The Effect of Personality, Social Support, and Life Events on Overall Survival in Breast Cancer

Somayeh Akbari [1], Fariborz Dortaj [1], Bayramali Ranjgar [2] and Mohammad Esmaeil Akbari [3, *]

[1]Department of Psycology, Sciences and Research Branch, Islamic Azad University, Tehran
[2]Department of Psycology, Rouedehen Islamic Azad University, Roudehen, Iran
[3]Cancer Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

*Corresponding author: Cancer Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Email: drakbari.drakbari@gmail.com

Abstract

Background: Breast cancer is the most malignant disease among women worldwide.

Objectives: The main purpose of this study was to investigate psychological factors on progress of cancer.

Methods: A total of 150 patients with breast cancer, who had attended the Cancer Research Center of Shahid Beheshti University of Medical Sciences from 2012 to 2014, were selected and assessed by patient clinical demographic questionnaire, NEO personality inventory (NEO PI), multidimensional scale of perceived social support (MSPSS), and stressful life events scale.

Results: 32.9% of patients has been diagnosed with stage 1, 39.9% with stage 2, 26.6% with stage 3, and 0.7% with stage 4 cancer. Among the personality traits, only conscientiousness has a significant correlation with the amount of lymph nodes. The effect size is 4.9%. In evaluating recurrence control with social support and personality traits, only conscientiousness and neuroticism have a significant correlation with lymph nodes. Correlation between the variables was not significant with the control of the effects of adverse events.

Conclusions: Psychosocial elements are among the factors affecting the treatment of patients with breast cancer. In this regard, stressful life events, especially the incidents associated with one's spouse and family, and the social support indicators influence the treatment and recovery of the patients.

Keywords: Cancer, Personality, Social Support, Life Events, Overall Survival

1. Background

Breast cancer is among the most prevalent cancers among women in the world, and given the good survival rate of these patients, frequent changes are observed in the psychological factors affecting them.

Patients with cancer often recognize to personality type C (1), which is characterized by the denial and emotional suppression, especially anger, non-submissiveness, unassertiveness, and defensiveness, so that express less positive emotions (2).

Social support is another factor affecting the quality of life of the patients, and it is of importance due to various reasons such as responding to the stress caused in these people (3).

The protective effects of social support on patients with cancer have been proven (4). Social support increases patients' adaptation to the disease and improves their quality of life, survival duration, and response to various treatments (5, 6).

Guy (7) is perhaps the first physician and surgeon, who introduced the effect of traumatic incidents on cancer. This role was further indicated in the younger patients in the subsequent studies.

In Iran, few studies have been carried out on the overall survival and disease-free survival of patients suffering from breast cancer and psychological factors.

2. Objectives

The present research was an attempt to study the relationship of "personality components", "social support", and "traumatic incidents" (stressful live event) with the overall survival and disease-free survival of patients with breast cancer.

3. Methods

A total of 150 patients with breast cancer, who had voluntarily attended the Cancer Research Center from

September 2012 to November 2014, participated in this study. The sample size was determined based on the previous studies. This study was approved by the Ethic Committee of Cancer Research Center, Shahid Beheshti University of Medical Sciences.

This group included women with breast cancer aged between 26 and 70 years. These components were introduced as the primary indicators based on indicators determining the overall survival and disease-free survival of patients such as the primary tumor size or the axillary lymph nodes condition, and the clinical stage of the disease. Afterwards, the patient information was collected, using the following 4 questionnaires.

3.1. Patient Clinical Demographic Questionnaire

This 34-item scale is approved by the Cancer Research Center for assessing the patients' demographic status and clinical indicators, including the tumor size and axillary lymph nodes condition, as well as the biological and pathological indicators of the disease.

3.2. NEO Personality Inventory (NEO PI)

It was developed in 1985 by McCrae and Costa to measure 5 major personality factors and 6 facets per factor, assessing 30 traits (8). Accordingly, this questionnaire, which offers a comprehensive personality assessment, is available in two forms. The "S" version is designed for self-reports and consists of 240 five-scale questions rated from "completely agree" to "completely disagree", which is rated by the subjects and suitable for men and women of all ages. The other version is the "R" or revised version, which is rated by the observer. This form consists of the same 240 questions, except that the questions are written in the third person. The "R" form can be either separately used for personality assessment or as a supplement to the self-report form "S" or its validity (9).

3.3. Multidimensional Scale of Perceived Social Support (MSPSS)

This scale was developed by Zimet et al. to measure the perceived social support from family, friends, and the important people of life (10). This scale consists of 3 subscales and 12 statements, with each statement being rated based on the 7-point scale from "completely disagree" (= 1) to "completely agree" (= 7).

3.4. Stressful Life Events Scale

The evaluation of life events of the subjects were based on the following:

(1) The negative, bad, and traumatic major incidents based on Holmes and Rahe's scale

(2) Fifty stressful events, which were the adjusted events derived from Holmes and Rahe (11).

Then, using expert advice, these issues were classified into thirteen categories that were used in our research, including:

1- Divorce and abandonment
2- Spouse's death
3- Death of a beloved one (siblings, etc.)
4- Severe illness of a beloved one
5- Personal severe illness
6- Serious marital problems
7- Serious problems with children
8- Serious problem with others
9- Serious professional problems
10- Serious economic problems
11- Legal and judicial problems
12- We know there is problem, but it is unclear
13- There is no problem

The data were analyzed by SPSS 21 (SPSS Inc., Chicago, IL). The nominal data were described, using proper tables and diagrams, while the numerical data were described, using the central tendency and dispersion indices (mean and standard deviation). The χ^2 test was performed to compare the nominal variables, while the t-student and analysis of variance (ANOVA) tests were used to group the mean scores of the groups. Regression analyses were also performed to analyze the role of each variable in the overall survival and cancer-free survival rates of the patients.

4. Results

32.9% of patients had been diagnosed with stage 1, 39.9% with stage 2, 26.6% with stage 3, and 0.7% with stage 4 cancer.

69.3% of the patients had higher education than the diploma, and 3.5% were illiterate. Table 1 shows that most of the patients had experienced a severe illness of a beloved one (22.3%), spouse's death (21.5%), and divorce and abandonment (19%).

Table 2 shows that the mean and standard deviation of patients was 65.55 and 16.915 in social support, 30.37 and 5.705 in neuroticism, 17.01 and 5.717 in extraversion, 27.29 and 4.221 in openness, 20.86 and 4.558 in agreeableness, and 20.61 and 5.063 in conscientiousness, respectively.

Table 3 shows that with increasing disease stage, the median survival months are reduced.

Table 4 indicates the role of psychological variables in the model. Among the psychological variables, only openness is a significant predictor of overall patient survival compared to new experiences.

Since the beta coefficient is negative, it can be concluded that an increase in the rate of openness can play a

Table 1. Frequency Distribution of Adverse Events in Affected Women

Variable	Frequency	Percentage
Divorce and abandonment	26	18.2
Spouse's death	29	2.3
Death of a beloved one	20	14
Severe illness of a beloved one	31	21.7
Personal severe illness	2	1.4
Serious marital problems	4	2.8
Serious problems with children	0	0
Serious problem with others	4	2.8
Serious professional problems	2	1.4
Serious economic problems	2	1.4
Legal and judicial problems	2	1.4
We know there is problem, but it is unclear	8	5.6
There is no problem	13	5.6
Total	143	100

Table 2. Descriptive Indices of Social Support and Personality Traits in 143 Patients

Variable	Minimum	Maximum	Mean $\pm$ SD
Social support	18	19	65.55 ± 16.915
Neuroticism	15	42	30.37 ± 5.705
Extraversion	18	36	17.01 ± 5.717
Openness	18	46	27.29 ± 4.221
Agreeableness	13	42	20.86 ± 4.558
Conscientiousness	-	47	20.61 ± 5.063

role (albeit slight) in increasing the survival time (among the variables in the openness equation, the degree of freedom of freedom was different and significant to other variables).

Table 5 shows the correlation of zero (normal) rank among the variables. Among the personality traits, only conscientiousness has a significant correlation with the amount of lymph nodes. The effect size is 4.9%. (Much conscientiousness is not good, although the amount of correlation is negligible practically).

In evaluating recurrence control with social support and personality traits, only conscientiousness and neuroticism have a significant correlation with lymph nodes.

Correlation between the variables was not significant with the control of the effects of adverse events.

5. Discussion

According to the research hypotheses, social support and personality traits are involved in the overall survival of patients with breast cancer. In addition, among the psychological variables, only openness to experience is a significant predictor of overall survival of these patients. Given the negative beta coefficient, an increase in openness is expected to contribute (even slightly) to the decreased survival duration. On other hand, clinical stage effect of cancer, conscientiousness was the only trait, showing a significant correlation with the number of lymph nodes. In addition, only consciousness and neuroticism showed a significant correlation with the number of lymph nodes by controlling the effect of relapse. Neuroticism and conscientiousness showed a negative and positive correlation with the number of lymph nodes, respectively. In the hypothesis about controlling the effect of traumatic incidents, conscientiousness and neuroticism were the only traits, showing a positive significant relationship with the number of lymph nodes. Finally, in the hypothesis about controlling the survival effect, social support as a predictor of the tumor size and the lymph nodes number along with conscientiousness as a predictor of the lymph node numbers have the highest effects compared to the other variables.

In line with the findings of this study, the results of various studies have unveiled the relationship of traits with different types of cancer, especially breast cancer. Personal differences such as personality substantially contribute to the regulation of the relationship of environmental events (stressors) with the immune system and progress of chronic diseases such as cancer (12). Eysenck argues that some individuals are prone to cancer due to certain traits, which also shorten the lives of patients with cancer. As proposed by Vahdaninia and Montazeri in their study in 2011, personality, psychosomatic, and psychological factors stir behaviors that affect the survival of patients with cancer by directly and indirectly affecting the immune system. Baider et al. also believed that adaptation and confrontation with chronic diseases such as cancer occur more rapidly in patients with facilitator traits such as flexibility (13). The study conducted by Reynolds et al. indicated that there is a relationship between the expression of emotions and improved recovery in patients with cancer (14).

To explain the above findings, it could be stated that as people possessing the openness trait show higher levels of flexibility to new experiences, they accept the positive and negative experiences more properly and experience the positive and negative emotions more deeply. Hence, they show more flexibility to cancer as a new unconventional experience and experience deeper emotions. This trait, therefore, helps fight cancer and reduce its term.

Given the positive relationship of conscientiousness with the number of lymph nodes with and without con-

Table 3. Median and Overall Survival Rates in the Patients

Stage	Estimate	Standard Error	Mean (95% CI)		Estimate	Standard Error	Median (95% CI)	
			Lower Bound	Upper Bound			Lower Bound	Upper Bound
Stage 1	141.924	36.184	71.002	212.845	107.167	31.466	45.494	168.839
Stage 2	153.690	29.028	96.795	210.585	100.583	37.539	27.006	174.161
Stage 3	138.275	30.051	79.375	197.174	94.167	12.862	68.956	119.377
Total	146.222	17.994	110.953	181.491	105.167	11.074	83.462	126.871

Abbreviation: CI, confidence interval.

Table 4. Variables in Equation

	B	Standard Error	Parent	Degree of Freedom	Degree of Freedom	Exp (B)	95% CI for Exp (B)	
							High	Low
Social support	0.004	0.011	0.154	1	0.695	1.004	0.984	1.025
Neuroticism	-0.035	0.037	0.916	1	0.339	0.965	0.898	1.038
Extraversion	0.036	0.036	1.022	1	0.312	1.037	0.967	1.112
Openness	-0.082	0.039	4.432	1	0.035	0.921	0.854	0.994
Agreeableness	0.017	0.047	0.127	1	0.722	1.017	0.928	1.114
Conscientiousness	-0.036	0.048	0.590	1	0.442	0.964	0.878	1.058

Table 5. Normal Correlation of Social Support Variables and the Size and Characteristic of the Tumors and the Glands

Variables	T	P Value	CD	Rank	N_+	P Value	CD	Rank
Social support	0.126	0.087	0.016	1	0.046	0.309	0.002	5
Neuroticism	-0.068	0.232	0.005	2	-0.137	0.068	0.019	2
Extraversion	0.023	0.403	0.005	3	0.078	0.199	0.006	4
Openness	-0.007	0.471	0.0000	4	-0.032	0.365	0.001	6
Agreeableness	-0.009	0.462	0.0001	5	0.111	0.115	0.012	3
Conscientiousness	-0.009	0.460	0.0001	6	0.222	0.008	0.049	1

trol over the effects of the disease stage, relapse and survival, it could be stated that despite the previous evidence of the relationship between other diseases such as cardiovascular diseases and this personality type, it is suggested that these individuals value order and discipline and have healthier habits (such as proper activity, healthy diet, and avoidance of alcohol and smoking) than the others. Hence, these individuals live longer with fewer cardiovascular diseases. However, this trait yielded opposite results in patients with cancer in this research. In other words, conscientiousness was directly related to the number of lymph nodes, increasing the severity of the disease. To explain this outcome, it could be argued that cancer can undermine emotions, fears, anxiety, and negative affects even in conscientious patients due to its gradual negative effects. This condition harms competence as one of the traits of conscientious individuals. As a result, healthy behaviors such as proper activity, healthy diet, and avoidance of alcohol

and smoking can control and improve the conditions of patients with cancer. According to the results of various studies on the personality traits, patients with cancer reported more vulnerability, anxiety, self-absorption, anger, guilt, and lack of self-expression. Moreover, these individuals experience positive emotions such as affectivity, contemplation, impulsivity, preoccupation, and competence less than others (2).

Findings of the various studies about the negative correlation between neuroticism and the number of lymph nodes suggest that negative emotions, which are among the main characteristics of neuroticism, not only influence the patient's psychological reactions and responses to diseases, but also increase the likelihood of relapse (15, 16). In addition, some research findings prove that neuroticism is more prevalent in patients with cancer than healthy individuals (17). This factor, which is based on negative and unpleasant emotions, is composed of several traits, includ-

ing anxiety, depression, vulnerability, and emotional instability. Among the major characteristics of this factor are maladaptation and negative affectivity. In other words, patients scoring high on this factor stage lower adaptation to the outside world and often experience negative feelings. Hence, the positive correlation of neuroticism with the number of lymph nodes in patients with cancer can be attributed to the maladaptation, vulnerability, and emotional instability resulting from this trait in patients with cancer, which also affects the tumor size and lymph nodes.

The evidence on the role of social support in predicting tumor size and lymph nodes as well as the role of conscientiousness in predicting the number of lymph nodes with control over traumatic incidents suggest that social support has protective effects on patients with cancer. Therefore, the lack of social support is an important predictor of acceptance and mortality in patients with cancer. For instance, Suarez and Ramiz found out that social support improves adaptation to disease, quality of life, survival duration, economic status, and social consistency and facilitates self-evaluation, bonding with society, and loneliness handling (13).

Baider et al. argued that adaptation and confrontation with chronic diseases such as cancer are sped up in patients benefiting from facilitators such as social support and spiritual capital (13). In his research, Frantz pointed out that some survivors of cancer continue to suffer and constantly deal with the subsequent problems. He attributed this condition to factors such as a lack of social support (18). According to a study conducted in the United States, Afro-American women with cancer, who did not enjoy adequate social support, did not properly adapt to the disease (19).

The effective role of social support in mitigating depression in female patients with cancer has also been demonstrated (20-22). Accordingly, women must establish social relations to be able to cope with the stress, resulting from the diagnosis and treatment of breast cancer, and it was indicated that social support diminishes the harmful effects of the stressful life events such as cancer. Consequently, patients enjoying adequate social support show higher levels of hopes (23).

In the authors' previous research, maladaptation and a lack of spouse (due to any reason) were among the factors affecting the treatment of patients with breast cancer, while social support had a proper protective role. Moreover, although personality traits do not have a significant effect, traumatic incidents are considerably involved in the severity of the disease. In this regard, divorce and death are the most important factors, while the beloved ones' problems (death or disease) take the next priorities.

5.1. Conclusions

Psychosocial elements are among the factors affecting the treatment of patients with breast cancer. In this regard, stressful life events, especially the incidents associated with one's spouse and family, and the social support indicators influence the treatment and recovery of the patients.

References

1. Hosaka T, Fukunishi I, Aoki T, Rahe RH, Solomon GF. Development of a "Type C" inventory: Cross-cultural applications. *Tokai J Exp Clin Med*. 1999;**24**(2):73–6. [PubMed: 10641995].

2. Azkhosh M, Asgari A. Five factor model in Iranian culture: A psychometrics analysis of NEO-five factor inventory (NEO-FFI). *Int J India Psychol*. 2014;**1**(4).

3. Lee MK, Park S, Lee ES, Ro J, Kang HS, Shin KH, et al. Social support and depressive mood 1 year after diagnosis of breast cancer compared with the general female population: A prospective cohort study. *Support Care Cancer*. 2011;**19**(9):1379–92. doi: 10.1007/s00520-010-0960-4. [PubMed: 20676695].

4. Kodzi IA, Obeng Gyimah S, Emina J, Chika Ezeh A. Religious involvement, social engagement, and subjective health status of older residents of informal neighborhoods of Nairobi. *J Urban Health*. 2011;**88 Suppl 2**:S370–80. doi: 10.1007/s11524-010-9482-0. [PubMed: 20589536]. [PubMed Central: PMC3132232].

5. Suarez L, Ramirez AG, Villarreal R, Marti J, McAlister A, Talavera GA, et al. Social networks and cancer screening in four U.S. Hispanic groups. *Am J Prev Med*. 2000;**19**(1):47–52. doi: 10.1016/S0749-3797(00)00155-0. [PubMed: 10865163].

6. Courtens AM, Stevens FC, Crebolder HF, Philipsen H. Longitudinal study on quality of life and social support in cancer patients. *Cancer Nurs*. 1996;**19**(3):162–9. doi: 10.1097/00002820-199606000-00002. [PubMed: 8674024].

7. Butow PN, Hiller JE, Price MA, Thackway SV, Kricker A, Tennant CC. Epidemiological evidence for a relationship between life events, coping style, and personality factors in the development of breast cancer. *J Psychosom Res*. 2000;**49**(3):169–81. doi: 10.1016/S0022-3999(00)00156-2. [PubMed: 11110988].

8. Costa PTJ, McCrae RR. *The NEO personality inventory manual*. Odessa, FL: Psychological Assessment Resources; 1985.

9. Garrousi Farshi M. *[A new approach to personality evaluation: Application of factor analysis in personality studies]*. Tabriz: Danyal; 2001. Persian.

10. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The multidimensional scale of perceived social support. *J Pers Assess*. 1988;**52**(1):30–41. doi: 10.1207/s15327752jpa5201_2.

11. Holmes TH, Rahe RH. The Social Readjustment Rating Scale. *J Psychosom Res*. 1967;**11**(2):213–8. doi: 10.1016/0022-3999(67)90010-4. [PubMed: 6059863].

12. Eysenck HJ. *Smoking, personality, and stress: Psychosocial factors in the prevention of cancer and coronary heart disease*. Springer Science & Business Media; 2012.

13. Baider L, Ever-Hadani P, Goldzweig G, Wygoda MR, Peretz T. Is perceived family support a relevant variable in psychological distress? A sample of prostate and breast cancer couples. *J Psychosom Res*. 2003;**55**(5):453–60. doi: 10.1016/S0022-3999(03)00502-6. [PubMed: 14581100].

14. Reynolds P, Hurley S, Torres M, Jackson J, Boyd P, Chen VW. Use of coping strategies and breast cancer survival: Results from the Black/White Cancer Survival Study. *Am J Epidemiol*. 2000;**152**(10):940–9. doi: 10.1093/aje/152.10.940. [PubMed: 11092436].

15. Watson M, Homewood J, Haviland J, Bliss JM. Influence of psychological response on breast cancer survival: 10-year follow-up of a population-based cohort. *Eur J Cancer*. 2005;**41**(12):1710–4. doi: 10.1016/j.ejca.2005.01.012. [PubMed: 16098457].

16. Petticrew M, Bell R, Hunter D. Influence of psychological coping on survival and recurrence in people with cancer: Systematic review. *BMJ*. 2002;**325**(7372):1066. doi: 10.1136/bmj.325.7372.1066. [PubMed: 12424165]. [PubMed Central: PMC131179].

17. Golden-Kreutz DM, Andersen BL. Depressive symptoms after breast cancer surgery: Relationships with global, cancer-related, and life event stress. *Psychooncology*. 2004;**13**(3):211–20. doi: 10.1002/pon.736. [PubMed: 15022156]. [PubMed Central: PMC2150738].

18. Burleson BR, Albrecht TL, Sarason IG. *Communication of social support: Messages, interactions, relationships, and community*. Sage Publications, Inc; 1994.

19. Taghavi M, Kalafi E, Talei A, Dehbozorgi G, S. M. A. Taghavi . [Investigating the relation of depression and religious coping and social support in women with breast cancer]. *J Isfahan Med Sch*. 2011;**28**(115):901–8. Persian.

20. Lee EH, Yae Chung B, Boog Park H, Hong Chun K. Relationships of mood disturbance and social support to symptom experience in Korean women with breast cancer. *J Pain Symptom Manage*. 2004;**27**(5):425–33. doi: 10.1016/j.jpainsymman.2003.10.007. [PubMed: 15120771].

21. Neuling SJ, Winefield HR. Social support and recovery after surgery for breast cancer: Frequency and correlates of supportive behaviours by family, friends and surgeon. *Soc Sci Med*. 1988;**27**(4):385–92. doi: 10.1016/0277-9536(88)90273-0. [PubMed: 3175721].

22. Pistrang N, Barker C. The partner relationship in psychological response to breast cancer. *Soc Sci Med*. 1995;**40**(6):789–97. doi: 10.1016/0277-9536(94)00136-H. [PubMed: 7747213].

23. Rosedale M. Survivor loneliness of women following breast cancer. *Oncol Nurs Forum*. 2009;**36**(2):175–83. doi: 10.1188/09.ONF.175-183. [PubMed: 19273406].