Structural Pattern of Personality Traits in Cancer Patients on Treatment Adherence and Self-Efficacy Mediated by Social Support

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Abstract

Objective: Treatment adherence, the extent to which patients can follow the agreed recommendations for prescribed treatments with a healthcare provider, is a key component of chronic disease management. This study aimed at examining the structural pattern of personality traits of cancer patients on treatment adherence and cancer coping self-efficacy mediated by social support.

Method: The method of the present study was descriptive, and the research design was correlational based on structural equation modeling. The statistical population included all female patients with breast cancer referred to Shahid Rahimi Hospital for follow-up treatment, among whom 300 were selected using the convenience sampling method. Then, they completed the research questionnaires, including Five Personality Traits, the Self-efficacy for Appropriate Medicine Use Scale, Cancer Behavior Inventory, and Social Support Therapeutic Outcomes Questionnaire. The research data were analyzed using AMOS statistical software.

Results: The results showed a significant relationship between personality traits, adherence to treatment, cancer self-efficacy, and social support. The results of structural equation modeling showed a good fit of the model with the experimental data, and the general hypothesis of the research was confirmed. Personality traits have a significant positive effect on adherence to cancer treatment and self-efficacy. Also, personality traits mediated by social support showed a negative and significant relationship with adherence to treatment and cancer self-efficacy.

Conclusion: This study showed the effective role of social support in the outcome of social and individual measures to increase adherence to treatment and cancer self-efficacy in patients with breast cancer.

Keywords: Personality traits; Treatment adherence; Cancer self-efficacy; Social support; Cancer.

Introduction

Given that chronic diseases in all ages, socioeconomic and cultural groups are observed has been one of the considerable issues of health officials. One of a variety of chronic diseases is breast cancer. Breast cancer is the most common, deadly, emotionally, and psychologically influential cancer among women (Mosher, Johnson, Dickler, Norton, Massie & DuHamel, 2013); almost a third of all cancers in women account for it and it is intended the second cause of death from cancer in women after lung cancer (Yousuf, Al Amoudi, Nicolas, Banjar & Salem, 2012). The awareness of malignant and life-threatening diseases changes the understanding of life in individuals, so multiple studies have shown a close relationship between chronic diseases and cancer and psychological states (Montgomery & McCrone, 2010). Therefore, to improve the physical and mental condition of these patients, treatment seems necessary, and

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treatment adherence is one of the most important factors in predicting the general health of these patients in the future.

Adherence to chronic disease management is critical to achieving improved health outcomes, quality of life, and cost-effective health care (Viswanathan, Golin, Jones, et al., 2012). A World Health Organization review of adherence behaviors noted that "increasing adherence may have a greater effect on health than improvements in specific medical therapy" (Farajzadegan et al., 2021). With an average adherence rate of only 50% among patients with chronic diseases, non-adherence is a serious challenge to chronic disease management (Burkhart & Sabaté, 2003). While inadequate treatment adherence is an important factor in treatment failure, non-adherence to treatment not only raises health concerns but also leads to increased health costs and resources related to health care (Jaam, Hadi, Kheir, et al., 2018). Non-adherence to treatment affects the quality of treatment and consequently health (Thorneloe, Griffiths, Emsley, Ashcroft, et al., 2018) and leads to losing the effectiveness of treatment and imposing high costs on the government and the health system. Therefore, treatment adherence can play an important role in achieving effective treatment and increasing self-confidence and self-efficacy in these patients (Aziz, Hatah, Makmor-Bakry, et al., 2018).

'Self-efficacy' is the belief that one can control challenging environmental demands by taking adaptive action (Bandura, 1997). According to social cognitive theory (Bandura, 1997), perceived self-efficacy strongly influences behavior and is positively associated with adjustment. Among heterogeneous groups of cancer patients, positive associations of self-efficacy with mood (Cunningham, Lockwood, & Cunningham, 1991), psychological adjustment (Hirai, Suzuki, Tsuneo, Ikenaga, Hosaka, & Kashiwagi, 2002), physical (Hochhausen, Altmaier, McQuellon, et al., 2007)

and social wellbeing (Boehmer, Luszczynska & Schwarzer, 2007) and cognitive functioning (Luszczynska, Scholz & Schwarzer, 2005) have been found and a positive effect of self-efficacy on quality of life has also been observed among breast cancer patients (Northouse, Mood, Kershaw, Schafenacker, Mellon, Walker, et al., 2002). Despite obstacles and relapses that may reduce a person's motivation, self-efficacy affects a person's efforts to change risky behaviors and perseverance to continue the effort (Safren, Blashill, Lee, O'Cleirigh, et al., 2018; Luther, Coffin, Firmin, Bonfils, et al., 2018), which is associated with the onset and maintenance of positive changes in health as well as the effort and perseverance of the individual in performing health-oriented behaviors (Asadi et al., 2021). Therefore, self-efficacy can play a very important role in predicting the quality of life in cancer patients. Therefore, self-efficacy can play a very important role in predicting the quality of life in cancer patients.

Personality traits in patients with breast cancer are another critical variable in the quality of life of these patients. Patients' personality differences may be more important than their clinical characteristics and determine their capacity to adapt or not to adapt to disease conditions (Giulietti, Vespa, Ottaviani, Berardi, et al., 2019). Personality factors can affect the response to treatment, and personality assessment is especially important when preparing a treatment plan for specific patients (Tamura et al., 2021). Personality refers to relatively stable styles of thinking, feeling, and acting, and is related to health by forming the methods of evaluating events, challenges, and body feelings (Nielsen, Christensen, Finne & Knardahl, 2019). The pattern of five personality factors is one of the most appropriate paradigms for conceptualizing human personality, and because of its reproducibility and widespread use in most cultures as a basic framework for describing and evaluating personality, it enjoys research support (Zhang, Wang, He, Jie & Deng,

2019). A study using the Eysenck personality inventory (EPI) showed that breast cancer patients with higher extraversion scores tended to have a lower risk of death. Existing findings demonstrated that personality has a considerable impact on the development and progression of breast cancer (Minami, Hosokawa, Nakaya, Sugawara, Nishino, Kakugawa & Fukao, 2015). Neuroticism was defined as the personality trait most often associated with different aspects of breast cancer survival, such as fatigue, lower quality of life, and depression. It was also underlined that in addition to conservative therapy for breast cancer, personality, acceptability, and neuroticism were important factors responsible for the emergence of depressive symptoms a year after surgical therapy (Den Oudsten, Van Heck, Van der Steeg, Roukema, & De Vries, 2009). Moreover, in post-chemotherapy patients with breast cancer, cancer-related fatigue level was found correlated to psychoticism, extraversion/introversion, neuroticism, and lie subscales of EPI (Wang, Jiang, Tang, Feng, Zeng & Wang, 2013). Also, Research results showed that there was a positive correlation between neurotic personality scores and depression, anxiety, and hopelessness scores (İzci, Erdogan, İlgün, Çelebi, Alço, Kocaman & Özmen, 2018). In general, it can be said that personality traits play an undeniable role in the health of cancer patients. A practical point in the field of self-efficacy and health-oriented behaviors of cancer patients is their willingness to share experiences. When these people see others succeeding in changing their lifestyle through persistent effort, they start to feel that they are also efficient in carrying out activities to change their lifestyle, which can lead to their adaptation (Parker, Prince, Thomas, Song, et al., 2018).

Social support is a complex, multi-facet construct (Uchino, 2004). Perceived social support deals with perceptions concerning the general availability of support (Haber, Cohen, Lucas, & Baltes, 2007). In contrast, received support refers to evaluations of recalled actual acts of supportive behaviors, whereas satisfaction with received support would refer to patients' evaluations of specific behaviors recalled as acts of support (Schwarzer, Knoll, & Rieckmann, 2004). Another facet of support, called the need for support, deals with evaluations of the degree of need for mastering challenges with actual acts of help from others (Schwarzer, Knoll, & Rieckmann, 2004). Received support, need for support, and satisfaction with received support are conceptually related, as they refer to actual acts of support (Kaniasty & Norris, 1992). Theories of social support classify this construct depending on its function and distinguish emotional (e.g., empathy, understanding), informational (e.g., advice about making decisions), or instrumental (e.g., physical assistance) support (Haber et al., 2007). In general, social support deals with the function and quality of social relations (Schwarzer et al., 2004). In contrast, social integration (e.g., the size of the social network) refers to the structure and the number of social relations (Schwarzer et al., 2004). Other constructs, such as marital satisfaction are usually seen as the outcomes of perceived or received support. Although all these social concepts may relate to QOL, the underlying mechanisms would differ (Nausheenn, Gidron, Peveler & Moss-Morris, 2008). High levels of social support are associated with health behavior and appropriate health outcomes (Watson, Grossems & Russell, 2019). Social support is a network of family, friends, neighbors, and the community available to individuals with cancer when they need psychological, physical, and financial help (Kadambi, Soto-Perez-de-Celis, Garg, Loh, et al., 2020). Social support is directly associated with quality of life improvement and treatment adherence in patients with chronic diseases (Akbari et al., 2021).

In the model linking support to health proposed by Uchino (Uchino, 2004). Social support is assumed to promote QOL, affect, and morbidity through two

psychosocial mediating mechanisms: behavioral processes (e.g., fostering health-promoting behaviors, adherence) and psychological processes (e.g., stress appraisal) (Berkman, Glass, Brissette & Seeman, 2000). Those mechanisms affect immune and cardiovascular functions, which in turn influence disease progression and QOL. Research explaining morbidity, mortality, and QOL among cancer patients often concentrates on support from family and friends(Uchino, 2004). On the other hand, most recent studies dealing with lung cancer patients highlight the role of support from healthcare professionals (Thompson, Sola & Subirana, 2005). Trials evaluating nurse-delivered interventions aiming at attenuating distress or physical symptoms among lung cancer patients indicated that such interventions may be an effective tool in promoting. Patients assign high value to informational and emotional support from medical personnel, similar to the value of support from family and friends. Comprehensive analyses of the relationships between support and QOL among cancer patients should account for various support sources. Optimal matching hypotheses suggest that the strongest links between social support and the outcomes are observed if there is a match between the type of support, characteristics of the stressor encountered, and the health outcomes.

For instance, it can be assumed that different aspects of QOL may be associated with support from different sources (Boehmer, Luszczynska & Schwarzer, 2007). Among cancer patients, support from family and friends may be related in particular to emotional (or psychological) QOL, whereas support received from healthcare personnel may be particularly helpful in attenuating physical symptoms (Thompson, Sola & Subirana, 2005).

Adherence to treatment is crucial to improving outcomes in patients with cancer. Good social support is associated with better adherence, but the mechanism for this association has not been well-explored. Also, cancer patients have many psychological and social problems that can be improved by effective and efficient treatment. In achieving this goal, treatment adherence, personality traits, self-efficacy, and social support can play a vital role. On the other hand, due to very little research to identify factors related to adherence to cancer treatment and self-efficacy in Iran, the knowledge gap in this area of research was the main reason for carrying on the present study. Therefore, this study aimed to investigate the direct and indirect relationships between personality traits, adherence to treatment, and self-efficacy in patients with breast cancer, considering the mediating role of social support. See Figure 1.
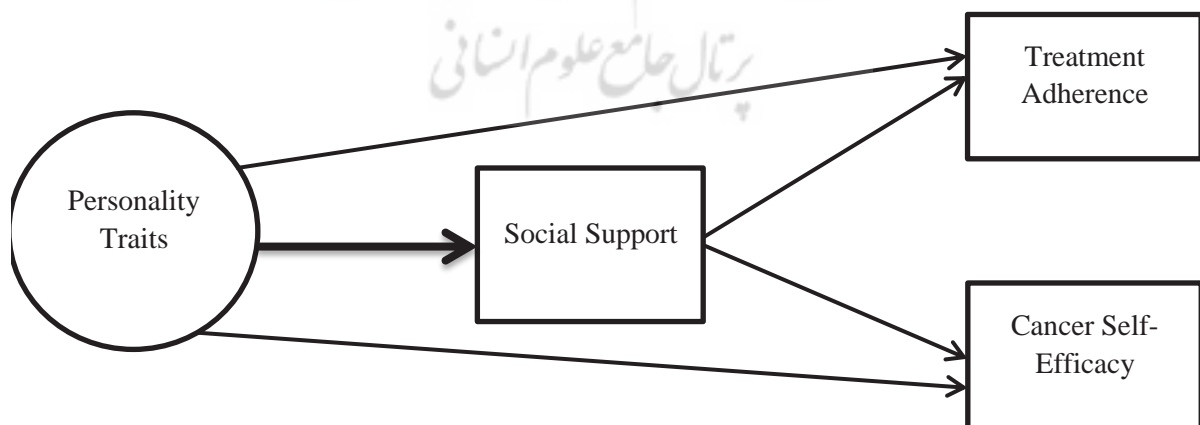
Figure 1. Hypothesized Model: The direct and indirect relationships between personality traits, dherence to treatment, and self-efficacy in patients with breast cancer, considering the mediating role of social support.

Method

The method of the present study was descriptive-correlational based on structural equation modeling. The research population included all women with breast cancer in Lorestan province who were referred to the oncology ward of Shahid Rahimi Hospital in Khorramabad for follow-up treatment from summer 2019 to spring 2020. From them, 300 participants were selected through convenience sampling. Inclusion criteria were women with breast cancer, the age range of 20-65 years, married, having no serious physical illness other than cancer, lacking major psychiatric disorders, the literacy of the minimum cycle, and being willing to respond to the questionnaire. A demographic information questionnaire, Cancer Behavior Scale, personality traits, and therapeutic outcomes of social support were used to collect data.

1.*NEO Five Features Inventory (NEO- FFI):* McCreery developed this 60-item questionnaire to measure five main personality features of neuroticism, extraversion, openness, agreement, and conscience, each of which has 12 specific items. The 60-item form of this questionnaire was used in the present study. Each factor of this questionnaire has 12 questions that are scored on a five-point Likert scale. The content validity of this questionnaire has been investigated through its correlation with two forms of the personal report and observer evaluation form, in which the maximum correlation of factors related to the extroversion dimension was 0.66, and the minimum was 0.45 in the adjustment factor. The reliability coefficients of this questionnaire were reported through Cronbach's alpha method for neuroticism, extraversion, openness, agreement, and conscience, 0.88, 0.80, 0.79, 0.76, and 0.83, respectively (Rastgar Faraj Zadeh & Mohammadian, 2019).

2. *The Self-Efficacy Appropriate Medicine Use Scale (SEAMS)*: The Self-Efficacy Appropriate Medicine Use Scale (SEAMS) was used to measure patients' treatment adherence. This questionnaire has 13 items and has been developed and standardized by Racer (2007). The validity of this scale has been reported as 0.4 by Racer (2007) using the criterion-related method and factor analysis. The external reliability of this tool was obtained at 0.57 by the test-retest correlation coefficient. The internal reliability of the instrument was reported at 0.89 by Cronbach's alpha, which is acceptable. The validity and reliability of this instrument were evaluated in Iran by Sancholi, Bagheri, and Ebrahimi (2017) on the elderly with chronic diseases, and its internal reliability was reported at 0.81 using Cronbach's alpha and 0.77 using the split-half method. The external reliability of the scale was also obtained by the test-retest method, and the correlation coefficient was 0.97.

3. *Cancer Behavior Inventory (CBI):* The 12-item form of the Cancer Behavior Scale was used to measure cancer-coping self-efficacy. This questionnaire has four subscales of independence, participation, stress management, and emotion management. This questionnaire is scored on a 9-point Likert scale. The validity of this questionnaire using the correlation method shows its positive relationship with quality of life and optimism and its negative relationship with depression and stress caused by the disease (P <0.01). The validity and reliability of this instrument were evaluated in Iran by Karamoozian, Kalantari Khandani, Bagheri, Dehghanifar, and Darekordi (2019) on patients with breast cancer, and its internal reliability was confirmed with a Cronbach's alpha coefficient value of 0.75 (ranging from 0.69 to 0.74 for the seven factors). The external reliability of the scale was also obtained by the internal consistency method, Cronbach's alpha has been reported at 0.88, which is acceptable (Merluzzi, Phillip, Heitzmann, Liu, et al., 2018).

4. *Social Support Therapeutic Outcome Questionnaire:* Social support was measured by the short

form of the Social Support Therapeutic Outcome Questionnaire. The questionnaire has 8 items scored on a 5-point Likert scale whose validity and psychometric properties have been evaluated on 3241 women with breast cancer. The results of the factor analysis reported by Moser et al. (2012) showed the structural difference between the two factors of instrumental support and emotional support in this questionnaire. The results of factor analysis show that the two subscales are separate. The results of construct validity showed the relationship between social support and marital status, having children, social isolation, and body mass index. Also, the correlation between the 8-items and 19-item versions of this questionnaire was reported as positive and significant (P <0.01). The validity and reliability of this instrument were evaluated in Iran by Maghsoodi and Salehinejad (2018) on patients with breast cancer, and its internal reliability was confirmed based on a Cronbach's alpha coefficient value of 0.74. The reliability reported by Moser et al. (2012) using Cronbach alpha correlation was 0.92, which is acceptable (Moser, Stuck, Silliman, Ganz, et al., 2012).

Procedure

After coordination with the officials of Lorestan University of Medical Sciences and performing the necessary procedures with the deputy and security part of the oncology ward of Shahid Rahimi Hospital in Khorramabad, data were collected using the questionnaires. Patients with breast cancer were selected by the convenience sampling method and in a suitable place in the clinic environment, the objectives of the research, observing the ethical standards, and completing questionnaires were stated for them. Among the most important inclusion criteria of the study were breast cancer, living in Lorestan province, not having an acute mental disorder, and consent to participate in the study. Also, the lack of any conditions for inclusion in the study, lack of accurate and complete answers to all questions of the questionnaire, and cancellation of

cooperation at any stage of the study were the most important exclusion criteria of the study.

Patients entered the study with knowledge about the research objectives and satisfaction to participate in the study and then completed the questionnaires individually in the same place and alone away from family and others in a safe and quiet environment. In this study, all participants were assured that all the ethical principles in the research, including confidentiality, non-disclosure of names, as well as having the authority to participate and cancel the research at any stage of the study.

Data were collected over one year from the beginning of summer 2019 to the end of spring 2020. In addition to answering demographic questions, subjects completed personality traits, drug self-efficacy, cancer behavior, and social support questionnaires. After collecting the data, with strict supervision over the completion of the questionnaires, distorted cases and statistical outliers were excluded from the data after the initial evaluation. To compensate for the loss of subjects, seven more people participated in the study, and finally, 300 completed questionnaires were included in the data analysis. Structural equation modeling using AMOS software was used to analyze the data and investigate the causal relationships between the variables.

Results

The demographic data of the participants in the study of the complete face square is presented in Table 1.

Table 2 provides a statistical description of the studied variables. The reported degree for the skewness and kurtosis indices of the scores indicates the normality of distribution and the observation of the normality assumption. The reported correlation for the relationship between variables also indicates a direct and significant

Table 1: Sample characteristics (N = 300)

		Frequency	Percentage
Age group	Less than 35 years	4	1.3
	35-44	69	23.0
	45-50	52	17.3
	51-55	74	24.7
	56-65	53	17.7
	More than 65	48	16.0
Education	Elementary	8	2.7
	Middle school	51	17.0
	High school	74	24.7
	Bachelor	126	42.0
	Master and higher	41	13.7
Diagnosing duration	Under one year	73	24,3
	From one to two years	75	25,0
	Two to five years	91	30,3
	More than five years	61	20,3

Table 2: Mean, standard deviation (SD), and correlation between personality, treatment adherence, self-efficacy, and social support (N = 300).

	Mean	SD	kurtosis	Skewness
Neurosis	30/12	5/89	0/082	-0/226
Extraversion	19/97	5/23	0/038	-0/945
openness	22/84	5/35	0/809	0/149
Agreement	23/85	4/99	0/055	-0/421
Conscience	21/87	4/67	-0/118	-0/386
Social support	24.12	5.99	0/341	-0/261
Treatment adherence	21/04	4/78	0/325	0/194
Self-efficacy	68.23	17.40	0/613	0/493

relationship between neurotic personality traits, agreement, and conscience with social support and cancer self-efficacy and also a direct and significant relationship between social support and cancer self-efficacy (p <0.01).

In general, it can be concluded that the structural model

Table 3: Correlation matrix

	1	2	3	4	5	6	7	8
Neurosis	1							
Extraversion	-.352**	1						
openness	-.074	.243**	1					
Agreement	-.392**	.293**	.141*	1				
Conscience	-.414**	.363**	.201**	.430**	1			
Social support	-.266**	-.116*	-.069	-.260**	-.438**	1		
Treatment adherence	-.153**	-.139**	-.053	-.175**	-.192**	.556**	1	
Self-efficacy	-.241**	-.019	-.055	.188**	.379**	.671**	.509**	1

**P<0.01 , *P<0.05
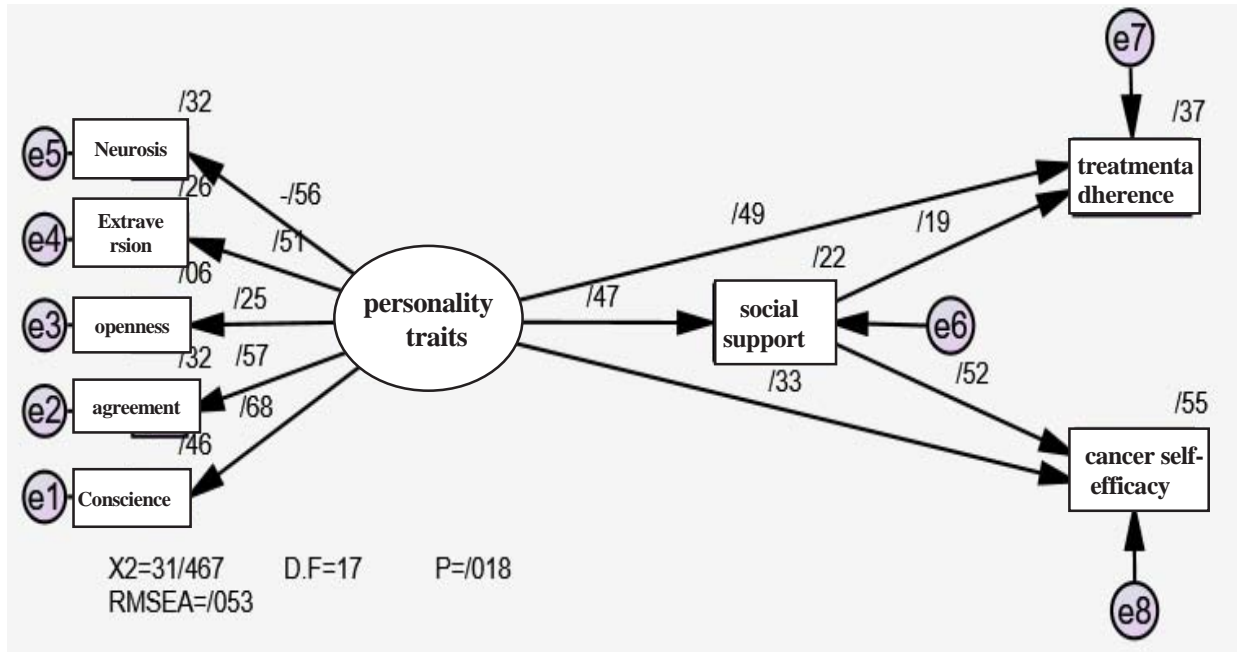
Figure 1: Structural pattern of personality traits mediated by social support on adherence to cancer treatment and self-efficacy.

Table 4: Model fit indices

	Modified fit		Adaptive fit		Absolute fit	
Index	CMIN/df	RMSEA	NFI	CFI	GFI	AGFI
Acceptable value	>5	>10	<0.90	<0.90	<0.90	<0.80
Obtained value	1.85	0.053	0.95	0.97	0.97	0.94

of personality traits mediated by social support on treatment adherence and cancer coping self-efficacy in cancer patients has a good fit, and the research hypothesis is confirmed.

From the Chi-square Modified Fit Index (CMIN=1.85), the root means of squared estimation error (RMSEA) was reported as 0.053, which according to the acceptable value of each indicator presented in Table

4, confirms the good fit of the model. From adaptive fit indices, the Modified Fit Index (NFI= 0.95) and Coping Fit Index (CFI=0.97) indicate a very good fit for the model. Finally, from the absolute fit indices, the good fit index (GFI=0.97) and the adjusted good fit index (AGFI= 0.94) indicate a very good fit of the model with the experimental data.

The overall effect of the five personality traits

Table 5: Direct and Indirect Relationships

	Effect size	Bootstrap scope		Sig. level	
		Low level	High level		
Total effect	Treatment adherence	0.58	0.48	0.66	.001
	Self-efficacy	0.59	0.50	0.67	0.01
Direct effect	Treatment adherence	0.49	0.37	0.60	0.01
	Self-efficacy	0.33	0.24	0.43	0.006
indirect effect	Treatment adherence	0.09	0.04	0.14	0.01
	Self-efficacy	0.25	0.19	0.30	0.01

on treatment adherence and cancer-coping self-efficacy in the study group was significant (p <0.01). Based on the obtained experimental data, the size of the direct effect of personality traits on treatment adherence is 0.37, and on cancer coping self-efficacy is 0.24 (p <0.01). Also, the indirect effect of personality traits mediated by social support on treatment adherence was 0.09, and on cancer coping self-efficacy was 0.25, which is statistically significant (p <0.01).

Discussion

The present study examined the structural modeling of personality traits in cancer patients on treatment adherence and cancer coping self-efficacy mediated by social support. The results showed a significant relationship between personality traits, treatment adherence, cancer self-efficacy, and social support. Also, personality traits have a significant positive effect on adherence to treatment and cancer-coping self-efficacy. On the other hand, personality traits through social support showed an indirect and significant effect on treatment adherence and self-efficacy in coping with cancer, which was in line with research by Shen et al. (2020), Quast et al. (2020), Toledo et al. (2020), Kheirabadi et al. (2020), Pazokian et al. (2020), and Bayat Asghari et al. (2015).

Personality is an important determinant of health outcomes and has a direct impact on health behaviors, quality of life, and the outcomes of treatment measures. Numerous studies have shown the effect of personality traits on health-oriented behaviors. The influence and action of personality traits on each other is also a significant issue. High levels of agreement and neurosis, along with low levels of conscience, are associated with smoking. Neuroticism is also associated with more visits to the doctor (Emilson et al., 2020). Neurotic people have feelings of guilt, low self-esteem, isolation,

anxiety, and shyness. They are prone to irrational beliefs and cannot control their anxiety and stress properly. Some researchers believe that high levels of fear and stress reduce treatment adherence in those who report higher levels of neurosis. Such people are more likely to experience stressful events and have more depressive attacks (Kheirabadi et al., 2020). High levels of neurosis are directly related to behaviors such as smoking, alcohol consumption, addiction, and irregular sleep. People who score high on neurosis have more negative emotions and engage in stressful experiences. An overview of research on the relationship between neurosis and health-oriented behavior shows the negative relationship between these two factors. Neurosis also increases the risk of health problems (Gale, Cukic, Cukic, Batty, McIntosh, et al., 2017). Extroverts are energetic and optimistic. The desire to cooperate with others and the desire to work and encourage as well as interest in crowded places are other characteristics of these people. The results of the relationship between extraversion and adherence to treatment have been heterogeneous in research. The relationship between extraversion and treatment adherence in the present study was negative. The results of the research indicate high alcohol consumption, smoking, and high-risk behaviors in extroverts, which may explain the negative relationship between this feature and adherence to treatment (Kheirabadi et al., 2020).

In recent years, there has been a growing interest in examining the remaining three dimensions of personality with health-oriented behaviors, among which the emphasis on conscience has been more noticeable. People with higher scores on this trait are more self-disciplined and organized, which is associated with health-promoting behaviors. These people have more physical and mental health, are at lower risk for cognitive impairment, and ultimately have lower mortality (Joyner, Rhodes

& Loprinzi, 2018). Conscience has been described as the impulse control prescribed in society that facilitates goal-oriented and task-oriented behavior. This tendency is one of the main reasons for the careful observance of medical instructions by conscientious advocates. Conscience is negatively associated with high-risk health behaviors such as excessive alcohol consumption, smoking, and drug abuse, and in turn is positively associated with healthy and preventive behaviors, such as regular visits to the doctor and exercise. Since conscience is associated with improved survival, it is largely able to explain why treatment adherence is higher in these individuals (Ko, Moon, Koh, Pae & Min, 2020).

Moreover, higher levels of conscience are associated with a sense of competence and confidence, and these categories may explain part of higher mental health in these individuals. People who score higher on this trait have more physical activity. This trait has a negative relationship with alcohol and smoking, and also adherence to a proper diet and adequate sleep in these people is a better situation than those who have a lower level of conscience. In general, it can be said that people with a conscience are more committed to health-oriented and preventive behaviors (Joyner et al., 2018). Research on the relationship between health outcomes and openness is relatively less than the relationship between experience and agreement. However, open-mindedness may facilitate adaptation to new situations that promote cognitive, emotional, and physical health and decreases mortality. On the other hand, the results of the research have shown that openness to experience causes a person to be more prone to high-risk behaviors (Joyner et al., 2018). The agreement essentially describes the interpersonal tendencies towards altruism and the desire to cooperate with others. The connection of this characteristic to physical health is relatively low, although numerous studies have shown a higher relationship with mental health. Also, the quantitative results of the research indicate that high agreement, along with high extroversion, is associated with positive behaviors of health-oriented health and regular physical exercises (Emilson et al., 2020).

This research, like any other study, has some limitations. The first limitation of the present study is the dimension of the place and time of the study, which limits the generalizability of the results to other contexts and populations. The research design is correlational with a predictive type that does not show causality. The data of this research was self-report which may increase the general variance and exaggerate the exact relationships between the variables. It may also affect the misunderstanding of the questions and the lack of attention. To compensate for the existing limitations, it is suggested to carry out similar research in a longitudinal or experimental method to demonstrate causal relationships. Repeating this study in groups with other cultural and religious and linguistic diseases and characteristics is also recommended. Besides, we suggest that the mediating role of cancer coping self-efficacy in treatment be examined in the form of structural equation modeling.

Conclusion

The external and intermediary variables of the proposed model showed a significant contribution to the prediction of the treatment adherence and cancer-coping self-efficacy of patients with breast cancer. Although patients at the onset of breast cancer generally have an acceptable adherence to treatment, this trend has declined over time, and this non-adherence causes the recurrence of the disease. Personal characteristics are the known variables in clinical interventions, but choosing

social support as the intermediary variable between these variables and adherence to treatment confirms the theoretical and practical value of this variable. Creating a platform for the formation and growth of the social support network within the therapeutic measures and the preparation and implementation of specialized interventions to increase social support will have a significant contribution to increasing the treatment and self-efficacy of cancer in patients.

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References

Akbari, R., Gholami Raad, Z., Fateme, S., Weisi Poor, F., & Saeid, S. (2021). The Role of Perceived Social Support, Family Resiliency and Religious Orientation in predicting Emotional Cognitive Regulation among student. *Islamic Studies in Health*, 5(3), 35-44.

asadi medikhanmahalle, N., zebardast, A., rezaei, S. (2021). The Explanation of Regrets in Frist Degree Survivors of Cancer Patients with Early Death. *QUARTERLY JOURNAL OF HEALTH PSYCHOLOGY*, 10(39), 7-28.

Aziz, H., Hatah, E., Makmor-Bakry, M., Islahudin, F., Ahmad Hamdi, N., & Mok Pok Wan, I. (2018). Qualitative exploration of the modifiable factors for medication adherence among subsidised and self-paying patients in Malaysia. *BMC health services research*, *18*(1), 605-613.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York, NY: Freeman.

bayat asghari, A., gharaee, B., heydari, H., javaheri, J., mousanejad, S., aramon, A. (2015). The relationship between personality dimensions' adherence in patients with type 2 diabetes. QUARTERLY JOURNAL OF HEALTH PSYCHOLOGY, 4(16), 59-68.

Berkman, L. F. (1982). Glass T. Brissette I. & Seeman T. E (2000). From social integration to health: Durkheim in the new millennium. Social Science & Medicine, 51,

843-857.

Boehmer, S., Luszczynska, A., & Schwarzer, R. (2007). Coping and quality of life after tumor surgery: Personal and social resources promote different domains of quality of life. Anxiety, Stress and Coping, 20(1), 61–75.

Boehmer, S., Luszczynska, A., & Schwarzer, R. (2007). Coping and quality of life after tumor surgery: Personal and social resources promote different domains of quality of life. Anxiety, Stress and Coping, 20(1), 61–75.

Boehmer, S., Luszczynska, A., & Schwarzer, R. (2007). Coping and quality of life after tumor surgery: Personal and social resources promote different domains of quality of life. Anxiety, Stress and Coping, 20(1), 61–75.

Burkhart, P. V., & Sabaté, E. (2003). Adherence to long-term therapies: evidence for action. Journal of nursing scholarship: an official publication of Sigma Theta Tau International Honor Society of Nursing, 35(3), 207-215.

Cunningham, A. J., Lockwood, G. A., & Cunningham, J. A. (1991). A relationship between perceived self-efficacy and quality of life in cancer patients. Patient Education and Counseling, 17(1), 71–78.

Den Oudsten, B. L., Van Heck, G. L., Van der Steeg, A. F., Roukema, J. A., & De Vries, J. (2009). Predictors of depressive symptoms 12 months after surgical treatment of early☐stage breast cancer. Psycho☐Oncology: Journal of the Psychological, Social and Behavioral Dimensions of Cancer, 18(11), 1230-1237.

Emilsson, M., Gustafsson, P., Öhnström, G., & Marteinsdottir, I. (2020). Impact of personality on adherence to and beliefs about ADHD medication, and perceptions of ADHD in adolescents. BMC psychiatry, 20(1), 139-149.

Farajzadegan, Z., Tavakoli Moghadam, N., Naderolasli, M., Aahmadloo, H., Boroumand, M. A., & Motamed, N. (2021). Correlation between sense of coherence (SOC) and quality of life (QOL) in cancer patients; A systematic review. *Iranian Journal of Health Psychology*, 4(2), 77-86.

Gale, C. R., Čukić, I., Batty, G. D., McIntosh, A. M., Weiss, A., & Deary, I. J. (2017). When Is Higher Neuroticism Protective Against Death? Findings from UK Biobank. Psychological science, 28(9), 1345–1357.

Giulietti, M. V., Vespa, A., Ottaviani, M., Berardi, R., Balercia, G., Arnaldi, G., Gattafoni, P., Fabbietti, P., Rosa, M. D., & Spatuzzi, R. (2019). Personality (at

Intrapsychic and Interpersonal Level) Associated with Quality of Life in Patients with Cancer (Lung and Colon). *Cancer control: journal of the Moffitt Cancer Center*, *26*(1), 1073274819880560.

Haber, M. G., Cohen, J. L., Lucas, T., & Baltes, B. B. (2007). The relationship between self-reported received and perceived social support: A meta-analytic review. *American journal of community psychology*, *39*(1), 133-144.

Hirai, K., Suzuki, Y., Tsuneto, S., Ikenaga, M., Hosaka, T., & Kashiwagi, T. (2002). A structural model of the relationships among self-efficacy, psychological adjustment, and physical condition in Japanese advanced cancer patients. *Psycho-Oncology,* 11(3), 221–229.

Hochhausen, N., Altmaier, E. A., McQuellon, R., Davies, S. M., Papadopoulos, E., Carter, S., et al. (2007). Social support, optimism, and self-efficacy predict physical and emotional well-being after bone marrow transplantation. *Journal of Psychosocial Oncology,* 25(1), 87–101.

İzci, F., Erdogan, Z. İ., İlgün, A. S., Çelebi, E., Alço, G., Kocaman, N., ... & Özmen, V. (2018). Impact of personality traits, anxiety, depression and hopelessness levels on quality of life in the patients with breast cancer. *European journal of breast health,* 14(2), 105-111.

Jaam, M., Hadi, M. A., Kheir, N., Mohamed Ibrahim, M. I., Diab, M. I., Al-Abdulla, S. A., & Awaisu, A. (2018). A qualitative exploration of barriers to medication adherence among patients with uncontrolled diabetes in Qatar: integrating perspectives of patients and health care providers. *Patient preference and adherence, 12,* 2205–2216.

Joyner, C., Rhodes, R. E., & Loprinzi, P. D. (2018). The Prospective Association Between the Five Factor Personality Model with Health Behaviors and Health Behavior Clusters. *Europe's journal of psychology*, *14*(4), 880–896

Kadambi, S., Soto-Perez-de-Celis, E., Garg, T., Loh, K. P., Krok-Schoen, J. L., Battisti, N. M. L., ... & Hsu, T. (2020). Social support for older adults with cancer: Young International Society of Geriatric Oncology review paper. *Journal of Geriatric Oncology,* 11(2), 217-224.

Kaniasty, K., & Norris, F. H. (1992). Social support and victims of crime: Matching event, support, and outcome. *American journal of community psychology,* 20(2), 211-241.

Karamoozian, M., Kalantari Khandani, B., Bagheri, M., Dehghanifar, F., & Darekordi, A. (2019). Assessing Self-efficacy for Coping with Cancer: Psychometric Analysis of the Cancer Behavior Inventory (CBI). *Iranian Quarterly Journal of Breast Disease,* 12(4), 8-20.

Ko, K. M., Moon, S. J., Koh, J. H., Pae, C. U., & Min, J. K. (2020). Contribution of Personality Traits, Psychological Factors, and Health-Related Quality of Life to Medication Adherence in Patients with Rheumatoid Arthritis. *Yonsei medical journal*, *61*(5), 406–415.

Maghsoodi, S., & Salehinejad, Z. (2018). The relationship between social support and quality of life among cancer patients in Kerman. *Quarterly Journal of Social Work,* 7(2), 15-22.

Merluzzi, T. V., Philip, E. J., Heitzmann Ruhf, C. A., Liu, H., Yang, M., & Conley, C. C. (2018). Self-efficacy for coping with cancer: Revision of the Cancer Behavior Inventory (Version 3.0). *Psychological Assessment,* 30(4), 486-499.

Minami, Y., Hosokawa, T., Nakaya, N., Sugawara, Y., Nishino, Y., Kakugawa, Y., ... & Tsuji, I. (2015). Personality and breast cancer risk and survival: The Miyagi cohort study. Breast cancer research and treatment, 150(3), 675-684.

Montgomery, M., & McCrone, S. H. (2010). Psychological distress associated with the diagnostic phase for suspected breast cancer: systematic review. *Journal of advanced nursing,* 66(11), 2372-2390.

Moser, A., Stuck, A. E., Silliman, R. A., Ganz, P. A., & Clough-Gorr, K. M. (2012). The eight-item modified Medical Outcomes Study Social Support Survey: psychometric evaluation showed excellent performance. *Journal of clinical epidemiology*, 65(10), 1107-1116.

Mosher, C. E., Johnson, C., Dickler, M., Norton, L., Massie, M. J., & DuHamel, K. (2013). Living with metastatic breast cancer: a qualitative analysis of physical, psychological, and social sequelae. *The breast journal,* 19(3), 285-292.

Nausheen, B., Gidron, Y., Peveler, R., & Moss-Morris, R. (2009). Social support and cancer progression: a systematic review. *Journal of psychosomatic research,* 67(5), 403-415.

Nielsen, M. B., Christensen, J. O., Finne, L. B., & Knardahl,

S. (2020). Workplace bullying, mental distress, and sickness absence: the protective role of social support. *International archives of occupational and environmental health*, *93*(1), 43-53.

Northouse, L. L., Mood, D., Kershaw, T., Schafenacker, A., Mellon, S., Walker, J., et al. (2002). Quality of life of women with recurrent breast cancer and their family members. *Journal of Clinical Oncology,* 20(19), 4050–4064.

Parker, S., Prince, A., Thomas, L., Song, H., Milosevic, D., Harris, M. F., & IMPACT Study Group (2018). Electronic, mobile and telehealth tools for vulnerable patients with chronic disease: a systematic review and realist synthesis. *BMJ open*, *8*(8), e019192

Pazokian, M., Beigmoradi, S., Movafegh, F., & Akbarzadeh, S. (2020). Correlation between Social Support and Hope with Medication Adherence in Type II Diabetic Patients. *Archives of Pharmacy Practice*, 11(1), 130-135.

Quast, L. F., Gutiérrez-Colina, A. M., Cushman, G. K., Rea, K. E., Eaton, C. K., Lee, J. L., George, R. P., & Blount, R. L. (2020). Adherence Barriers for Adolescent and Young Adult Transplant Recipients: Relations to Personality. *Journal of pediatric psychology*, *45*(5), 540–549.

Rastgar Faraj Zadeh, L., & Mohammadian, A. (2019). The Role of the Mediator of Attachment Styles in the Relationship between Personality Traits and Fetishism. *The Neuroscience Journal of Shefaye Khatam*, 7(2), 44-55.

Safren, S. A., Blashill, A. J., Lee, J. S., O'Cleirigh, C., Tomassili, J., Biello, K. B., Mimiaga, M. J., & Mayer, K. H. (2018). Condom-use self-efficacy as a mediator between syndemics and condomless sex in men who have sex with men (MSM). *Health psychology: official journal of the Division of Health Psychology, American Psychological Association*, *37*(9), 820–827.

Sanchooli.A, Bagheri, H & Ebrahimi,H (2018). Validation of the Persian Version of Self-Efficacy for Appropriate Medication Use Scale (SEAMS). Knowledge and Health in Basic Medical Sciences, 12(4), Page:69-75

Schwarzer R, Knoll N, Rieckmann N. (2004). Socialsupport. InHealth Psychology, Kaptein A,Weinman J (ed.), Blackwell: Malden, UK,;158–181.

Shen, A., Qiang, W., Wang, Y., & Chen, Y. (2020). Quality of life among breast cancer survivors with triple negative breast cancer--role of hope, self-efficacy and social support. *European journal of oncology nursing: the official journal of European Oncology Nursing Society*, *46*, 101771. Advance online publication. 16; 46:101771

Tamura, S., Suzuki, K., Ito, Y., & Fukawa, A. (2021). Factors related to the resilience and mental health of adult cancer patients: a systematic review. *Supportive Care in Cancer*, *29*(7), 3471-3486.

Thompson, E., Solà, I., & Subirana, M. (2005). Non-invasive interventions for improving well-being and quality of life in patients with lung cancer—a systematic review of the evidence. Lung Cancer, 50(2), 163-176.

Thorneloe, R. J., Griffiths, C. E., Emsley, R., Ashcroft, D. M., Cordingley, L., Barker, J., ... & Hussain, S. (2018). Intentional and unintentional medication non-adherence in psoriasis: the role of patients' medication beliefs and habit strength. *Journal of investigative dermatology*, *138*(4), 785-794.

Toledo, G., Ochoa, C. Y., & Farias, A. J. (2020). Exploring the role of social support and adjuvant endocrine therapy use among breast cancer survivors. *Supportive care in cancer: official journal of the Multinational Association of Supportive Care in Cancer*, *28*(1), 271–278.

Uchino, B. N. (2008). Social support and physical health. In Social Support and Physical Health. Yale university press. 1-247

Viswanathan, M., Golin, C. E., Jones, C. D., Ashok, M., Blalock, S. J., Wines, R. C., ... & Lohr, K. N. (2012). Interventions to improve adherence to self-administered medications for chronic diseases in the United States: a systematic review. *Annals of internal medicine,* 157(11), 785-795.

Wang, S. H., He, G. P., Jiang, P. L., Tang, L. L., Feng, X. M., Zeng, C., & Wang, G. F. (2013). Relationship between cancer□related fatigue and personality in patients with breast cancer after chemotherapy. Psycho□Oncology, 22(10), 2386-2390.

Watson, R. J., Grossman, A. H., & Russell, S. T. (2019). Sources of social support and mental health among LGB youth. *Youth & Society*, *51*(1), 30-48.

Yousuf, S. A., Al Amoudi, S. M., Nicolas, W., Banjar, H. E., & Salem, S. M. (2012). Do Saudi nurses in primary health care centres have breast cancer knowledge to

promote breast cancer awareness? *Asian Pacific Journal of Cancer Prevention,* 13(9), 4459-4464.

Zhang, X., Wang, M. C., He, L., Jie, L., & Deng, J. (2019). The development and psychometric evaluation of the Chinese Big Five Personality Inventory-15. *PloS one*, *14*(8), e0221621.