Iran Red Crescent Med J. 2020 March; 22(3):e98347. doi: 10.5812/ircmj.98347.

Published online 2020 March 10. **Research Article**

# Relationship of Social Support and Coping Strategies with Post-Traumatic Growth and Functional Disability Among Patients with Cancer: Meditating Role of Health Literacy

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**Received** 2019 September 23; **Accepted** 2020 January 31.

## Abstract

**Background:** Psychological factors play important roles in mental and physical outcomes of cancer, like disability and positive growth after exposure to cancer trauma.
**Objectives:** This study aimed to investigate the mediating role of health literacy in the relationship of social support and coping strategies with post-traumatic growth and functional disability among patients with cancer.
**Methods:** The present descriptive, cross-sectional study included 265 patients (142 women and 123 men) with various types of cancer selected by a convenience sampling method among patients referring to the Cancer Clinics of Imam Khomeini Hospital in Tehran, Iran. Data were collected by the "WHO Disability Assessment schedule", "post-traumatic growth inventory", "Functional, Communicative, and Critical Health Literacy scale", "Social Support scale", and "Brief Cope scale". Data were analyzed by structural equation modeling (SEM) using AMOS-24 and SPSS-20 software.
**Results:** The results showed that social support had a significant positive correlation with post-traumatic growth ($P \leq 0.001$) and health literacy ($P \leq 0.001$) and a significant negative correlation with functional disability ($P \leq 0.001$). There was a significant positive correlation between avoidance-coping strategies and post-traumatic growth ($P \leq 0.001$) and functional disability ($P \leq 0.051$). Problem-focused coping strategies had a significant positive correlation with health literacy ($P \leq 0.051$) and there was a significant negative correlation between health literacy and functional disability ($P \leq 0.001$). Additionally, health literacy had a mediating role in the relationship between social support and functional disability ($P \leq 0.001$) and between problem-focused coping strategies and functional disability ($P \leq 0.001$).
**Conclusions:** Social support and coping strategies directly or through the mediating role of health literacy are important predictors of post-traumatic growth and functional disability among patients with cancer, suggesting the need for intervening and educating in these areas to improve patients' physical and mental status.

*Keywords:* Coping Strategies, Disability, Health Literacy, post traumatic growth, Social Support

## 1. Background

People may experience at least one painful event throughout their lives. One of the most painful events in human life is cancer, which causes a serious crisis in the lives of patients, their families, and those around them (1). A significant number of cancer patients experience social, emotional, and psychological distress (2). Research suggests that psychological and social factors influence cancer onset, progression, and mortality (3).

One consequence of experiencing extremely challenging living conditions is the development of functional disability. Functional disability is defined as the existence of a functional problem at the physical, personal, and social levels in one or more areas of life that the individual experiences in interacting with environmental factors and their health status (4). Cancer and its diagnosis and treatment are associated with some functional limitations (5). Patients with cancer experience a wide range of disabilities due to various cancer treatments such as surgery, chemotherapy, and radiation (6) or peripheral nerve surgery (7).

Although the painful events that people experience in life often lead to negative psychological consequences, they can also have positive consequences, called post-

traumatic growth (8). In short, post-traumatic growth can be defined as positive psychological changes as a result of coping with very challenging living conditions (8). More than 53% of cancer patients have reported some degrees of post-traumatic growth acting as a protective shield against stressful events (9). Additionally, by the improvement of post-traumatic growth in cancer patients, their performance is also enhanced (10).

One of the important measures to reduce the complications of the disease and improve the functions of patients is to enhance their health literacy, the ability of patients to read and interpret the information required for their health so that they can make appropriate decisions regarding their health (11). Health literacy plays an important role in the decisions made by cancer patients over a wide range of topics from diagnosis to treatment (12). Patients who have recently received cancer diagnosis and treatment may receive inaccurate specialized information as to their diagnosis (13). The impact of health literacy on the functions and life quality of cancer patients is considered an important issue in their health (14). Poor health literacy leads to poor mental and physical status, lacked knowledge of the medical condition, increased length of hospital stay, and increased medical expenses (15).

Another important factor in reducing the psychological distress of patients in stressful situations is to receive social support, defined as the individuals' access to resources they can trust in and use as aids in stressful situations such as cancer diagnosis (16). Support plays a major role in coping with serious and chronic diseases such as cancer. Close friends, social support, and the frequency of social participation have positive and independent relationships with health levels, leading to a positive relationship between social support and health (17). Important factors such as social and emotional support should be taken into consideration to maintain the spirit of coping and overcome the feelings of helplessness, hopelessness, and loneliness in cancer patients (18).

Among the important factors affecting the spirit of patients and helping overcome the helplessness of cancer patients is the concept of coping strategies. They are referred to as strategies involved in the use of one's own adaptive or incompatible methods to adapt to a threat to reach one's psychological balance (19). Cancer patients use a variety of strategies to cope with their problems and the patients' differences in coping strategies reflect their differences in adaptation (20). Research shows that problem-focused coping strategies are the strongest predictors of disability reduction and their components are directly correlated with a high quality of life (21).

A review of the literature indicates that the highest level of functional disability is found in those cancer patients that have the most ineffective coping styles and the least amount of social support (22). In addition, receiving caregiver support and problem-focused and avoidance-coping strategies significantly can predict post-traumatic growth in cancer patients (23). On the other hand, social support perception predicts information seeking in these patients (24). Moreover, the results have shown that problem-focused and avoidance-coping strategies can predict the variance of post-traumatic growth (25). Health literacy also plays an important role in promoting the health and performance of patients; by promoting health literacy in society, healthy behaviors are further encouraged (26).

So far, no integrated model has investigated the current research model in cancer patients. Theoretically, this model is based on relevant models in previous research (22-24, 27, 28). Not many studies have investigated the role of different coping strategies in predicting the functions of cancer patients and their cognitive changes. In addition, although emotion-focused and avoidance-coping strategies are expected to have a negative relationship with patient recovery and functioning, this relationship has not been empirically investigated. The main drawback in previous research is that health literacy, as an important construct among cancer patients, has received less attention from researchers, and the effect of health literacy on the process of cancer recovery is yet to be elucidated. This study provides a comprehensive understanding of the role of health literacy in the psychological and functional dimensions of cancer patients through a comprehensive and integrated model. Finally, this study examines an exploratory model in the context of Iranian culture that could explain the psychological factors that influence the treatment process of cancer patients. Considering the theoretical foundations mentioned above, the purpose of the present study was to investigate the mediating role of health literacy in the relationship of social support and coping strategies with post-traumatic growth and functional disability among patients with cancer (Figure 1).

## 2. Methods

### 2.1. Study Design

The purpose of the present study was to investigate the direct and indirect relationships among variables through structural equation analysis.

### 2.2. Setting and Sample

The study population included all male and female patients (20-60-years-old) referring to the Cancer Clinics of Imam Khomeini Hospital in Tehran. The study was conducted in the Cancer Clinics of Imam Khomeini Hospital

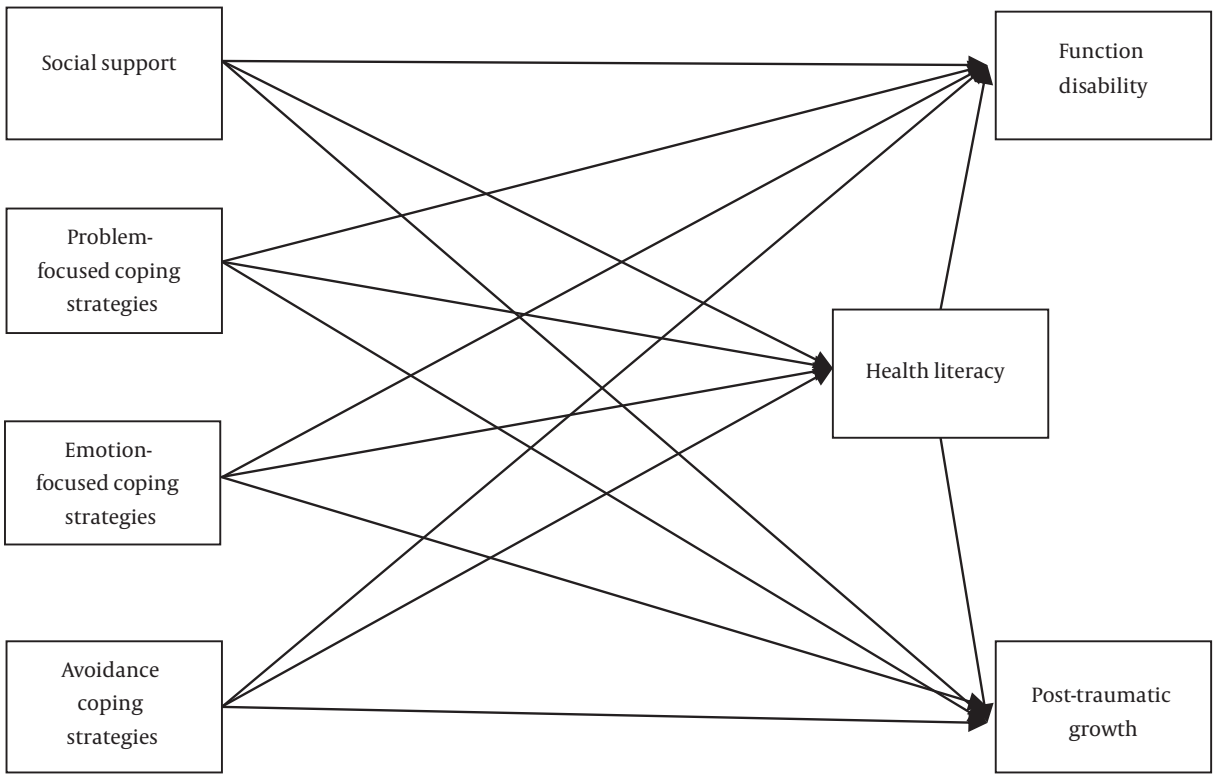


**Figure 1.** The hypothesized model of the mediating role of health literacy in the relationship of social support and coping strategies with post-traumatic growth and functional disability among patients with cancer

in Tehran, Iran, on all patients that were referred to these clinics with a cancer diagnosis from July to November 2018 to follow their treatment. The required statistical sample (265 cancer patients) was selected from the above statistical population by a convenience sampling method. The inclusion criteria were the age range of 20 - 60 (due to physical ability and literacy required to complete the questionnaires), cancer diagnosis by a cancer specialist, treatment follow-up by the patient, one year of treatment, consent to participate in research, and a minimum education level of high school. The exclusion criteria were chronic diseases associated with cancer diagnosed by a specialist and an incomplete research measure.

Following the approval of the proposal by the Psychology Department of Zanjan University and obtaining a code of ethics from the Imam Khomeini Hospital Cancer Research Center (code: IR.TUMS.VCR.REC.1397.866), entry permits were obtained for the study. Necessary coordination with hospital cancer clinics was made to distribute the questionnaires to the patients. After obtaining written consent from patients and in accordance with the provisions of the Helsinki Declaration, voluntary participation and the right to withdraw from the study were made explicit for the participants. Ultimately, the questionnaires were collected.

### *2.3. Instruments and Procedures*

To assess the demographic criteria, a questionnaire was developed by the researcher containing information on gender, education, age, occupation, and type of cancer.

#### *2.3.1. World Health Organization Disability Assessment Schedule 2.0*

World Health Organization Disability Assessment schedule 2.0 (WHODAS 2.0) was developed by WHO to assess functional disability in patients with chronic pain. The tool has 36 items that examine six domains, namely cognition, mobility, self-care, loneliness, life activities, and social participation. Questions are related to patients' experiences over the past month; the higher the participants' scores, the greater the disability (29). In the current study, the Cronbach's alpha coefficient was 0.95 for the whole instrument and 0.91, 0.95, 0.94, 0.98, 0.93, and 0.91 for cognition, mobility, self-care, loneliness, life activities, and social participation, respectively.

#### 2.3.2. Post-Traumatic Growth Inventory

The post-traumatic growth inventory (PTGI) investigates all positive changes following a traumatic event. The instrument has 21 items that identify five domains of psychological growth following a stressful trauma: new possibilities, relationship with others, life appreciation, personal strength, and spiritual change. Post-traumatic growth is based on a six-point Likert scale ranging from never (0) to very high (5). The maximum score on the scale is 105; the higher the score on this scale, the more the traumatic growth (8). In the current study, the Cronbach's alpha coefficient was 0.87 for the whole instrument and 0.71, 0.75, 0.64, 0.68, and 0.73 for possibilities, relationship with others, life appreciation, personal strength, and spiritual change, respectively.

#### 2.3.3. Functional, Communicative, and Critical Health Literacy Questionnaire (FCCHI)

This questionnaire assesses health literacy in patients with chronic diseases with 14 items. The following are the scales of this tool: functional health literacy, communication health literacy, and critical health literacy. Participants' answers to the questions fall under a four-point Likert scale (never: 1, rarely: 2, sometimes: 3, and most of the time: 4). This questionnaire does not have a cut-off line for individuals and the total score of the questionnaire is obtained by dividing the scores into four categories; thus, the participant's score ranges from 1 (low health literacy) to 4 (high health literacy) (30). In the current study, internal consistency is reported as the Cronbach's alpha coefficient of 0.82, indicating the desirable psychometric properties of the instrument.

#### 2.3.4. Social Support Scale

The Social Support scale (MOS-SSS) was developed by Sherburne and Stewart to measure the amount of social support received by the subject. The tool has 19 items and four subscales including emotional-information support, tangible support, positive social interaction, and kindness. Participants specify their answers to the questions on a five-point Likert scale (never: 1, rarely: 2, sometimes: 3, often: 4, and always: 5). The lowest and the highest scores on the questionnaire were 19 and 95, respectively; a higher score indicates higher social support of the participants (31). The current study reports a 0.90 coefficient for the reliability of this questionnaire using Cronbach's alpha, which shows high internal consistency of this instrument.

#### 2.3.5. Brief Cope Scale (BCS)

Carver designed this questionnaire to evaluate different strategies for coping with stress. The questionnaire has 28 items to measure three kinds of strategies, namely problem-focused, emotion-focused, and avoidance-coping strategies. The range of responses to each item is from 1 to 4 (never: 1, rarely: 2, often: 3, and a lot: 4) (32). Cronbach's alpha was examined in the current study and the results showed the coefficients of 0.70, 0.75, and 0.73 for problem-focused, emotion-focused, and avoidance-coping subscales, respectively, indicating its high validity.

### 2.4. Statistical Analysis

The data were primarily analyzed by descriptive statistics (correlation, mean, and standard deviation) using SPSS-20. The results were then analyzed using structural equation analysis by AMOS-24 software.

## 3. Results

Descriptive statistics such as mean, standard deviation, and correlation coefficients are presented in Table 1.

The results showed that all relationships were significant at $P \geq 0.001$, except for the relationships between social support and avoidance coping strategy, problem-focused coping and avoidance-coping strategy, health literacy and avoidance-coping strategy, functional disability and avoidance-coping strategy, and functional disability and post-traumatic growth.

### 3.1. Fitting the Research Model

The present research model has a total of five variables. We investigated social support variables and coping strategies as exogenous variables, health literacy as a mediator variable, and functional disability and traumatic growth variables as endogenous variables. Prior to examining the structural coefficients, the pattern fit was examined. Table 2 shows the fitness indicators of the proposed and modified research models. According to Table 3, to determine the adequacy of the proposed model for data fitting, we used a combination of fitness indices such as chi-square ($\chi^2$), standardized chi-square, goodness of fit index (GFI), adjusted GFI (AGFI), normalized fit index (NFI), comparative fit index (CFI), incremental fit index (IFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA).

As shown in Table 3, the proposed model had a good fit based on fit indices. In the next step, to improve the fitness of the initial model, we eliminated the relationships between problem-focused coping strategies and functional disability, problem-focused coping strategies and post-traumatic growth, emotion-focused coping strategy and functional disability, emotion-focused coping strategy and health literacy, emotion-focused coping strategy and post-traumatic growth, avoidance-coping strategy and health

**Table 1.** Descriptive Statistics and Correlation Coefficients Between the Research Variables[a]

| Variables | Values | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| **Social support** | 78.28 ± 17.36 | 1 | | | | | | |
| **Problem-focused coping** | 25.99 ± 3.53 | 0.35** | 1 | | | | | |
| **Emotion-focused coping** | 30.26 ± 4.60 | 0.27** | 0.50** | 1 | | | | |
| **Avoidance coping** | 20.59 ± 4.18 | 0.00 | -0.03 | -0.17** | 1 | | | |
| **Health literacy** | 3.22 ± 0.64 | 0.47** | 0.31** | 0.26** | 0.00 | 1 | | |
| **Functional disability** | 36.38 ± 27.87 | -0.41** | -0.30** | -0.28** | 0.11 | -0.45** | 1 | |
| **Post-traumatic growth** | 67.26 ± 16.37 | 0.31** | 0.19** | 0.17** | 0.23** | 0.21** | -0.02 | 1 |

[a]Values are expressed as mean ± SD.

**Table 2.** Direct Relationship Measurement Parameters in the Modified Model

| Pathways | Standardized Estimate | Unstandardized Estimate | Standard Error | Critical Ratios | Significance |
|---|---|---|---|---|---|
| **SS → HL** | 0.412 | 0.015 | 0.002 | 7.205 | ≤ 0.001 |
| **P-FC → HL** | 0.167 | 0.030 | 0.010 | 2.916 | ≤ 0.001 |
| **SS → FD** | -0.259 | -0.415 | 0.095 | -4.352 | ≤ 0.001 |
| **SS → P-TG** | 0.315 | 0.297 | 0.053 | 5.561 | ≤ 0.001 |
| **AC → FD** | 0.122 | 0.810 | 0.349 | 2.319 | ≤ 0.05 |
| **AC → P-TG** | 0.227 | 0.888 | 0.222 | 4.004 | ≤ 0.001 |
| **HL → FD** | -0.335 | -14.456 | 2.565 | -5.637 | ≤ 0.001 |

Abbreviations: AC, avoidance coping; FD, functional disability; HL, health literacy; P-FC, problem-focused coping; P-TG, post-traumatic growth; SS, social support.

**Table 3.** Fit Indices of the Hypothesized Research Model and the Modified Research Model

| Model | RMSEA | TLI | IFI | CFI | NFI | AGFI | GFI | $\chi^2$/df | df | $\chi^2$ |
|---|---|---|---|---|---|---|---|---|---|---|
| **Suggested Model** | 0.14 | 0.65 | 0.98 | 0.98 | 0.98 | 0.80 | 0.99 | 6.45 | 1 | 6.45 |
| **Modified Model** | 0.08 | 0.88 | 0.96 | 0.96 | 0.94 | 0.92 | 0.98 | 2.97 | 5 | 14.88 |

literacy, and health literacy and post-traumatic growth because of the insignificant relationships in the proposed model.

The most commonly used fitness index in structural equation modeling is chi-square ($\chi^2$). The first point to be made when interpreting the chi-square value is that the smaller its value, the better the model fit to the data; hence, the zero value shows a perfect fit. The goodness of fit index (GFI) is a measure of the amount of variance/covariance data that can be estimated by a given model. Values above 0.90 indicate a good fit of the model. The adjusted GFI is a general measure of fitness that measures the degree of freedom. When the index is 0.85 or higher, the model fit is acceptable, and values close to 0.95 indicate a good fit. The normalized fit index (NFI) is a normed incremental fit index, with values above 0.90 indicating a good fit to the data. The comparative fit index (CFI) varies from 0 to 1 and it should be above 0.90 based on the comparison of the proposed model with zero models. Values higher than or equal to 0.90 indicate an acceptable fit to the data. The incremental fit index (IFI) compares the fit of a given model with the base model, where there is typically no covariance between variables. The closer the difference is to 1, the greater the fit will be, and the value of 0.90 is usually regarded as a good fit. The Tucker-Lewis index (TLI) measures the fit of a model that is better than the standalone model (i.e., the zero model, assuming a zero relationship between variables). The Tucker-Lewis index should be higher than 0.90. The RMSEA provides useful data for evaluating the approximation value in the community, and has an orientation that renders the efficient models more useful. A value below 0.05 indicates a close fit of the model to the degrees of freedom. Values between 0.05 and 0.10 show an acceptable fit. The value of 0.08 or less indicates a logical approximation error and values above 0.10 indicate a need to reject the model.

According to the foregoing criteria and based on Table 3, for the modified model, the value of chi-square for the degrees of freedom was 2.97, indicating a good fit of the model. The values of GFI, AGFI, NFI, CFI, IFI, and TLI in the

modified model were 0.99, 0.80, 0.98, 0.98, 0.98, and 0.65, respectively, indicating the goodness of fit of the model in the present study.

The standard coefficients in Figure 2 confirm the seven direct hypotheses of this study. As mentioned earlier, the following directions were eliminated from the direct pathways: problem-focused coping strategies to functional disability, problem-focused coping strategies to post-traumatic growth, emotional-focused coping strategies to functional disability, emotion-focused coping strategies to health literacy, emotion-focused coping strategies to post-traumatic growth, health literacy to avoidance coping strategy, and health literacy to post-traumatic growth.

The parameters of the direct relationship measurement in the modified model are presented in Table 2. As shown, standard pathways' coefficients and critical values of all variables related to the modified model were significant.

### 3.2. Findings of Indirect Hypotheses in the Proposed Model

The bootstrap method was used to investigate the hypotheses regarding the indirect effects of variables. Intermediate relationships were analyzed using the bootstrap method in AMOS-20 software. The results are presented in Table 4.

**Table 4.** Results of the Bootstrap Method of Intermediate Pathways in the Proposed Model

| Pathways | Standardized Indirect Effects | Upper Bounds | Lower Bounds |
|---|---|---|---|
| SS → HL → FD | -0.138 | -0.090 | -0.201 |
| P-FC → HL → FD | -0.056 | -0.014 | -0.109 |

Table 4 shows that the upper and lower limits of the indirect relationship of social support with functional disability did not include zero, indicating a significant indirect pathway. Furthermore, Table 4 shows that the upper and lower limits of the indirect relationship between problem-focused coping strategy and functional disability did not include zero and the obtained coefficients were within this distance, indicating the meaningfulness of this pathway.

## 4. Discussion

The present study investigated the mediating role of health literacy in the relationship of social support and coping strategies with post-traumatic growth and functional disability among patients with cancer. According to the results, social support had a positive relationship with post-traumatic growth and health literacy and a significant negative relationship with functional disability. Avoidance-coping strategies had a significant positive relationship with post-traumatic growth and functional disability. Problem-focused coping strategies had a significant positive relationship with health literacy, and health literacy had a significant negative relationship with functional disability. Health literacy mediated the relationship between social support and functional disability and the relationship between problem-focused coping strategies and functional disability. The following will explain the research hypotheses.

The findings showed that social support had a significant positive relationship with health literacy in cancer patients, which is in line with the results of previous studies (24, 33-35). To explain the results, positive support resources and support from one's social networks can enhance the ability of cancer patients to obtain and fathom medical information. In people with appropriate resources and social support, this can play an important facilitating role in establishing and maintaining healthy behaviors and attitudes, increasing participation in specialists' therapy sessions and improving cancer health status, which can positively affect treatment and recovery. According to Courtenay (35), cancer support groups play an important role in accessing health literacy. For instance, cancer patients sharing their status with friends can increase their ability to understand cancer and subsequently participate in and adhere to treatment courses. On the other hand, some studies have shown that when the patients' family members are next to them, the time spent by specialists for the patients increases, providing the patients with more information about the disease (36).

The findings showed that social support had a significant negative relationship with functional disability in cancer patients, which is consistent with the results of previous research (18, 22, 37). In explaining the findings of the present study, most people who have more social support have a better quality of life; in fact, by changing people's assessment of stressful life events such as cancer, social support reduces their negative psychological responses to these stressors, and eventually changes their coping strategies, resulting in improved performance and reduced disability (38). Social support has positive effects on physical, mental, social, and economic well-being, generating a better sense of life, better overall life satisfaction, and better coping with illness. Positive social relationships and support make the symptoms of patients less severe through affecting their physical and mental health (39). Receiving support from family and friends helps the patients overcome their physical and psychological limitations and disabilities by reducing their negative self-esteem and in-

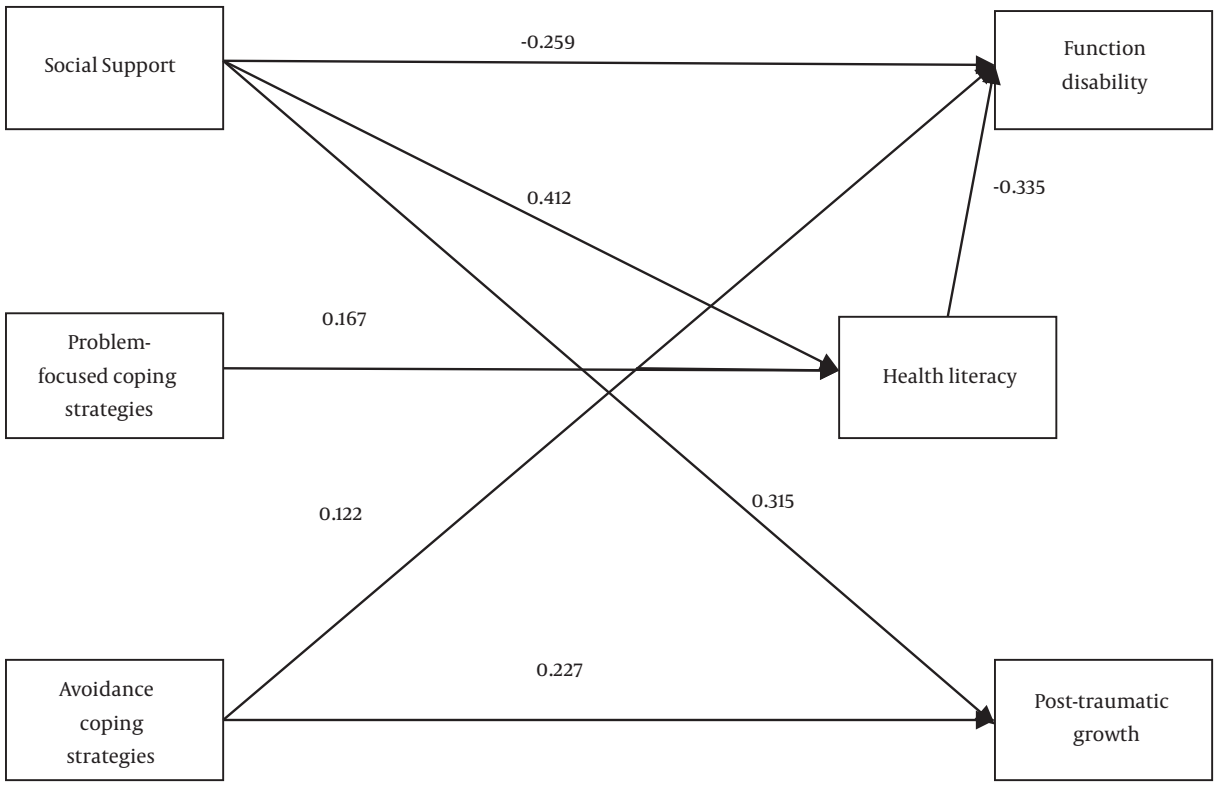


**Figure 2.** Modified model's standard coefficients concerning the meditating role of health literacy in the relationship of social support and coping strategies with post-traumatic growth and functional disability among patients with cancer

creasing their positive self-esteem; thus, patients further devote their time and energy to their abilities and functions (18).

The findings showed that social support had a significant positive relationship with post-traumatic growth in cancer patients, which is in accordance with other studies (23, 27, 40). Lepore and Kernan (41) took into account the social processing model of stressful life events, suggesting that the social context could enhance the direct effects of non-cognitive factors on post-traumatic growth. For example, patient supportive interactions directly could reduce stressors, increase self-efficacy, and create a sense of growth and value in life. According to the emotional processing model, talking to others results in post-traumatic growth through facilitating one's cognitive processing and coping responses (42). Social support in cancer patients enhances and facilitates post-traumatic growth by reducing the negative effects of stressful events (43). Accordingly, social support can improve psychological well-being and cognitive change by influencing the patient's positive reinterpretation of stressful situations such as cancer, altering cognitive processes, and creating meaning (40).

The results showed that problem-focused coping strategies had a positive relationship with health literacy in cancer patients, which is in line with previous studies (44-46). In explaining the results, it can be pointed out that patients with problem-focused coping strategies face a large amount of information in different medical fields due to direct exposure to questions and interpretations of information, which corresponds to the type of problem (45). Coping styles are powerful strategies in the cancer domain because they help individuals achieve higher self-efficacy and effective strategies for acquiring and modifying their information (44). Another possible explanation for the relationship between problem-focused coping strategies and health literacy in cancer patients is that individuals with problem-focused coping strategies have characteristics such as positive evaluation, instrumental support, and planning of challenging the situations. These strategies result in the patients' regular and consistent participation in the therapeutic process and communication with health care professionals, which increases personal information and health literacy (47).

The findings showed that avoidance coping strategies have a significant positive relationship with functional disability in cancer patients, which is consistent with the results of previous research (21, 22, 48). In the stress-coping process, patients use maladaptive coping strategies such as fewer cognitive-avoidance strategies to solve their problems, meaning that the patients' problem-solving skills are well understood; by avoiding participation, denying, or using alcohol and drugs, they become more negative and disabled, and as the cycle progresses, their functions become more impaired and their disability increases (49). The repeated use of coping styles such as drugs, smoking, and blaming others can lead to negative emotions and attitudes, as well as physical and mental fatigue in patients (50). In fact, due to the lack of direct exposure to the stressor, this style of coping leads to dysfunctional beliefs about the problem, thereby making the patient experience negative emotions such as anger and fatigue. Given that coping styles are repeated patterns, the continued avoidance of coping strategies results in an increased functional disability to cope with the disease.

The findings of this study showed that positive coping strategies have a positive relationship with post-traumatic growth in cancer patients, which is not in agreement with the results of other studies (23, 25) where avoidance-coping strategies had a significant negative relationship with post-traumatic growth in cancer patients. However, our results are in line with the findings of one previous study (20). According to the results obtained in the present study, there is a significant positive relationship between avoidance coping strategies and post-traumatic growth and this result is inconsistent with previous findings in this field. It seems that the results of this study are influenced by other factors affecting the choice of strategies such as the intolerance of ambiguity and the control source. In fact, people with less tolerance choose short-term impact strategies such as avoidance to cope with the ambiguity of stressful events. On the other hand, the source of one's control is influenced by the type of coping strategy used. People with external control tend to use more ineffective strategies in the face of stressful events because they believe they will not play an important role in controlling their affairs. Therefore, it is concluded that the results are influenced by factors such as the intolerance of ambiguity and locus of control, which were not considered in the present study.

The results showed that health literacy had a significant negative relationship with functional disability in cancer patients, which is consistent with the findings of previous studies (14, 26, 28). There is a significant relationship between the concept of health literacy and health-promoting behaviors (28). Researchers believe that understanding and reading health concepts can improve self-care and increase physical activity, and this relationship can motivate and track the recovery process in individuals. A possible explanation for the negative association between health literacy and functional disability in cancer patients is that poor health literacy can limit the patient's understanding of complex information about cancer diagnosis and treatment, thereby impeding the patients' understanding of medical processes. Thus, patients with health literacy deficits will have problems in the communication process (51). On the other hand, inadequate health literacy may limit the patients' ability to talk to family and health professionals (14). Patients who have problems with information acquisition and processing have less confidence in their ability to cope with their health problems and manage their physical symptoms.

The results of the current study showed that social support through health literacy had a significant relationship with functional disability in cancer patients, which is in line with other studies (28, 37, 52). In explaining the results, an increase in social support in cancer patients makes them more likely to interact with specialists, medical staff, family, and friends (52). In fact, patients, who mostly consult professionals, family, and friends regarding these issues, or are attracted to support groups (mental health groups and treatment groups) to improve their mental and physical health, have good information on the dimensions of cancer, self-care, preventive measures, and how they are treated and diagnosed; moreover, increased social support improves functions and reduces the patients' disability rates (53). On the other hand, research has shown that patients with lower social support experience higher levels of psychological distress such as anxiety. In fact, failure to participate in donor groups, inaccurate information, and lack of consultation with professionals due to stress, distress, and anxiety lead to poor levels of health literacy; a combination of these factors along with poor social support leads to hopelessness (37).

The findings of this study showed that problem-focused coping strategies through health literacy had a significant relationship with functional disability in cancer patients, which is in accordance with the results of previous studies (44, 54, 55). According to Lazarus's exchange theory of coping and stress, coping strategies have a direct relationship with health-related behaviors (49). Link et al. (50) used Lazarus's coping and stress model and the theory of planned behavior to identify factors that affect coping with illness in cancer survivors. According to their findings, functional levels in cancer patients are influenced by factors such as coping strategies. Patients employing problem-focused coping strategies make clear changes in their attitudes and awareness of the disease because they

are well aware of the sources of valid information and how to access it. Problem-focused coping strategies involve access to higher levels of health literacy by incorporating components such as planning, changing attitudes, and active confrontation. According to the results of the present study, problem-focused coping strategies, by providing the patients with more knowledge on the disease, can better tackle the disease stress and reduce disability.

### 4.1. Conclusions

According to the model obtained in the present study, it is concluded that social support and coping strategies are important predictors of traumatic growth and functional disability in Iranian cancer patients. Among the innovations of the present study, we can point to the mediating role of health literacy that increases the predictive effects of coping strategies and social support in predicting post-traumatic growth and functional disability.

The first limitation of the study was the use of a cross-sectional design to examine the relationships between variables where all data were collected over a limited period of time in a hospital, which may have affected the validity of the data. Using pen/paper tools and overestimating or underestimating responses by participants may further influence the findings. In future research, it is suggested that these variables be investigated in the form of longitudinal studies in order to obtain findings with higher validity. Further recommended is a limited number of cancer types for a more facile comparison along with the examination of the psychological characteristics of each cancer type. Considering the results obtained in the present study regarding the relationship between coping strategies and other variables, it is suggested that other effective factors related to coping strategies such as ambiguity intolerance and source of control be considered in future research.

## Acknowledgments

The researchers would like to thank all the officials and staff of Imam Khomeini Hospital, as well as the participants in the research.

## Footnotes

**Authors' Contribution:** Samaneh Roohi and Javad Salehi conceived the study and designed the research topic. Javad Salehi and Habibollah Mahmoodzadeh supervised the conduct of the data collection. Samaneh Roohi and Habibollah Mahmoodzadeh undertook the recruitment of participating centers and patients. Zekrolah Morovati and Javad Salehi provided statistical advice on study design and analyzed the data. Samaneh Roohi drafted the manuscript and all authors contributed substantially to its revision. Samaneh Roohi takes responsibility for the paper as a whole.

**Conflict of Interests:** The authors declare no conflict of interest.

**Ethical Approval:** We obtained an Ethical Code from the Imam Khomeini Hospital Cancer Research Center (code: IR.TUMS.VCR.REC.1397.866) and then entry permits were obtained for the study. Necessary coordination with Hospital Cancer clinics was made to provide the patients with the questionnaires.

**Funding/Support:** This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Informed Consent:** After obtaining written consent from patients and in accordance with the provisions of the Helsinki Declaration, voluntary participation and the right to withdraw from the study were made explicit for the participants. Ultimately, questionnaires were collected.

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