

Influence of Coping Style on Symptom Interference Among Adult Recipients of Hematopoietic Stem Cell Transplantation

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Physical symptoms can cause difficulties for patients after cancer treatment. In a study assessing patients receiving chemotherapy, radiation, or both for breast cancer, greater experience of physical symptoms during treatment resulted in increased cancer-related distress and general distress after treatment (Jim, Andrykowski, Munster, & Jacobsen, 2007). Increased cancer distress is a concern because of its links to poorer health outcomes (Jim et al., 2007). Physical symptoms also influence patients' feelings of well-being and perceived life expectancy. A quality-of-life study revealed that patients, three years after treatment, judged their quality of life based on physical and somatic concerns (Broers, Kaptein, Le Cessie, Fibbe, & Hengeveld, 2000). In addition, physical symptoms influenced patients' quality of life more negatively than psychological factors (Gaston-Johansson & Foxall, 1996).

The authors of this article propose that degree of symptom interference is as important in patients' daily living as presence of symptoms. Health-related quality of life (HRQOL) originally was conceptualized (Ware, 1994) as both the presence of symptoms (e.g., fatigue) and the degree to which these symptoms cause interference in daily life roles (e.g., work, social functioning). Thus, generic measures of HRQOL (e.g., SF-36®) have scales that assess symptoms (e.g., bodily pain) and scales that assess the degree to which symptoms cause interference in life activities (e.g., functioning at work, interpersonal relationships with family) (Ware, 1994).

Patients with cancer have reported the occurrence of many types of symptoms, with some causing a burden when carrying out daily functions; however, extensive literature is not available on symptom interference in patients with cancer. In a study of pain among patients with cancer (primary sites lung and

Purpose/Objectives: To investigate the influence of coping style on interference caused by a variety of common post-treatment symptoms after hematopoietic stem cell transplantation.

Design: Longitudinal; secondary analysis of data from the original study that examined health-related quality-of-life variables (e.g., depression, well-being) in adult patients treated with conventional bone marrow transplantation or depleted T-cell bone marrow transplantation.

Setting: Fifteen university medical centers in the United States.

Sample: 105 adult recipients of hematopoietic stem cell transplantation.

Methods: Patients were assessed via telephone-based interviews for coping style at baseline and for symptom interference in daily living six months post-treatment.

Main Research Variables: Coping style and symptom interference.

Findings: Neither age nor gender predicted symptom interference, with the exception of chronic graft-versus-host disease, where older patients experienced more interference at six months, and breathing symptoms, for which women experienced more interference than men at six months. Avoidant coping style at baseline predicted increased interference from symptoms, but emotion-focused and instrumental coping styles did not predict decreased interference.

Conclusions: A generalized avoidant coping style before treatment increased interference from common cancer symptoms six months after hematopoietic stem cell transplantation.

Implications for Nursing: An intervention to teach alternate coping strategies should be implemented prior to treatment and tested for prevention of symptom-related life interference.

prostate), Hwang, Chang, and Kasimis (2002) demonstrated that pain severity predicted life interference, but pain relief and satisfaction with pain management did not. More recently, Wang, Tsai, Chen, Lin, and Lin

(2008) studied patients with lung cancer and the degree of interference caused by two symptom clusters: general symptoms (e.g., fatigue) and gastrointestinal symptoms (e.g., nausea, vomiting). Although both clusters were associated with interference, the general symptoms accounted for more variance in life interference.

Coping, broadly defined, consists of responses used by persons facing threat or harm (Folkman & Moskowitz, 2004). Billings and Moos (1981) proposed a categorization system in which coping responses target the person's emotions (e.g., try to see the positive side of events), target the stressor itself (e.g., find out more about the problem), or are avoidant in nature (e.g., use drugs or alcohol to reduce tension). Researchers and theorists believe coping responses are not inherently good or bad because the context of the stressor and the characteristics of the person are highly relevant to coping effectiveness, but coping can be studied as more effective in terms of the person experiencing more positive affect and achieving a partial or complete resolution of the stressor.

Patients use a variety of coping styles to deal with physical symptoms that accompany the stressors of medical treatment, and coping styles have been related to adjustment. Increased avoidant coping among patients with cancer correlated with higher psychological distress (Molassiotis, Van Den Akker, Milligan, & Goldman, 1997) and with depression and anxiety (Wells, Booth-Jones, & Jacobsen, 2009). One study (Shapiro, McCue, Heyman, Dey, & Haller, 2010) revealed that avoidant strategies such as disengagement were associated with negative emotional states (e.g., depression, negative affect). Cognitive strategies to process emotions, such as benefit finding and hope, were associated with positive outcomes, such as more happiness.

The aim of the current study was to consider the effect of coping style on symptom interference. Based on previous research, the authors hypothesized that coping style (e.g., emotion-focused coping, instrumental coping, avoidant coping) would be an influential factor in the extent to which symptoms interfered with the life of a patient with cancer six months post-transplantation. Based on previous literature, the authors expected avoidant coping to predict increased symptom interference and emotion-focused and instrumental coping to predict decreased symptom interference.

Methods

Participants

Participants were enrolled in a longitudinal, multicenter randomized trial of alternate approaches to prevent graft-versus-host disease among patients receiving an allogeneic hematopoietic stem cell transplantation (HSCT) (Wagner, Thompson, Carter, & Kernan, 2005).

Consenting adult participants (N = 314) at 15 sites in the United States received treatment and were enrolled in a HRQOL substudy (Altmaier et al., 2006). For the current study, coping style data were obtained from interviews conducted at baseline and symptom interference data from interviews conducted six months post-treatment; 105 patients completed six-month interviews. Study attrition from baseline to six months was from patient mortality, patients being too ill to participate, and difficulties scheduling interviews. Thus, the current study represents a secondary analysis of data from the original study, which examined HRQOL variables (e.g., depression, well-being) in adult patients treated with conventional bone marrow transplantation or depleted T-cell bone marrow transplantation.

Eligibility criteria for the trial were patients younger than 56 years who were diagnosed with one of the selected study diseases (e.g., leukemia). Patients with an active central nervous system, with Karnofsky scores below 50% (i.e., 10–100), who previously had been treated with autologous or allogeneic stem cell transplantation, with uncontrolled infections, who were pregnant or breastfeeding, or those having suitable related donors were not eligible. As presented in more detail in Wagner et al. (2005), 39% of the sample at baseline was diagnosed with chronic myelogenous leukemia, 17% with acute myelocytic leukemia, 16% with acute lymphocytic leukemia, 6% with myelodysplastic syndrome, 3% with other leukemias, and 1% with non-Hodgkin lymphoma.

Of the 105 participants in the study, 53% were male and 47% were female; 88% were Caucasian and 7% were African American. Educational levels varied; 4% had not completed high school, 31% were high school graduates, 53% had some college education, and 12% had at least a college degree. Fifty-seven percent were married, 36% single, and 7% divorced or widowed. Participant age ranged from 19–56 (\bar{X} = 35.98, SD = 10.59).

Procedure

Institutional review board approval was obtained. All interviews were conducted by telephone and lasted about 45 minutes. Before the interviews, participants were mailed keys that defined the response scale for each measure. When patients were unable to complete the interview in one session, they were recontacted to finish it.

Measures

The brief **Coping Orientation to Problems Encountered** (Carver, 1997) was used to measure coping style. The scale consists of 30 self-report items, with responses ranging from 1 (I usually don't do this at all) to 4 (I usually do this a lot). Participants were asked to complete the scale in terms of how they generally respond to stressful events. Three theoretically grounded subscales were constructed: emotion-focused coping (emotion-focused),

instrumental coping (action-focused), and avoidant coping (behavior and cognitive escape). Examples of relevant items are as follows: “I have been getting emotional support from others” (emotion-focused), “I have been taking action to try to handle the situation better” (instrumental), and “I have been saying to myself “This isn’t real”” (avoidant). Internal consistency reliability of the subscales, measured using the Cronbach alpha, was 0.76 for emotion-focused coping, 0.65 for instrumental coping, and 0.57 for avoidant coping.

The **Bush Bone Marrow Transplant Module** (Bush, Donaldson, Haberman, Dacanay, and Sullivan, 2000) is a measure of symptoms experienced by patients with cancer, particularly after hematopoietic stem cell transplantation. Patients respond to 31 symptom items by indicating to what degree each symptom interfered with their life during the past 14 days; responses range from 1 (not at all) to 4 (very much).

Symptom items yielded nine subscales: gastrointestinal symptoms, skin problems (e.g., rash), eye problems (e.g., gritty feeling), mouth problems (e.g., sores), breathing problems (e.g., wheezing), joint problems (e.g., pain in joints), worry or fear symptoms (e.g., anxiety), and cognitive difficulties (e.g., difficulty maintaining a train of thought). Items were summed to achieve total scores, with higher scores representing more interference. Cronbach alpha coefficients were calculated for each subscale for the six-month post-transplantation time points. An additional item, developed for this study, assessed interference from chronic graft-versus-host (GVHD).

Results

Descriptive information on coping styles and on interference for the symptom clusters and for the single GVHD item at six months post-treatment can be found in Table 1. The means reported in that table are item means, and the standard deviations are scale standard deviations.

Hierarchical regression analyses examined the relationship between coping style, measured at baseline, and symptom interference, measured six months post-treatment. Before analyses were conducted, interference scores at six months were compared for treatment arm differences; only interference from gastrointestinal symptoms revealed a treatment arm difference ($t[103] = 2.07, p < 0.04$) (depleted T-cell $\bar{X} = 1.37, SD = 0.33$; conventional treatment $\bar{X} = 1.24, SD = 0.33$). Examination of regression assumptions revealed the presence of skewness and kurtosis in several interference scale distributions. To compensate for non-normal distributions, appropriate transformations (e.g., inverse, \log_{10} , square root) were applied to interference scale scores. Results of the transformed data revealed minimal changes to distributions and significance levels. The original data were retained and used in all analyses. In all regression

Table 1. Mean, Standard Deviation, and Internal Consistency (α) of Coping Scales and Interference Scales

Scale	Baseline (N = 255)		
	\bar{X}	SD	α
Coping			
Emotion (N = 10)	3.06	0.5	0.76
Instrumental (N = 10)	2.72	0.4	0.65
Avoidant (N = 10)	1.69	0.32	0.57
Scale	Six Months (N = 105)		
	\bar{X}	SD	α
Gastrointestinal (N = 9)	1.3	0.33	0.7
Skin (N = 5)	1.21	0.4	0.72
Eye (N = 6)	1.15	0.31	0.77
Mouth (N = 5)	1.35	0.41	0.58
Breathing (N = 4)	1.22	0.35	0.58
Joint (N = 3)	1.4	0.6	0.64
Worry or fear (N = 2)	1.53	0.67	0.67
Cognitive difficulty (N = 3)	1.48	0.75	0.93
Graft-versus-host disease (N = 1)	1.38	0.78	–

models, age and gender (male = 1, female = 0), were entered into the first block, with emotion-focused coping, instrumental coping, and avoidant coping in the second. Treatment arm (0 = depleted T cell, 1 = conventional treatment) also was entered in the first block for the regression predicting gastrointestinal interference. Dependent variables were the eight symptom-interference scales. A Bonferroni correction was used to control for experiment error for coping style (e.g., $0.05/9 = 0.006$).

Analyses of six-month data revealed that age was a significant predictor of interference from chronic GVHD ($\beta = 0.21$), eye symptoms ($\beta = 0.23$), and mouth symptoms ($\beta = 0.26$), as all p values were less than 0.05. The direction of the relationship was such that the older patients were, the more life interference from symptoms they experienced. In addition, breathing symptom interference was predicted by gender ($\beta = 0.27, p < 0.01$); women experienced more interference from breathing symptoms than men. No other interference scales were predicted by age or gender. In addition, the treatment arm did not predict the gastrointestinal interference scale.

Emotion-focused and instrumental coping did not predict interference scales; all p values were greater than 0.05. Avoidant coping was a significant predictor of increased interference from skin ($\beta = 0.31, p < 0.006$), eye ($\beta = 0.29, p < 0.006$), mouth ($\beta = 0.26, p < 0.01$), and gastrointestinal ($\beta = 0.2, p < 0.05$) symptoms. In each case, more avoidant coping predicted more interference. Similarly, avoidant coping predicted interference from cognitive symptoms such as fear or worry and cognitive difficulties ($\beta = 0.376$ and 0.316 , respectively, $p < 0.006$ for both). Results of regression analyses are presented in Table 2.

Discussion

In the current study, the authors considered how three dispositional coping styles—avoidant, emotion-focused, and instrumental—predicted the degree of interference caused by common post-HSCT symptoms at six months post-treatment. Avoidant styles are comprised of coping responses that avoid either emotional distress or problem resolution, emotion-focused styles include responses that manage negative affect, and instrumental styles are problem-oriented and focus on changing some aspect of the difficulty. As the authors had hypothesized, an avoidant coping style predicted increased interference from symptoms. Contrary to expectations, however, neither instrumental nor emotion-focused coping predicted decreased interference. That finding likely is a result of the floor effect among interference scores; the average patient in the current study reported little symptom interference after treatment. Item means for interference data typically were between 1 (a little bit of interference) and 2 (moderate interference). However, the large standard deviations suggest a range of patient interference experiences.

Patients receiving treatment for cancer report many symptoms with varying degrees of severity (Edman, Larsen, Hägglund, & Gardulf, 2001). However, no studies were found in the literature that assessed how coping style specifically affects symptom interference. Although healthcare professionals should assess the presence of symptoms, the current study demonstrates that they also should assess how much interference those symptoms are imposing on daily life.

The data add to the evidence that avoidant coping predicts maladjustment (Aarstad, Aarstad, Bru, & Olofsson, 2005; Stanton, Collins, & Sworowski, 2001). One study examining coping styles found increased avoidant coping led to elevations in anxiety, anger, and depression (Fife et al., 2000). Avoidant coping among gynecologic patients with cancer receiving extensive chemotherapy was associated with poorer emotional and physical well-being (Costanzo, Lutgendorf, Rothrock, & Anderson, 2006). Together, avoidant coping and low social support were identified as risk factors for high levels of distress among individuals with chronic illness (Devine, Parker, Fouladi, & Cohen, 2003).

Strengths of the current study are the use of a longitudinal research design; limitations include the sample being predominantly Caucasian and well educated. The descriptive interference data suggest that most patients do not experience high levels of interference from their symptoms, but the large variances indicate a wide range of patient experiences. In addition, although the authors measured coping style at baseline with a measure that reflects general use of coping strategies, coping was not reassessed after the initiation of treatment to determine if coping style translated to coping response. Finally, nine regressions were conducted, inflating the probabil-

ity of a type I error. Notably, although the gastrointestinal and mouth scales were statistically significant at a 0.05 level, they did not reach the corrected significance level of $p < 0.006$.

Implications for Nursing Practice

The current study's data suggest that nursing researchers evaluate whether changing coping strategies among patients with cancer from avoidant to emotion-focused or problem-solving coping will decrease subsequent

Table 2. Regression Coefficients for Coping Style Predicting Six-Month Symptom Interference

Interference and Coping Style	B	SE β	β	R ²
Gastrointestinal				0.1
Emotion	-0.06	0.07	-0.11	
Instrumental	0.07	0.08	0.09	
Avoidant	0.17	0.09	0.2*	
Skin				0.1
Emotion	-0.04	0.05	-0.11	
Instrumental	0.05	0.05	0.1	
Avoidant	0.17	0.06	0.31***	
Eye				0.14
Emotion	0.03	0.04	0.09	
Instrumental	-0.05	0.05	-0.11	
Avoidant	0.15	0.05	0.29***	
Mouth				0.14
Emotion	-0.06	0.05	-0.14	
Instrumental	-0.02	0.05	-0.03	
Avoidant	0.15	0.06	0.26**	
Breathing				0.11
Emotion	0.02	0.03	0.08	
Instrumental	-0.04	0.04	-0.1	
Avoidant	0.03	0.04	0.07	
Joints				0.06
Emotion	-0.02	0.04	-0.07	
Instrumental	0.08	0.05	0.17	
Avoidant	0.1	0.05	0.18	
Worry or fear				0.14
Emotion	-0.02	0.03	-0.07	
Instrumental	-	0.04	0.01	
Avoidant	0.14	0.04	0.38***	
Cognitive difficulties				0.11
Emotion	-0.03	0.05	-0.07	
Instrumental	0.02	0.06	0.04	
Avoidant	0.2	0.06	0.32***	
GVHD				0.08
Emotion	-0.02	0.02	-0.12	
Instrumental	0.01	0.02	0.07	
Avoidant	0.04	0.02	0.19	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.006$

GVHD—graft-versus-host disease; SE—standard error

Note. Age and gender were controlled in regressions. Treatment arm was controlled in regression predicting gastrointestinal.

symptom interference. Nursing professionals can be more cognizant of how patients are coping before treatment and can assist patients in understanding how their coping will relate to their later daily experience and well-being. In addition, for patients who have displayed poor or avoidant coping in previously stressful circumstances, nurses might implement a brief intervention to assist patients in acquiring a more optimistic stance toward coping, as well as specific skills. One example of how such an approach might operate is a report by Bevans et al. (2010) in which changing attitudes about problem solving to an approach orientation and teaching problem-solving skills were included in a family intervention package summarized with the acronym COPE: creativity, optimism, planning, and expert information. Their results suggested that patients and family caregivers benefited

from the treatment intervention, with patients showing improvement in problem-solving skills.

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References

- Aarstad, A.K., Aarstad, H.J., Bru, E., & Olofsson, J. (2005). Psychological coping style versus disease extent, tumour treatment and quality of life in successfully treated head and neck squamous cell carcinoma patients. *Clinical Otolaryngology*, *30*, 530–538. doi:10.1111/j.1749-4486.2005.01114.x
- Altmaier, E.M., Ewell, M., McQuellon, R., Geller, N., Carter, S.L., Henslee-Downey, J., . . . Gingrich, R. (2006). The effect of unrelated donor marrow transplantation on health-related quality of life: A report of the unrelated donor marrow transplantation trial (T-cell depletion trial). *Biology of Blood and Marrow Transplantation*, *12*, 648–655. doi:10.1016/j.bbmt.2006.01.003
- Bevans, M., Castro, K., Prince, P., Shelburne, N., Prachenko, O., Loscalzo, M., . . . Zabora, J. (2010). An individualized dyadic problem-solving education intervention for patients and family caregivers during allogeneic hematopoietic stem cell transplantation: A feasibility study. *Cancer Nursing*, *33*, E24–E32. doi:10.1097/NCC.0b013e3181be5e6d
- Billings, A.G., & Moos, R.H. (1981). The role of coping responses and social resources in attenuating the stress of life events. *Journal of Behavioral Medicine*, *4*, 139–157. doi:10.1007/BF00844267
- Broers, S., Kaptein, A.A., Le Cessie, S., Fibbe, W., & Hengeveld, M.W. (2000). Psychological functioning and quality of life following bone marrow transplantation: A 3-year follow-up study. *Journal of Psychosomatic Research*, *48*, 11–21. doi:10.1016/S0022-3999(99)00059-8
- Bush, N.E., Donaldson, G.W., Haberman, M.H., Dacanay, R., & Sullivan, K.M. (2000). Conditional and unconditional estimation of multidimensional quality of life after hematopoietic stem cell transplantation: A longitudinal follow-up of 415 patients. *Biology of Blood and Marrow Transplantation*, *6*, 576–591. doi:10.1016/S1083-8791(00)70067-X
- Carver, C.S. (1997). You want to measure coping but your protocol's too long: Consider the Brief COPE. *International Journal of Behavioral Medicine*, *4*, 92–100. doi:10.1207/s15327558ijbm0401_6
- Costanzo, E.S., Lutgendorf, S.K., Rothrock, N.E., & Anderson, B. (2006). Coping and quality of life among women extensively treated for gynecologic cancer. *Psycho-Oncology*, *15*, 132–142. doi: 10.1002/pon930
- Devine, D., Parker, P.A., Fouladi, R.T., & Cohen, L. (2003). The association between social support, intrusive thoughts, avoidance, and adjustment following an experimental cancer treatment. *Psycho-Oncology*, *12*, 453–462. doi:10.1002/pon.656
- Edman, L., Larsen, J., Hägglund, H., & Gardulf, A. (2001). Health-related quality of life, symptom distress and sense of coherence in adult survivors of allogeneic stem-cell transplantation. *European Journal of Cancer Care*, *10*, 124–130. doi:10.1046/j.1365-2354.2001.00251.x
- Fife, B.L., Huster, G.A., Cornetta, K.G., Kennedy, V.N., Akard, L.P., & Broun, E.R. (2000). Longitudinal study of adaptation to the stress of bone marrow transplantation. *Journal of Clinical Oncology*, *18*, 1539–1549.
- Folkman, S., & Moskowitz, J.T. (2004). Coping: Pitfalls and promise. *Annual Review of Psychology*, *55*, 745–774. doi:10.1146/annurev.psych.55.090902.141456
- Gaston-Johansson, F., & Foxall, M. (1996). Psychological correlates of quality of life across the autologous bone marrow transplant experience. *Cancer Nursing*, *19*, 170–176. doi:10.1097/00002820-199606000-00003
- Hwang, S.S., Chang, V.T., & Kasimis, B. (2002). Dynamic cancer pain management outcomes: The relationship between pain severity, pain relief, functional interference, satisfaction and global quality of life over time. *Journal of Pain and Symptom Management*, *23*, 190–200. doi:10.1016/S0885-3924(01)00418-3
- Jim, H.S., Andrykowski, M.A., Munster, P.N., & Jacobsen, P.B. (2007). Physical symptoms/side effects during breast cancer treatment predict posttreatment distress. *Annals of Behavioral Medicine*, *34*, 200–208.
- Molassiotis, A., Van Den Akker, O.B., Milligan, D.W., & Goldman, J.M. (1997). Symptom distress, coping style and biological variables as predictors of survival after bone marrow transplantation. *Journal of Psychosomatic Research*, *42*, 275–285. doi:10.1016/S0022-3999(96)00298-X
- Shapiro, J.P., McCue, K., Heyman, E.N., Dey, T., & Haller, H.S. (2010). Coping-related variables associated with individual differences in adjustment to cancer. *Journal of Psychosocial Oncology*, *28*, 1–22. doi:10.1080/07347330903438883
- Stanton, A.L., Collins, C.A., & Sworowski, L.A. (2001). Adjustment to chronic illness: Theory and research. In A. Baum, T.A. Revenson, & J.E. Singer (Eds.), *Handbook of health psychology* (pp. 387–403). Mahwah, NJ: Erlbaum.
- Wagner, J.E., Thompson, J.S., Carter, S.L., & Kernan, N.A. (2005). Effect of graft-versus-host disease prophylaxis on 3-year disease-free survival in recipients of unrelated donor bone marrow (T-Cell Depletion Trial): A multi-centre, randomised phase II-III trial. *Lancet*, *366*, 733–741. doi:10.1016/S0140-6736(05)66996-6
- Wang, S.Y., Tsai, C.M., Chen, B.C., Lin, C.H., & Lin, C.C. (2008). Symptom clusters and relationships to symptom interference with daily life in Taiwanese lung cancer patients. *Journal of Pain and Symptom Management*, *35*, 258–266. doi:10.1016/j.jpainsymman.2007.03.017
- Ware, J.E. (1994). *SF-36® physical and mental health summary scales: A user's manual*. Boston, MA: The Health Institute.
- Wells, K.J., Booth-Jones, M., & Jacobsen, P.B. (2009). Do coping and social support predict depression and anxiety in patients undergoing hematopoietic stem cell transplantation? *Journal of Psychosocial Oncology*, *27*, 297–315. doi:10.1080/07347330902978947