STAGE II BREAST CANCER: DIFFERENCES BETWEEN FOUR COPING PATTERNS IN SIDE EFFECTS DURING ADJUVANT CHEMOTHERAPY

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Abstract—Fifty-six women with stage II breast cancer receiving adjuvant chemotherapy were recruited for a study evaluating and comparing coping patterns for differences in physical and psychological side effects during treatment with adjuvant chemotherapy. Cluster analyses were used to split women into confrontive, avoidant-confrontive, avoidant-resigned, and resigned coping clusters. Side-effect measurements were taken on the day of adjuvant chemotherapy infusion and 3 and 7 days later. Repeated measures ANCOVAs indicated that coping clusters predicted significant variance in physical, psychological, and total side effects when variance in covariates was held constant. Confrontive subjects reported significantly fewer psychological and physical symptoms than avoidant-confrontive and avoidant-resigned copers. Confrontive copers also reported fewer side effects than resigned copers, but this difference was not significant when differences in covariate distributions were controlled. Particularly robust differences were noted when confrontive copers were compared with avoidant-confrontive copers. Results suggest that a critical component in optimal coping may be a willingness to discuss and think about illness.

Keywords: Adjuvant chemotherapy; Breast cancer; Coping; Quality-of-life; Side effects.

INTRODUCTION

Which coping patterns are most successful when individuals face a predictably challenging stressor such as chemotherapy for breast cancer? We know that distinct coping behaviors and thoughts can influence outcomes. Most researchers have focused on individual coping behaviors or thoughts such as disclosure [14], optimism [18], information seeking [19], denial [13], or avoidance [20]. These coping variables have been related to depression and anxiety [1–5], adjustment [6–9], and the intensity of pain experienced [10–12]. Researchers have found possible links between coping and survival [13–17].

Although useful, it is difficult to apply these findings to clinical situations. Which are the most important of these coping characteristics? How does possessing more than one of these coping characteristics at a time influence outcomes? The primary
research group studying patterns of coping thoughts and behaviors have been Greer, Pettingale, Morris, and colleagues [21–23]. They used structured interviews to investigate coping patterns they labeled fighting spirit, helplessness–hopelessness, anxious preoccupation, fatalism, and avoidance. The current research adds to the coping thoughts and behaviors included in these patterns other individual coping behaviors such as disclosure [24] and information seeking [19] that were not included by Greer and colleagues but which have demonstrated positive effects on outcomes.

Our first study examined how the more important of these characteristics aggregated together [25]. The results of this study indicated that, using cluster analysis, it was possible to reliably identify four coping patterns in cancer patients: confrontive; avoidant-confrontive; avoidant-resigned; and resigned. Table I presents comparisons between each of these coping patterns and their characteristics.

We used the same methodology presented in that study to investigate the presence of these patterns in 56 stage II breast cancer patients who were undergoing treatment with adjuvant chemotherapy. We selected this sample because they share prognosis, staging, and undergo homogeneous treatments.

When compared with the entire sample, the confrontive group (n=12) consisted of individuals who endorsed items indicated they were more optimistic regarding their future, sought information from medical sources more often, and wanted to be more involved in their treatment decisions. In addition, they did not avoid disclosing thoughts about breast cancer to family and friends nor were they likely to attempt to distract themselves from thinking about it.

When compared with the entire sample, the avoidant-confrontive group (n=19) consisted of individuals who endorsed items indicating they were more likely to seek information from medical professionals, were more optimistic regarding their future, and wanted to be involved in treatment decisions. They did not, however, want to think about or discuss breast cancer with friends or family, and endorsed items indicating that they actively avoided the topic and used distraction when the topic was introduced.

When compared with the entire sample, avoidant-resigned copers (n=15) endorsed items indicating they were more pessimistic about their future. They did not

<table>
<thead>
<tr>
<th>Coping cluster</th>
<th>Confrontive</th>
<th>Avoidant confrontive</th>
<th>Avoidant resigned</th>
<th>Resigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information-seeking from medical professionals</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Optimism</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Desire to be involved in treatment decisions</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Willingness to speak to family and friends about the disease</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Distracting behaviors</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Pessimism</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>
want to be involved in treatment decisions and avoided thinking about, or discussing the illness with friends or family. Like avoidant-confrontive copers, they endorsed items indicating that they actively avoided the topic and used distraction when the topic was introduced.

Last, when compared with the entire sample, the resigned group (n=9) consisted of individuals who endorsed items suggesting that they felt more pessimistic and hopeless about their future. In addition, they wanted to be less involved in treatment decisions and were less interested in seeking information from medical professionals or other sources. However, resigned copers did not shy away from conversations about the illness with friends or family and did not avoid thinking about the illness.

**Hypotheses**

Although the effects of these four patterns of coping on side effects during chemotherapy has yet to be researched, an integrative review of the literature suggests that the greatest benefits would be conferred on those who adopted a confrontive coping style. Optimistic breast cancer patients, or those labeled as having "fighting spirit," have been found to have longer survival [21] and a greater sense of well being [26]. Information seeking and involvement in treatment decisions have been related to positive psychological and physical outcomes [19, 27–33] and a willingness to think about and disclose traumatic experiences has been related to improved health [24].

In light of the above findings, we tested the following two hypotheses: First, self-reported coping patterns would significantly predict variance in side effects when other influential variables like socioeconomic status [34], type of chemotherapy [35, 36], and satisfaction with social support [37–41] were held constant. Second, confrontive copers would experience fewer side effects than avoidant-resigned, avoidant-confrontive, or resigned copers. We speculated that the smallest differences would be between confrontive and avoidant-confrontive copers as the tendency to distract oneself from thinking about side effects, present in the avoidant-confrontive copers, might be beneficial. To test these hypotheses women with stage II breast cancer were invited to participate in a study evaluating coping and side effects during adjuvant chemotherapy.

**METHOD**

**Subjects**

The original sample included 56 women with stage II breast cancer who were attempting to maintain or achieve first remission who were being treated with adjuvant chemotherapy. One subject’s data was radically incomplete (coping data was missing). To avoid having to adjust for missing data the total number of subjects was reduced to 55. All participants were receiving adjuvant chemotherapy during participation. Twenty-one (37.5%) subjects were recruited from three private oncology practices, 11 (19.6%) from a community-based private hospital, and 24 (42.8%) from two university-based teaching hospitals. Mean age of participants was 48.42 years (so=10.96). Subjects ranged in age from 33 to 76 years. (The sample was slightly younger than the mean age of breast cancer patients. However, it is likely that the sample accurately represents the age of patients who receive chemotherapy at these sites as older patients were more often treated with hormonal therapies rather than chemotherapy).

Nineteen of the 56 women (33.93%) reported being menopausal. On average, subjects had completed at least 1 year of college or taken specialized training following high school. Forty-two subjects (75%) were married or living with a significant other. The remaining 14 subjects were single or divorced. Fifty-two subjects were Caucasian, and four were African-American. On Hollingshead’s [73] four-factor socio-
The sample included 60 breast cancer patients (n=60) participating in a study to evaluate the impact of treatment on coping mechanisms and social support. Thirty-two had modified radical mastectomies or total mastectomies, 10 had partial mastectomies, and 11 had lumpectomies or tylectomies. Subjects were treated with one of two standard regimens for stage II breast cancer, including either cyclophosphamide, methotrexate, and 5-fluorouracil (CMF), or cyclophosphamide, doxorubicin, and 5-fluorouracil (CAF). Twenty-one subjects received doxorubicin-based regimens, accounting for 37.5% of the sample. The remaining 35, accounting for 62.5% of the sample, received methotrexate-based treatment. Most patients had been receiving chemotherapy at the time of the study for 3 months (mean=3.17 months, sd=2.02). Mean time since diagnosis was 4.59 months (sd=2.2). All subjects had had at least one prior chemotherapy treatment. Most subjects had surgery and then a two or three cycles of chemotherapy before participating.

**Measures**

**Demographics questionnaire.** A demographics questionnaire asked subjects to provide identifying information including age, race, education, occupation, spouse’s education, and spouse’s occupation. Subjects were also asked to provide medical information such as the type of prior surgery, history of illness, and current course of treatment.

**Medical Coping Modes Questionnaire (MCMQ).** The Medical Coping Modes Questionnaire (MCMQ) is a 19-item, factor analytically derived questionnaire designed to assess coping pattern [43, 44]. It provides scores on three subscales labeled “Confrontation,” “Avoidance,” and “Acceptance–resignation.” Sample questions include the following: “How much do you want to be involved in decisions regarding your treatment?”; “How often do you feel there is really no hope for your full recovery?”; and “How much has your illness caused you to think about certain things in your life in a more positive way?” Responses are given on a four-point scale: (1) “All the time”; (2) “Frequently”; (3) “Sometimes”; and (4) “Never.” Feifel and colleagues [43, 44] report internal consistency reliability ratings as confrontive α=0.70, avoidance α=0.66, and acceptance–resignation α=0.67. Construct validity data were obtained from personality measures, self-report data from the patients concerning their coping reactions to their illness, reports from the physicians treating the responding patients, and the report of the patient’s spouses. Results supported excellent construct validity [44]. It is notable that the MCMQ was designed to measure coping modes that are assumed to be more consistent than states and less consistent than personality traits [43]. This measure was selected because it queries patients for the thought patterns and behaviors we felt were best studied in the literature to date.

**Social Support Questionnaire.** Created through a factor analysis of 62 original items, the Social Support Questionnaire (SSQ) is a 27-item questionnaire measuring the number of people in a person’s given social support network and his/her satisfaction with that network [45]. Subjects list the people they can count on for support in a given set of circumstances and report their overall level of satisfaction with that support on a 1–6 Likert scale (1=very dissatisfied, 6=very satisfied). The SSQ produces two scores, a number score (SSQN) and a satisfaction score (SSQS).

The SSQ was normed on 602 college students. Internal consistency ratings, as calculated by Cronbach’s alpha, were very high (satisfaction α=0.94, number α=0.97). Test–retest reliability in the college population over a 4-week period was r=0.90 for N and r=0.83 for S. Validity data were obtained using three scales of the Multiple Affect Adjective Check List [46], the Eysenck Personality Inventory Scale [47], and the Marlowe–Crowne Social Desirability Scale [48]. Results suggest that the SSQ has strong convergent and discriminant validity with these measures [45]. Reviews of the SSQ indicate that it is generally considered an excellent measure of social support [49].

The mean number of social supports (SSQN) listed by subjects in this sample was 24.35 (sd=13.07). Thus, on average, subjects had roughly four individuals they relied on when in the six situations listed in the inventory. With few exceptions, individuals in the sample generally reported high satisfaction with the social support they received (SSQS). The mean satisfaction for all subjects was 5.33 (sd=0.78) on a six-point Likert scale inventory for all six situations listed.

**Rotterdam Symptom Checklist (RSCL).** The Rotterdam Symptom Checklist (RSCL) was selected because it is disease-specific, measures 30 different side effects, is completed by the patient, and can be administered by telephone. The questionnaire generates scores on three subscales, including physical side effects, psychological side effects, and overall or total side effects [50, 51]. The RSCL has been used in a number of studies of breast cancer patients [51–55].

Reported ratings of internal consistency were good (r=0.88). Alpha coefficients for the psychological and physical subscales were also within an acceptable range across populations (psychological α’s=0.88–0.94, physical α’s=0.71–0.88) [50]. Concurrent and discriminant validity data, produced through comparisons with other inventories, including the Hospital Anxiety and Depression Scale [56] and the Psychological Adjustment to Illness Scale [57], were favorable [51].
It is notable that the Rotterdam scores take into account both the number and intensity of side effects. Side effects are responded to on a four-point scale (1 = not at all, 2 = a little, 3 = somewhat, and 4 = very much). Thus, a difference of eight points could represent a difference in eight side effects by a magnitude of one, or four side effects by two, etc.). Higher scores represent better functioning. That is, individuals with high scores reported fewer and/or less intense side effects. The highest score possible is 120, the lowest is 30.

Procedure

Prior to participation all subjects gave informed consent as mandated by the Institutional Review Board for Protection of Human Subjects at that site. Subjects identified for participation included stage II breast cancer patients who met the following criteria: (1) scheduled to receive adjuvant chemotherapy that day; (2) attempting to achieve first remission; (3) having had at least one previous cycle of chemotherapy; and (4) were available for follow-up. The purpose of the study was described to patients as a study "to help the medical community better understand what it is like to experience the day-to-day effects of chemotherapy and how coping patterns influence side effects in stage II breast cancer patients." Subjects were told before they participated that the researcher was not connected in any way to their physician or oncology nurse and that their treatment would not be altered in any way by participation or nonparticipation. Furthermore, they were informed that the researcher would not be communicating with anyone, including their physician and oncology nurse, regarding side effects or any other information they reported. All subjects were told that the study was confidential and that their names would be removed from all records immediately after the final contact, 1 week from the day they completed the questionnaires.

Subjects had contact with the investigator on the day of chemotherapy (day 1), 3 days later (day 3), and 7 days later (day 7). These days were selected for study because they include the time it takes to experience the most acute side effects of chemotherapy used to treat stage II breast cancer (usually around day 3), and for recovery (usually by day 7). While fatigue and surgery-induced lymphadema continued throughout treatment, by day 7 the majority of chemotherapy side effects had subsided for the vast majority of patients.

At the initial contact subjects completed a questionnaire packet consisting of the demographics questionnaire, the SSQ, the MCMQ, and the RSCL. On day 3 the researcher telephoned the subject at a predetermined time to collect the RSCL ratings. The researcher read the following transcript to each subject: "What we are going to do refers to your last 12 waking hours. I'm going to read you a symptom and I'd like you to respond on a four-point scale with '4' meaning 'very much' and '1' meaning 'not at all.' For example, let's say I said 'headaches,' and you had been having quite a few headaches during the last 12 hours. You might say '4,' or if you had only been bothered a little you might just say '2.' Are you ready? 'Lack of appetite.'" The researcher then read the items, one by one, from the Rotterdam Symptom Checklist. Before ending the phone call, the researcher asked the subject to confirm the time the subject wished to be contacted on the seventh day. On day 7 this process was repeated. After responding subjects were offered an opportunity to ask questions and were asked not to discuss their responses with any other potential subjects.

Following participation, subjects were mailed an information form that provided them with an assigned subject number and the phone number and address of the researcher. The form thanked participants for their efforts and informed subjects that if they telephoned or wrote to the researcher identifying themselves by subject number they would receive summary data from the study.

RESULTS

Analysis strategy

First, cluster analyses were used to group subjects who used similar coping patterns. This cluster analysis replicated the procedure reported previously [25]. Next, ANCOVAs were used to evaluate the influence of coping pattern on side effects while partialing out differences between groups on covariables including age, type of surgery, time since last chemotherapy treatment, menopausal status, socioeconomic status, type of chemotherapy regimen, number of social supports, satisfaction with social supports, and site of treatment. That is, the ANCOVAs tested if having a different coping pattern would result in differences in side effects if all of the subjects were of the same age, had the same surgery, etc. Last, the groups were compared to assess which had significantly different side-effect profiles.
Cluster analyses. Results of the pilot study [25] indicated that it was possible to reliably produce identifiable patterns of coping in a sample of cancer patients by cluster analyzing the Medical Coping Modes Questionnaire. The same methodology was used for the current sample. Using the SYSTAT statistics program, a squared Euclidean distance measure was calculated. Then, using Ward's method, the data were placed into hierarchical clusters. Once in hierarchical clusters, the data were organized such that each datapoint started at one end of the hierarchy tree and were grouped until all the data were in one large group. The stopping rule developed by Robinson and colleagues was applied [58]. This clustering strategy produced four clusters of behaviors and cognitions with means significantly greater than the mean of the entire sample (see Fig. 1). In other words, a person in the resigned group endorsed more pessimistic items than the average person in the sample. These clusters replicated those found in the pilot study [25].

Preliminary analyses. Plotted in Fig. 2 are mean scores for total side effects, psychological side effects, and physical side effects within each of the coping clusters across the three measurement occasions. These mean scores do not take into account differences in distributions of covariates across clusters. So, although Fig. 2 might be informative, analyses that control for these covariates are still warranted.

Three variables have previously been identified as influential in predicting quality-of-life outcomes. These include socioeconomic status [34], type of chemotherapy [35, 36], and satisfaction with social support [37–41]. While these are the only three variables that have been identified in the past as robust predictors of quality of life,
Coping and quality of life

Fig 2. Comparisons of mean (a) total side effects, (b) psychological side effects, and (c) physical side effects for coping clusters on days 1, 3, and 7 of adjuvant chemotherapy. Note: Higher numbers reflect fewer side effects.

the most conservative approach to testing the hypotheses was to control for any variables that might theoretically have an influence on side effects. For this reason, five additional variables were also measured and controlled for in subsequent ANCOVAs testing the hypotheses of this study. The covariates for these ANCOVAs were as follows: age, type of surgery, time since last chemotherapy treatment, menopausal status, socioeconomic status (SES), type of chemotherapy regimen, number of social supports, satisfaction with social supports, and site of treatment.

To discern whether or not side effects changed over time (i.e., over the three measurement occasions), three sets of analyses were performed. First, the main effect of time on the physical, psychological, and total side-effects variables was examined. Second, the effects of the covariates on the three side-effects variables were examined over time. Third, the effects of the clusters on side effects over time were examined. If, overall, there is no effect of measurement occasion, the side-effects variables could be aggregated, thus simplifying the model.

There were significant time effects for total side effects, $F(2, 104)=3.26, p=0.042$, and physical side effects, $F(2, 104)=4.82, p=0.01$. As shown, total side effects dropped on day 3 and then rebounded past initial levels on day 7. Physical side effects demonstrated the same pattern as total side effects; that is, it dropped during the third day of treatment and improved beyond day 1 levels on day 7. Although not significant, psychological side effects demonstrated a trend toward steady im-
Table II.—Means and standard deviations of side effect variables within treatment day

<table>
<thead>
<tr>
<th>Side effects variable</th>
<th>Treatment day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day 1</td>
</tr>
<tr>
<td>Physical</td>
<td>M  SD</td>
</tr>
<tr>
<td>Physical</td>
<td>61.65 2.26</td>
</tr>
<tr>
<td>Psychological</td>
<td>24.67 1.77</td>
</tr>
<tr>
<td>Total b</td>
<td>84.31 3.87</td>
</tr>
</tbody>
</table>

* Scores represent an absence of side effects; that is, higher scores represent having fewer side effects.

* Sum of physical and psychological side effects.

Whereas we know that the side-effects measure changes over time, we do not know if the effects of the covariates on side effects change over time. To address whether the effects of the covariates on side effects change over time (i.e., across measurement occasions), covariate×occasion interactions were computed for each of the nine aforementioned covariates. None of these were significant for total side effects or physical side effects. For psychological side effects, there was one significant site×occasion interaction for one of the dummy-coded sites, $F(2, 78)=3.174, p=0.047$, suggesting that at one site the influence of covariates may have changed over time when compared with one other site. With this exception, the effects of the covariates on side effects did not change over time.

Even if the relationship between the covariates and side effects does not change over time, there still might be an effect of time in the relationship between the coping clusters and side effects. Thus, to test whether the effects of coping cluster on side effects changes over time, a Cluster×Occasion interaction was evaluated for each of the three side-effects variables (see Fig. 2). None of these interactions were significant: $F(6, 78)=0.62, p=0.71$, for total side effects; $F(6, 78)=0.72, p=0.61$, for physical side effects; and $F(6, 78)=0.53, p=0.78$, for psychological side effects. Thus, the effects of coping cluster on side effects are maintained over the three measurement occasions.

To summarize, despite the fact that the side-effect scores were significantly different on different measurement occasions, the effects of neither the covariates nor the clusters on side effects changed over time. Therefore, one can sum the side effects variables across measurement occasions to simplify the model for testing hypotheses. Thus, for each participant, each of the three side effects scores were summed across the three measurement occasions. These global variables then served as dependent variables in three between-subjects ANCOVAs. Cluster was the between-subjects factor, whereas, as stated previously, the covariates were age, type of surgery, time since last chemotherapy treatment, menopausal status, socioeconomic status, type of chemotherapy regimen, number of social supports, satisfaction with social supports, and site where treatment was received.

Three variables had significant or near significant predictive relationships with the side effects. Socioeconomic status consistently predicted a significant amount of
Table III.—Repeated measures ANCOVAs, influence of significant covariates on side effects

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Covariate</th>
<th>df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global total side effects</td>
<td>Socioeconomic</td>
<td>1, 39</td>
<td>9.407</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>Chemotherapy</td>
<td>1, 39</td>
<td>3.832</td>
<td>0.057</td>
</tr>
<tr>
<td></td>
<td>Soc. support sat.</td>
<td>1, 39</td>
<td>9.149</td>
<td>0.004</td>
</tr>
<tr>
<td>Global physical side effects</td>
<td>Socioeconomic</td>
<td>1, 39</td>
<td>6.082</td>
<td>0.018</td>
</tr>
<tr>
<td></td>
<td>Chemotherapy</td>
<td>1, 39</td>
<td>3.707</td>
<td>0.067</td>
</tr>
<tr>
<td></td>
<td>Soc. support sat.</td>
<td>1, 39</td>
<td>7.55</td>
<td>0.009</td>
</tr>
<tr>
<td>Global psychological side effects</td>
<td>Socioeconomic</td>
<td>1, 39</td>
<td>6.95</td>
<td>0.009</td>
</tr>
<tr>
<td></td>
<td>Chemotherapy</td>
<td>1, 39</td>
<td>3.707</td>
<td>0.067</td>
</tr>
<tr>
<td></td>
<td>Soc. support sat.</td>
<td>1, 39</td>
<td>14.257</td>
<td>0.001</td>
</tr>
</tbody>
</table>

...variance in side effects when variance from other variables was held constant. Satisfaction with social support was also a significant predictor of total side effects and psychological side effects, but not of physical side effects. Last, chemotherapy regimen approached predicting a significant portion of the variance in total side effects. These relationships are displayed in Table III.

**Hypothesis testing**

To address the first hypothesis (i.e., that coping cluster would explain a significant amount of variance when covariates were held constant), we examined the main effect of Cluster on side effects with the covariates partialed out. In addition to the significant results for the aforementioned covariates, the Cluster main effect was significant for all three global side effects variables in these ANCOVAs: total side effects, $F(3, 39)=5.31, p=0.004$; physical side effects, $F(3, 39)=3.78, p=0.018$; and psychological side effects, $F(3, 39)=4.04, p=0.013$ (see Fig. 2). That is, as stated in the first hypothesis, coping clusters explain a significant amount of variance in side effects.

To evaluate the second hypotheses (i.e., that individuals in confrontive clusters would have fewer side effects during chemotherapy than individuals using other coping patterns), comparisons of the adjusted means gleaned from the previous ANCOVAs were performed using Shaffer’s (1986) modified sequentially rejective Bonferroni procedure. This procedure corrects significance values to reduce the number of spurious findings when doing multiple comparisons.

Table IV shows the adjusted side-effects means for each of the four clusters. They represent the means of total, physical, and psychological side effects for the coping clusters controlling for differing covariate distributions in the clusters. As can be

| Table IV.—Means of side effects adjusted for differences in covariates

<table>
<thead>
<tr>
<th>Side effects</th>
<th>Confrontive</th>
<th>Avoidant confrontive</th>
<th>Avoidant resigned</th>
<th>Resigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td>65.49</td>
<td>58.83</td>
<td>60.39</td>
<td>61.52</td>
</tr>
<tr>
<td>Psychological</td>
<td>29.56</td>
<td>24.42</td>
<td>25.27</td>
<td>24.82</td>
</tr>
<tr>
<td>Total</td>
<td>95.04</td>
<td>83.25</td>
<td>85.66</td>
<td>86.34</td>
</tr>
</tbody>
</table>

Adjusted means calculated across treatment days.

* Higher scores represent having fewer side effects.

* Sum of physical and psychological side effects.
Table V.—Post hoc comparisons between coping clusters on side effects

<table>
<thead>
<tr>
<th>Side effect variable and clusters compared</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resigned versus confrontive</td>
<td>1.67</td>
<td>0.103</td>
</tr>
<tr>
<td>Resigned versus avoidant-confrontive</td>
<td>1.19</td>
<td>0.239</td>
</tr>
<tr>
<td>Resigned versus avoidant-resigned</td>
<td>0.52</td>
<td>0.604</td>
</tr>
<tr>
<td>Confrontive versus avoidant-confrontive</td>
<td>3.32</td>
<td>0.002b</td>
</tr>
<tr>
<td>Confrontive versus avoidant-resigned</td>
<td>2.52</td>
<td>0.016a</td>
</tr>
<tr>
<td>Avoidant-confrontive versus avoidant-resigned</td>
<td>0.78</td>
<td>0.384</td>
</tr>
<tr>
<td>Psychological</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resigned versus confrontive</td>
<td>2.46</td>
<td>0.018a</td>
</tr>
<tr>
<td>Resigned versus avoidant-confrontive</td>
<td>0.22</td>
<td>0.830</td>
</tr>
<tr>
<td>Resigned versus avoidant-resigned</td>
<td>0.26</td>
<td>0.795</td>
</tr>
<tr>
<td>Confrontive versus avoidant-confrontive</td>
<td>3.16</td>
<td>0.003b</td>
</tr>
<tr>
<td>Confrontive versus avoidant-resigned</td>
<td>2.02</td>
<td>0.013b</td>
</tr>
<tr>
<td>Avoidant-confrontive versus avoidant-resigned</td>
<td>0.59</td>
<td>0.558</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resigned versus confrontive</td>
<td>2.40</td>
<td>0.021a</td>
</tr>
<tr>
<td>Resigned versus avoidant-confrontive</td>
<td>0.90</td>
<td>0.373</td>
</tr>
<tr>
<td>Resigned versus avoidant-resigned</td>
<td>0.20</td>
<td>0.839</td>
</tr>
<tr>
<td>Confrontive versus avoidant-confrontive</td>
<td>3.86</td>
<td>0.000a</td>
</tr>
<tr>
<td>Confrontive versus avoidant-resigned</td>
<td>3.04</td>
<td>0.004b</td>
</tr>
<tr>
<td>Avoidant-confrontive versus avoidant-resigned</td>
<td>0.90</td>
<td>0.378</td>
</tr>
</tbody>
</table>

For all t-values, df = 1, 39.

* p < 0.05.

* p < 0.05, using modified sequentially rejective Bonferroni correction.

seen in Table V, on all three variables the subjects in the confrontive coping cluster had significantly higher scores than those in the avoidant-confrontive and avoidant-resigned clusters. Furthermore, those in the confrontive coping cluster approached doing significantly better than those in the resigned cluster. These results are supportive of the second hypothesis that confrontive copers evidence fewer side effects than copers from any of the other clusters. As Table V displays, our speculation that avoidant-confrontive copers would have only slightly more side effects than confrontive copers was incorrect.

**Power**

Using 0.10 as the $R^2$ predicted from the coping variables alone and 0.60 as the amount of variance predicted by the full equation, an $n$ of 54.6 or 55 was required for adequate power (0.80) in the current study. Results indicate that there was indeed sufficient power with an $n=55$. The total $R^2$ varied at around 0.60 with the unique variance accounted for by coping totaling from 0.06 to 0.14 in post hoc ANCOVA. This suggests that it is unlikely that we committed type II errors in performing these analyses.

**DISCUSSION**

In support of the first hypothesis, coping patterns were significant predictors of physical, psychological, and total side effects in women with stage II breast cancer receiving adjuvant chemotherapy. In fact, these coping patterns explained a signifi-
cant amount of variance in side effects when variance in age, socioeconomic status, length of time in treatment, menopausal status, site where chemotherapy was received, prior surgical treatment, type of chemotherapy, number of social supports, and satisfaction with social support were held constant.

In support of the second hypothesis, confrontive copers reported significantly better physical and psychological functioning during adjuvant chemotherapy than women who coped with avoidant-confrontive, avoidant-resigned, or resigned patterns. In addition to being willing to discuss and think about the illness confrontive copers reported more optimism, information seeking, and more willingness to be involved in treatment decisions. The positive results for confrontive copers were not surprising given that optimism, information seeking, and a willingness to be involved in treatment decisions have all been related to better outcomes [19, 21, 26-33].

The most surprising finding was the dramatic difference in side-effect profiles between the confrontive and avoidant-confrontive copers. Confrontive copers reported significantly fewer side effects than avoidant-confrontive copers, surprising given that the only difference between these styles is the degree of willingness to discuss and think about breast cancer. This result has clinical implications. Health professionals will likely have difficulty discerning the confrontive from avoidant-confrontive copers, as they will both appear the same in medical settings: They will both be information seeking, willing to be involved in treatment decision, and optimistic. However, it appears that the critical differences between these two groups (willingness to discuss and think about breast cancer) will most likely occur when the individuals are away from medical settings where confrontive copers are willing to think about and discuss the illness with family and friends and avoidant-confronters distract themselves and avoid the topic.

From these results, it seems clear that, in addition to confrontive characteristics, a willingness to think about breast cancer and be disclosing with family and friends confers benefits on breast cancer patients in terms of fewer side effects. Although the specific nature of the disclosures or thoughts about illness that resulted in having fewer side effects is unclear, some have suggested that expression of negative feelings is the important element. Derogatis et al. [14] found that women with metastatic breast cancer who expressed more distress and dysphoria tended to live longer than less expressive peers. Others have observed that the qualities of acquiescence and politeness are usually seen in those patients who do poorly during treatment [17, 59]. Recently, immunological studies have focused on the relationship of disclosure to immune function. Pennebaker et al. [24] found that trauma survivors who disclose stressful material have better immune function than nondisclosure survivors. Similar results have been found with Epstein–Barr patients [60]. The results in support groups, where presumably one goal is to express oneself, are also supportive [11, 15, 61].

The degree to which the results of the current study can be applied to women with more or less advanced breast cancer, with different illnesses, or to women of differing cultural backgrounds is unknown. A number of studies have suggested that biological prognostic indicators and severity of diagnoses are not, in fact, correlated with coping style [22, 23]. This suggests that perhaps women develop coping styles in response to breast cancer as a global concept and pay less attention to their spe-
specific situation. If true, these results may be generalizable to women with more and less severe breast cancer diagnoses.

Literature suggests that generalizing the results of the current study to women with other types of cancer or other illnesses is not viable because there are sexual and body image effects that are unique to breast cancer patients and because breast cancer patients may be more or less emotionally stable [4, 22, 62–66]. Furthermore, because coping with cancer may be culturally bound [67–69], these results likely will not apply to breast cancer patients in other cultures.

The current study should be interpreted with caution as there are some methodological weaknesses that may temper these results. First, we omitted a measure of subjects’ satisfaction with marital relationship, a variable recently identified as a critical contributor to quality of life, and very possibly side effects, in breast cancer patients [70, 71]. Second, the MCMQ only measured a select number of coping behaviors and thoughts at one occasion. Therefore, the resulting clusters produced are but four of a myriad of possible coping patterns that may fluctuate over time. Future work is necessary before extrapolating from these results to the long term can be justified. Third, we did not include a measure of mood, particularly depression. It would have been useful to use such a measure to determine if resigned or avoidant-resigned copers were actually depressed. Fourth, the study recruited 55 subjects. While this number was adequate for detecting relationships between coping and side effects, larger numbers and replication is necessary before results can be considered conclusive. Finally, clusters are formed atheoretically in cluster analysis [72]. While this avoids biasing the outcome, it can also lead to spurious findings.

It must also be noted that this study has a “chicken and egg” problem. Side effects and coping are most likely intimately related. The current study evaluated only one cycle of chemotherapy in a series. It is possible that the linear relationship explored predicting side effects from coping is really only one half of the picture, and that each is mutually predictive of the other. Perhaps knowing your biological response to adjuvant chemotherapy results in adopting a different coping style? Future work may tease apart these complex relationships.

Despite these methodological limitations, this study does suggest that how patients think and behave in the face of breast cancer, may influence the number and intensity of physical and psychological side effects. It also provides evidence that there may be optimal patterns of coping in this population. It is hoped that future work will attempt to replicate the current findings with larger numbers of patients over longer periods of time. Such studies would help evaluate the degree to which coping patterns identified in the current study reflect consistent trait-like responses. If, as expected, the patterns are malleable, then interventions designed to change them may be successful in decreasing physical and psychological sequelae.

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Coping and quality of life


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