sizes are required on patients in different stages of the disease.

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Author contribution All authors contributed to the study conception and design. Seyedeh Maryam Attari participated in study design, drafting the conclusion, and drafting the manuscript, which was revised by Giti Ozgoli. Zohreh Mahmoodi participated in study design and interpretation of data and drafting the manuscript. Mozhgan Mohammadzadeh Nimekari participated in study design and data collection. Malihe Nasiri contributed to drafting the data, evaluation, and statistical analysis and interpretation of data. Yaghoub Ashouri taziani participated in study design, data evaluation, and the conclusion. Giti Ozgoli was responsible for overall supervision and participated in study acquisition, interpretation of data, and the conclusion, revision, and final approval of the manuscript. All authors read and approved the final manuscript and are accountable for all aspects of the work. All authors read and approved the final manuscript.

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Availability of data and materials Data are available upon request through the corresponding author.

Declarations

Ethical approval and consent to participate The study began after obtaining the necessary permits and receiving a code of ethics from the Ethics Committee of *Shahid Beheshti University of Medical Sciences* (IR.SBMU.PHARMACY.REC.1400.004 on April 27, 2021) and obtaining informed written consent from the participants. All procedures were performed in accordance with the ethical standards the 1964 Helsinki Declaration. Informed consent was obtained from all individual participants included in the study.

Consent for publication This manuscript does not contain any individual person's data in any form.

Conflict of interests The authors declare no competing interests.

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