

Minimal Contact Intervention With Autologous BMT Patients: Impact on QOL and Emotional Distress

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Bone marrow transplantation (BMT) is often a last treatment option for individuals who have experienced relapse or treatment failure and is often accompanied by increased levels of distress and reductions in quality of life (QOL). Despite this, few studies have been designed to improve post-BMT QOL and reduce distress. The current study examined the course of distress and QOL in 26 autologous BMT patients and the effect on distress and QOL of providing a minimal contact workbook intervention. Physical well-being decreased following the BMT, but increased at 2- and 6-month follow-up assessments, and distress did not significantly vary over the course of the study for patients in the standard care and workbook intervention groups. Examination of the reasons for the lack of group differences revealed that approximately half of the individuals randomized to the workbook intervention did not look at the material; with those that did reporting higher QOL, decreased anxiety, more adaptive coping, and decreased religiosity. The results argue for the importance of targeting patients at need prior to the transplant procedure, triaging them based on specific characteristics, and providing treatments that match these characteristics.

KEY WORDS: emotional distress; autologous bone marrow transplant; psychological intervention.

INTRODUCTION

Bone marrow transplantation (BMT) is used to treat a variety of cancers (e.g., Hodgkin's disease, leukemia, breast cancer, multiple myeloma), and is often the last course of treatment for patients who have experienced a treatment failure or a relapse of cancer. The BMT is an intensive procedure that may

require isolation and a lengthy convalescent period, a period of time that is often associated with significant physical and psychosocial morbidity (Colon, Callies, Popkin, & McGlave, 1991; Gale, 1982; Leigh, Wilson, Burns, & Clark, 1995; McQuellon, Craven, Russell, et al., 1996; Neitzert, Ritvo, Dancey, et al., 1998; Syrjala, Chapko, Vitaliano, et al., 1993). The BMT process has been conceptualized as a series of stages that includes pre-BMT referral, consultation and consent; pre-BMT conditioning; post-BMT hospitalization; and long-term recovery (Andrykowski, McQuellon, et al., 1998). Psychological morbidity has been reported in each of the stages of the BMT process (Alfidi, 1993; Patenaude, Levinger, & Baker, 1987; Patenaude, Rappeport, & Smith, 1986). For example, Jenkins, Linington, and Whittaker (1991) reported that 28% of their sample met diagnostic criteria for depression during the "preparation" phase of the BMT, and Trask, Paterson, Riba, et al. (2002) noted that 50% of their sample reported clinically significant levels of anxiety and distress during the

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consultation visit to determine appropriateness for a BMT.

Although several studies have focused on the psychological well-being of individuals prior to a BMT, the vast majority of literature has focused on post-BMT emotional and physical adjustment. Clinically significant scores on measures of anxiety and depression have been reported in 30–50% of patients in the months and years following transplant (Leigh et al., 1995; McQuellon et al., 1996). Global ratings of distress have been found to be elevated in as many as 93% of patients over an average of 3 years post-transplant. Such dysfunction has been found to be significantly higher than similar ratings by both healthy controls and other cancer patients (Molassiotis, van den Akker, Milligan, et al., 1996; Winningham, Nail, Burke, et al., 1994) and has been associated with longer hospital stays, poorer treatment outcomes, and lower survival rates (Futterman, Wellisch, Bond, & Carr, 1991). Thus, the post-BMT recovery period is often associated with increased distress that may be exacerbated by the presence of pain, fatigue, and adverse sexual functioning, and result in decreased quality of life (QOL; Winer, Lindley, Hardee, et al., 1999).

The impact of the BMT on patients' QOL has become increasingly important over the past decade. An investigation into the post-BMT QOL of patients by Andrykowski, Altmaier, Barnett, et al. (1990) revealed that patients report less than "normal" functioning in the areas of physical health, vocational ability, and mood disturbance. In contrast, studies by Belec (1992) and Jenkins et al. (1991) reported that most patients found their QOL to be "acceptable," with long-term impairments being rare in both autologous and allogeneic patients. Finally, Chao, Tierney, Bloom, et al. (1992) noted that QOL improved between the 90-day and 12-month assessment periods, and that 88% of their patients reported an above average or excellent QOL. Combined, the above studies suggest that there is considerable variability in the reports of QOL posttransplant.

Despite the findings that increased distress and reductions in QOL can occur in conjunction with the BMT, relatively few studies have been conducted to deal with these issues. The exception has been a series of studies that have demonstrated that relaxation training can reduce the pain associated with oral mucositis pain (Syrjala, Cummings, & Donaldson, 1992; Syrjala, Donaldson, Davis, et al., 1995). The lack of intervention studies in BMT patients is in

contrast to the studies of other cancer patients. Psychoeducational interventions for addressing the psychological issues of cancer patients have been implemented since the late 1970s and have included group and individual approaches as well as provision of educational material and telephone counseling (Fawzy & Fawzy, 1998; Holland, 1997). In terms of these latter approaches, the provision of educational material is designed to increase a patients' sense of control, improve their coping strategies, and reduce feelings of helplessness (Fawzy & Fawzy, 1998). Studies have found that the provision of minimal contact interventions, such as educational material in the form of booklets and pamphlets have been found to increase compliance, improve knowledge, and increase satisfaction when compared with individuals who did not receive such information (Brandenberg, Bergenmar, Bolund, et al., 1994; Eardley, 1988). Longer, more involved educational formats (e.g., 8-week groups) have resulted in improved coping strategies, higher quality of life, and brighter affect (Fawzy, Cousins, Fawzy, et al., 1990; Trask, 2002), but are associated with greater costs in terms of time, person hours, and money. Use of minimal contact communication channels, such as the telephone, and orientation at key timepoints (e.g., discharge from hospital) to educational materials the person can use at home may improve outcomes at a lower cost, and may offer several advantages over traditional group or individual counseling. In particular, minimal contact interventions are not restricted by the geographical proximity of patients to the treatment center, can occur if individuals cannot leave their home, and are cost-effective (Bucher, Houts, Glajchen, & Blum, 1998). Currently, to our knowledge, no study has investigated the impact of a minimal contact intervention on distress and QOL in BMT patients. As such, the primary goals of this study were to 1) identify and describe levels of distress, QOL, and coping styles of individuals presenting for an autologous bone marrow transplant at University of Michigan Cancer Center, 2) describe the longitudinal course of distress and QOL in both the intervention and control groups, and 3) determine the influence of a selected psychological intervention (i.e., written information about self-management techniques and a follow-up phone call) on emotional distress and QOL when compared with standard medical care. It was hypothesized that providing individuals with educational materials in addition to standard care would result in improved QOL and lower levels of distress when compared with those who received standard care alone.

METHODS

Patients

Twenty-six (13 males and 13 females) who were scheduled to receive an autologous BMT at the University of Michigan Comprehensive Cancer Center agreed to participate in this study. Individuals over the age of 18 who read and understood English, and were able to give their own consent were included. Individuals who were not able to read and understand English were excluded from the study. Patients ranged in age from 21 to 74 years ($M = 54.35$, $SD = 11.14$). Data was provided from all 26 patients at baseline. Two patients subsequently withdrew from the study prior to discharge and two patients died between the 2- and 6-month post-BMT assessments. Demographic characteristics of the sample are presented in Table I.

Measures

Background Information Questionnaire

The Background Information Questionnaire was comprised of a variety of demographic, lifestyle, and

personal history questions. It included questions on age, gender, race, education, work status, number of children, and religious importance. Also included were questions on smoking and alcohol history and current use, and history of mental health care.

Brief Symptom Inventory (BSI)

The BSI is a 53-item measure of emotional distress which takes between 5 and 10 min to complete (Derogatis, 1992; Derogatis & Melisaratos, 1983). It is the short version of the SCL-90-R and has well-demonstrated reliability and validity (Boulet & Boss, 1991). Individual items are answered on a 0 (*not at all distressed*) to 4 (*extremely distressed*) scale and are summed into one of nine clinical scales and three summary scales. Principal among these is the Global Severity Index (GSI), which provides the most sensitive measure of overall distress. The BSI is standardized using area T scores, each with a mean of 50 and a standard deviation of (SD) of 10.

Functional Assessment of Cancer Treatment—Bone Marrow Transplant (FACT-BMT)

The FACT-BMT is a 47-item questionnaire assessing QOL (McQuellon, Russell, Cella, et al., 1997). It is composed of 6 scales: physical well-being (PWB), social/family well-being, (SFWB) emotional well-being (EWB), functional well-being (FWB), relationship with doctor (not included in version 4), and additional concerns (AC). It also has a composite score; the Treatment Outcome Index (TOI), which is the sum of the PWB, FWB, and AC scales, as well as a Total score. The FACT-BMT has demonstrated reliability and validity (Cella, 1997).

Ways of Coping (WOC)

The WOC is a 66-item questionnaire that assesses individual coping strategies to a stressful situation (Folkman & Lazarus, 1985). The WOC has 8 scales (confrontive coping, distancing, self-control, seeking social support, accepting responsibility, escape-avoidance, planful problem solving, positive reappraisal) with good reliability and validity.

State-Trait Anxiety Inventory (STAI)

The STAI is a 40-item questionnaire designed to assess transient or situational and stable or

Table I. Demographic Characteristics

| Characteristic | Mean (range) | N (%) |
|-------------------------------|---------------|-----------|
| Age | 54.35 (21–74) | |
| Education in years | 14.52 (3–21) | |
| Number of children | 2 (0–6) | |
| Males | | 13 (50) |
| Marital Status | | |
| Never | | 1 (3.8) |
| Married | | 19 (73.1) |
| Divorced | | 5 (19.2) |
| Widowed | | 1 (3.8) |
| Employment | | |
| Working | | 5 (19.2) |
| Retired | | 6 (23.1) |
| Working within last 6 month | | 1 (3.8) |
| Not working >6 month | | 14 (53.8) |
| Race | | |
| Caucasian | | 24 (92.3) |
| African American | | 2 (7.7) |
| Religion important | | |
| Yes | | 16 (61.5) |
| Smoking status | | |
| Never | | 12 (46.2) |
| Quit prior to diagnosis | | 12 (46.2) |
| Currently smoking | | 2 (7.7) |
| Alcohol | | |
| Never | | 12 (46.2) |
| Currently drinking | | 9 (34.6) |
| Quit prior to or at diagnosis | | 4 (15.3) |
| Missing | | 1 (3.8) |

dispositional symptoms of anxiety (Spielberger, 1983; Spielberger & Sydeman, 1994). The questionnaire consists of a series of statements that have been used to describe individuals (e.g., "I feel nervous and restless"), and participants are asked to rate how often they generally feel anxiety from 1 (*almost never*) to 4 (*almost always*). Scores are summed and divided by 20 to provide an average state and a trait anxiety score. Test-retest stability coefficients are reasonably high for the trait scale and low for the state scale as expected given the two aspects of anxiety measured (Spielberger & Sydeman, 1994).

Procedure

Phase 1

Individuals who were admitted to the University of Michigan Comprehensive Cancer Center for an autologous BMT were asked to participate in a study that investigated the occurrence of distress in autologous bone marrow transplant patients. Individuals who consented to participate in the study completed questionnaires within a week of admission and prior to their transplant, within a week of discharge following transplant, and 2 and 6 months following discharge. In an attempt to ensure the accrual of as many 2- and 6-month follow-up questionnaires as possible, 2 weeks after questionnaires were sent, patients for whom questionnaires were not received were called reminding them to complete and return the questionnaires. If questionnaires were not received within that week, patients received another reminder phone call. This approach was successful in maintaining high return of questionnaires in a similar study in melanoma (Trask, Paterson, & Riba, 2002) and was based on Dillman survey methodology that has been found to increase the likelihood of responses.

Phase 2

Prior to discharge, patients were randomized to standard care or standard care plus a workbook. Those randomized to the intervention were provided at the time of discharge with a workbook that included material on relaxation techniques, the relationship between thoughts and emotions and how to challenge negative thinking, and problem-solving strategies. It was provided by one of the authors (AP) and accom-

panied by a standard script that provided an overview of the content of the workbook and suggested that patients start with the section that would likely be most relevant to them. The workbook was designed to be a reference aid for individuals to help them deal with life stresses or feelings of depression or anxiety they may have following the BMT. Instructions for each part of the workbook were provided to clarify the various sections and instruct patients on their use. Patients were not required to complete the workbook during the course of the study. Previous experience with the material presented in the workbook and the accompanying instructions suggested that the material is beneficial (Trask, Paterson, & Riba, 2002).

An overarching goal of this intervention was to determine whether providing patients with educational tools on coping without the support of an extensive face to face, weekly discussion of the material is sufficient to foster behavioral change and better adjustment. One week following discharge, patients who received the workbook were contacted by phone and asked if they had any questions about the workbook. One month after their discharge, patients who received a workbook were contacted by phone and asked questions regarding whether they had used any of the material in the workbook, how often they had used it, how effective it had been, which skill was the most effective, and if they had any questions about the material. In this way, the phone call served as a manipulation check to assure that patients were actually engaging in a treatment. The study was approved by the University of Michigan's Institutional Review Board and the Comprehensive Cancer Center's Protocol Review Committee.

Statistics

All values reported are two-tailed and all statistical analyses were performed using the Statistical Package for Social Sciences, Version 10 (SPSS-10: User's guide, Application guide, 1999). Historical GSI data (Boulet & Boss, 1991) examining pre- and post-therapeutic intervention emotional distress scores as measured by the GSI scale of the BSI were used to estimate the mean and variability in the emotional distress data. According to the estimate of the standard deviation from the historical data, 26 subjects would be required to provide 90% power to detect a difference of 10 between the intervention and nonintervention groups in the change of GSI area *T* scores.

RESULTS

Phase 1

Baseline and Discharge Characteristics

Patients at the baseline assessment reported, on average, minimal levels of distress and anxiety as measured by the BSI GSI and STAI, respectively, although 27% reported GSI scores ≥ 60 . Moderate levels of quality of life were reported on the subscales and overall FACT-BMT. Patients primarily reported using distancing and planful problem-solving coping on the WOC.

At the time of discharge, individuals continued to report minimal levels of distress and anxiety on the BSI; levels that did not differ from those reported at baseline; $t(21) = -0.258$, $p = .80$ and $t(21) = 0.786$, $p = .44$, respectively. As expected, changes in quality of life were observed between the baseline and discharge assessments. In particular, individuals reported significant reductions in PWB, $t(21) = 2.40$, $p = .026$, and TOI, $t(21) = 2.62$, $p = .016$. No significant differences were observed in any of the remaining scales. Table II presents the means and standard deviations (*SD*) for each scale at baseline and discharge.

Phase 2

Comparisons Between Discharge and 2-Month Outcome by Intervention

At the time of discharge, patients were randomized to either a workbook intervention or standard care. Comparisons were then made between the workbook intervention and standard care. Repeated measures ANOVAs revealed that there were no significant differences in distress or anxiety as measured by either the BSI or STAI between the discharge and 2-month assessment. Significant changes were observed, for individuals in QOL ratings. In particular, main effects were observed for QOL as measured by PWB, $F(1, 19) = 7.09$, $p = .015$; and the TOI, $F(1, 19) = 4.49$, $p = .047$. Trends were observed in the reporting of additional symptoms, $F(1, 19) = 3.52$, $p = .076$. On each scale, QOL increased from the discharge to 2-month assessment. None of the remaining FACT-BMT subscales were significantly different between the discharge and 2-month assessment. In addition, there were no differences between

Table II. Baseline and Discharge Descriptives

| | Baseline (Mean, <i>SD</i>) | Discharge (Mean, <i>SD</i>) |
|---------------------------|--------------------------------|---------------------------------|
| BSI | | |
| Somatization | 58.85 (4.52) | 58.82 (8.59) |
| Obsessive-compulsive | 55.69 (9.98) | 56.14 (11.35) |
| Interpersonal sensitivity | 48.00 (6.95) | 48.27 (7.70) |
| Depression | 52.31 (9.33) | 53.64 (8.78) |
| Anxiety | 50.54 (9.81) | 49.36 (9.15) |
| Hostility | 50.50 (9.00) | 49.18 (8.92) |
| Phobic anxiety | 50.31 (7.12) | 51.36 (9.46) |
| Paranoid ideation | 49.88 (5.81) | 46.45 (6.54) |
| Psychoticism | 53.00 (7.68) | 50.13 (7.15) |
| GSI | 54.31 (7.22) | 54.59 (8.79) |
| FACT-BRM | | |
| Physical | 20.19 (5.63) | 16.69 (6.00) |
| Social | 24.11 (3.75) | 25.06 (3.11) |
| Emotional | 16.31 (3.53) | 16.64 (4.16) |
| Functional | 16.22 (5.30) | 15.09 (5.60) |
| Additional | 35.57 (10.58) | 31.32 (5.23) |
| TOI | 71.99 (16.93) | 63.10 (14.95) |
| Total | 110.52 (17.86) | 104.80 (19.54) |
| Ways of coping | | |
| Confrontive | 10.29 (9.79) | |
| Distancing | 16.58 (9.51) | |
| Self-control | 14.13 (6.11) | |
| Seeking social support | 13.92 (7.01) | |
| Accepting responsibility | 6.19 (7.79) | |
| Escape-avoidance | 8.01 (7.17) | |
| Planful problem-solving | 15.45 (8.43) | |
| Positive-reappraisal | 11.42 (9.02) | |
| STAI | | |
| Trait anxiety | 34.28 (11.29) | 33.77 (10.14) |
| State anxiety | 33.48 (11.12) | 33.45 (12.54) |

those who received the workbook and those who did not.

Comparisons Between Discharge and 6-Month Outcome by Intervention

As with the 2-month comparisons, repeated measures ANOVAs revealed that there were no significant differences in distress or anxiety as measured by either the BSI or STAI between the discharge and 6-month assessment. As before, significant changes were observed, for individuals in QOL ratings. In particular, main effects were observed for QOL as measured by PWB, $F(1, 12) = 21.83$, $p = .001$; FWB, $F(1, 12) = 22.22$, $p = .001$; Additional Symptoms, $F(1, 12) = 9.13$, $p = .011$; and the TOI, $F(1, 12) = 23.38$, $p = .000$. On each scale, QOL increased from the discharge to 6-month assessment. None of the remaining FACT-BMT subscales were significantly different between the discharge and

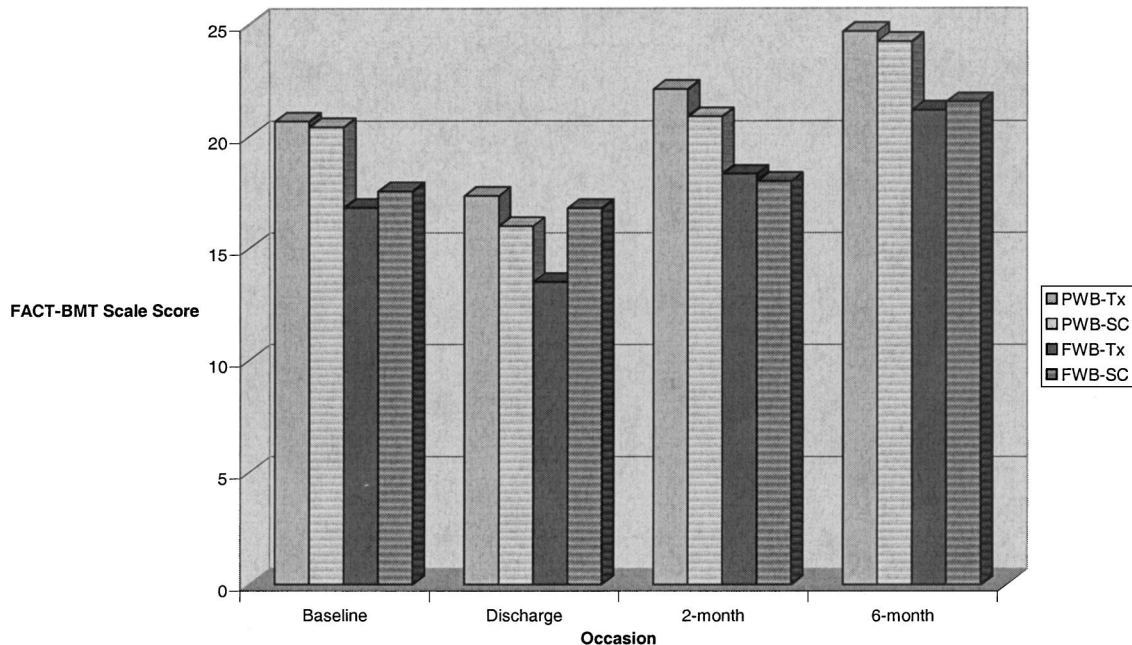


Fig. 1. Physical and functional QOL over the course of the study for treatment and standard care groups. (Note. PWB = Physical Well-Being, FWB = Functional Well-Being, Tx = Treatment Group, SC = Standard Care.)

6-month assessment. In addition, there were no differences between those who received the workbook and those who did not. Figure 1 presents the PWB and FWB QOL scores for both groups over the course of the study.

Examination of Coping Strategies by Treatment Group

Coping strategies were measured at baseline and then at 2- and 6-months as coping styles are typically consistent traits unless modified by an intervention. Interestingly, there were no differences in the coping strategies used by each group on these assessment measures.

Additional Comparisons

The lack of differences between the treatment and control groups prompted an examination of the responses of the treatment group to the 1 month phone call in order to determine whether the lack of differences could be the result of individuals failing to use the material provided to them. This analysis revealed that five (45%) patients reported that they had not looked at the workbook. When the treatment group was examined based on who reported look-

ing at the workbook and those who did not, several interesting findings appeared. Principal among them was the fact that 80% of those who did not look at the material reported that religion was important to them compared with 33% of those who looked at the material, a finding that approached significance, $\chi^2(1) = 2.40, p = .12$. In addition, while both groups indicated high reliance on distancing and self-control coping, individuals who did not look at the material reported greater reliance on escape-avoidance coping, while individuals who looked at the material reported using planful problem solving, seeking social support, and accepting responsibility. Finally, individuals in the group who looked at the workbook reported higher overall QOL at the 2-month assessment ($M = 121.87, SD = 17.23$) than those who did not look at the material ($M = 102.37, SD = 13.07$). This difference approached significance, $t(7) = -1.87, p = .104$, and would likely have been significant with a larger sample. Similar differences were observed on the PWB, FWB, and TOI scales. Higher levels of state anxiety were also noted in those who did not look at the workbook ($M = 41.95, SD = 16.11$) compared with those who looked at the material ($M = 28.80, SD = 10.64$).

Similar findings were observed between the two groups at the 6-month follow-up. Those who did not

look at the workbook continued to report low overall QOL, state anxiety, and use of maladaptive coping strategies. In contrast, those who had looked at the book reported higher overall QOL, less state anxiety, and a more balanced use of adaptive and maladaptive coping strategies. Independent *t* tests revealed that the groups differed on the PWB, FWB, TOI, and Total score on the FACT-BMT. Given the small sample size at this time point, however, additional data is needed to make firm conclusions.

DISCUSSION

The BMT procedure is often accompanied by adverse changes in emotional well-being and physical and functional QOL (Colon et al., 1991; Gale, 1982; Leigh et al., 1995; McQuellon et al., 1996; Neitzert et al., 1998; Syrjala et al., 1993). The exact impact on the BMT, however, is complicated by a variety of personal and illness variables. Nevertheless, some degree of impairment is observed in both autologous and allogeneic transplant patients, even several years after transplant (Andrykowski et al., 1990, 1998; Molassiotis et al., 1996; Winer et al., 1999). To better understand the presence of post-BMT complications, increased knowledge of pre-BMT variables is required. The present study examined autologous BMT patients prior to and after the transplant in order to document changes in distress and QOL during the BMT. Individuals did not report significant increases in distress or anxiety over the course of the study, although 27% reported clinically significant levels of distress at baseline; an amount that remained relatively constant during the course of the study and is consistent with that reported in other cancer studies (Andersen, 1992; Derogatis, Morrow, Fetting, et al., 1983; Farber, Wienerman, & Kuypers, 1984; Neitzert, Ritvo, Dancey, et al., 1998; Stefanek, Derogatis, & Shaw, 1987). Thus, the BMT itself did not appear to increase the emotional distress of autologous BMT patients.

The BMT did decrease physical well-being as individuals noted significant reductions in QOL from the baseline to discharge assessments. Physical well-being, functional well-being, and QOL associated with BMT-related symptoms, however, improved from the point of discharge to the 2- and 6-month follow-up assessments, a finding consistent with previous studies (McQuellon et al., 1996; Syrjala et al., 1995). Thus, as individuals receiving an autologous BMT progress farther away from the actual transplant procedure, and don't suffer from many of the compli-

cations associated with an allogeneic transplant, they are able to resume functional and physical activities. The lack of a short-term reduction in QOL is also a likely contributor to the low levels of emotional distress observed.

In addition to investigating the course of distress and QOL during the transplant process, the current study also attempted to determine the effect of a minimal contact workbook intervention. Contrary to expectations, those who received the workbook did not report significantly higher levels of emotional well-being or QOL when compared with those who did not receive the intervention 2- and 6-months post-transplant. This is inconsistent with the literature on the effect of educational interventions (Brandenberg et al., 1994; Eardley, 1988; Fawzy et al., 1990; Fawzy & Fawzy, 1998), but makes sense in light of responses to the 1-month phone call.

As noted, 45% of the sample randomized to the workbook intervention stated that they did not look at the material provided to them after being oriented to it at the time of discharge. If it is assumed that these individuals did not look at the workbook after the phone call either, then they would not have benefited from the information that was provided. As such, if the workbook had been effective in those who used it, including those who did not among the treated group could have minimized those improvements. Although power did not allow us to make comparisons between the subgroups of patients in the workbook condition, examination of the means suggested that this could have been the case, as those who looked at the workbook had higher post-BMT QOL, lower levels of anxiety, reported greater reliance on adaptive coping strategies, and had lower levels of religiosity.

The results from the study, as well as the aforementioned subgroup differences, provide several insights for future research. Among them is the likely importance of treatment matching or as defined in a previous article by Trask, Schwartz, Deaner, et al. (2002), targeting individuals who are at risk for poor outcomes. In the current study, autologous BMT patients were targeted as a sample that could be at risk for poor outcomes. Qualitative and quantitative results, however, suggest that not all autologous BMT patients are at risk for poor outcome and that there may be pretransplant characteristics (e.g., higher distress, poorer coping strategies, lower QOL) that put people at increased risk for poor outcomes post-BMT. Identifying the characteristics and targeting those people for different types of interventions needs to be explored.

Of equal importance would be to triage patients to interventions given certain baseline characteristics. In the current study, individuals were randomized either to standard care or standard care plus the minimal workbook intervention regardless of level of distress, illness, QOL, or coping strategies employed. It is possible that one of the reasons for poor adherence was the fact that patients did not feel that they were in sufficient distress; in other words, they “didn’t need it,” a sentiment reported by many of those who did not look at the material. In such a case, triaging patients to a treatment based on initial level of distress may have resulted in improved adherence and outcome. In a study we conducted with melanoma patients (Trask, Paterson, & Riba, 2002), patients were triaged based on distress level with good results (i.e., improved adherence, reduced distress, improved QOL).

Finally, developing treatments that provide maximal effectiveness is of importance. In the current study, patients reported that they used the relaxation material (and specifically diaphragmatic breathing) most often, with several others noting using some parts of the cognitive material. Relaxation techniques have been shown to be effective in other studies with BMT patients (Holland, 1997; Syrjala et al., 1992), and constitute a relatively easy technique to learn. From an ease of understanding, it is not surprising that patients did not report using the cognitive or problem-solving material with greater frequency. Future development of treatments may need to tailor the presentation of the material to patients based on complexity and ease of understanding, and may benefit from using several different forms of administration.

The current study has several limitations, among which is the small sample size. The original power calculations suggested that there was sufficient power given the sample size for comparing two groups. The unexpected presence of a third group through lack of patient adherence likely limited any group differences as well as our ability to draw firm conclusions about the benefits of our intervention. Nevertheless, the study is interesting in the combination of qualitative and quantitative results, points to the importance of additional intervention research, and for interventions that start earlier in the transplant process and are tailored to the needs of the patient.

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