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Psychosocial factors associated with quality of life in allogeneic stem cell transplant patients prior to transplant

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Abstract

***Objectives*: The primary aim of this retrospective study was to determine levels of psychological distress and quality of life (QoL) immediately prior to allogeneic stem cell transplantation. The secondary aim was to examine the demographic, medical and psychosocial factors that were correlated with various QoL domains at this stage of treatment.**

***Methods*: A series of measures was completed by 122 allograft patients as part of routine psychological assessment at the treating hospital prior to undergoing the transplant. These included the Mental Adjustment to Cancer Scale, the Brief Symptom Inventory-18 and the World Health Organisation Quality of Life-BREF. Demographic and medical data were also extracted.**

***Results*: In this study, 12% and 14% of the sample experienced significant levels of depressive and anxiety symptoms, respectively. Half of the sample reported impaired physical QoL, whereas approximately 40% reported poor psychological and social QoL. Besides relationship status, the limited number of demographic (age and gender) and medical factors (disease status) tested did not contribute significantly to reported QoL. After controlling for medical and demographic factors, weaker Fighting Spirit and higher levels of depression (trend towards significance) were associated with poorer physical and social QoL.**

***Conclusions*: The association among psychological distress, coping responses and QoL indicates that poor psychosocial functioning pre-transplant renders an increased likelihood of experiencing impaired QoL across various dimensions. It thus seems important that psychologically vulnerable patients are identified early in the treatment process. If psychosocial adjustment were improved, patients may experience better QoL pre-transplant with a potential subsequent influence on post-transplant outcomes.**

Introduction

Allogeneic haematopoietic stem cell transplant (HSCT) has been offered as a potentially curative treatment for a range of haematological cancers [1]. Given the intensive conditioning regimens prior to HSCT and the complications that may arise post-transplant, a significant body of research has developed about the factors that predict survival [2–7], general quality of life (QoL) and psychological morbidity post-transplant [8–17]. These factors can broadly be classified into the following categories: demographic factors, medical factors (e.g. disease stage, diagnosis, duration of illness), stable personality-related traits (e.g. coping styles), situational symptoms (e.g. existing levels of anxiety and depression) and external resources (e.g. level of social support) [18].

There have been mixed findings for demographic and medical factors as predictors of various dimensions of QoL [19]. For example, in a recent review by Braamse *et al*., it was indicated that poorer physical functioning after allogeneic transplant was strongly associated with chronic graft-versus-host disease (GVHD), whereas myeloablative conditioning weakly predicted worse physical functioning [20]. Furthermore, poorer psychological functioning had a weak-to-moderate association with lower social support, younger age, female gender, diagnosis, increased disease risk and GVHD. For the social functioning dimension, chronic GVHD and intensity of pre-transplant conditioning were negatively associated with social functioning [20].

There have been many studies in which the relationship between psychosocial factors and post-transplant QoL of HSCT survivors has been explored [14,17,21–25]. However, there has been less research into the association between pre-transplant QoL and psychosocial factors such as coping style, psychological distress and social support. Given that QoL impairments often begin prior to HSCT because of disease progression or the effects of previous treatment, it is equally important to examine the pre-transplant phase [19].

In the limited literature regarding the pre-transplant phase, Fife *et al*. reported that patients are most psychologically vulnerable during the hospitalisation period before the transplant, compared with other times during the transplant process [26]. Similarly, Siston *et al*. found that psychosocial adjustment pre-transplant was more impaired in vocational, domestic, social and psychological functioning compared with a group of HSCT survivors [27]. Despite the aforementioned findings, other researchers have suggested that medical staff, including physicians and coordinators, frequently underestimate or direct less focus to symptoms of psychological distress, while overestimating general QoL and role functioning [28–30]. Given the curative and life-saving potential of HSCT, it has been suggested that a patient's decision to undergo a transplant may be less likely to factor in the detrimental QoL effects that may occur during and after the process [19]. Thus, ascertaining the factors that are associated with QoL prior to transplant and intervening at that stage may be helpful in managing QoL deficits that occur following the procedure. Furthermore, findings indicate that pre-transplant levels of psychological functioning are strongly predictive of post-transplant distress and QoL [13,20,31–33]. This, therefore, reinforces the importance of the pre-transplant period in the HSCT process.

The association between coping style and psychological functioning pre-transplant has also been examined in a limited body of literature. For example, acceptance/resignation and cognitive avoidance coping have been associated with heightened depression, anxiety, total mood disturbance [31,34,35] and anger [26]. Similarly, in another study, patients' mental adjustment to cancer, that is, coping response to the diagnosis of cancer, was related to depression [36]. In this research, weaker Fighting Spirit (FS) and higher levels of Helpless-hopelessness (HH), Anxious-preoccupation and fatalism responses were associated with pre-existing depressive disorder. It is important to note that mental adjustment to cancer responses are also characterised by emotional reactions, thus leading to ambiguity in interpreting the associations that were found with psychological distress.

Given that the conclusions from these studies are limited by small sample sizes and univariate designs, this precludes analysis of the contribution of psychosocial factors after controlling for demographic and medical variables. Thus, the primary aim of the present study was to ascertain levels of psychological distress (anxiety and depression) and QoL immediately prior to transplantation. The secondary aim was to examine the extent to which demographic factors (age, gender, relationship status), medical factors (disease status) and psychological factors (coping responses to cancer and anxiety and depression severity) were associated with various domains of QoL (physical, social and environmental) in this same period.

Materials and methods

A retrospective file audit was conducted on data collected routinely for patients undergoing allogeneic HSCT at The Alfred Hospital (Melbourne, Australia) from 2005 to 2011. In this study, 220 allografts were performed during this period. Although the aim of this audit was to capture the experience of consecutive patients, 73 did not complete pre-transplant clinical psychology assessments. This was the result of scheduling conflicts, availability of psychology staff and insufficient time before the transplant occurred. Therefore, the audited sample consisted of 151 patients who had completed pre-transplant assessments. Four of these patients did not subsequently undergo transplantation and were excluded. Thus, the records of 147 patients formed the final dataset.

Measures

Brief Symptom Inventory-18

The Brief Symptom Inventory-18 (BSI-18) is an 18-item self-report measure of somatic distress, depression and anxiety [37]. It has been demonstrated to be effective in identifying emotional distress in various cancer patient populations. The author has reported internal consistency reliability coefficients ranging from 0.74 to 0.89 across the four scales. Furthermore, the BSI-18 has been shown to have good convergent validity when compared with the Symptom-Checklist-90 Revised instrument. Higher scores indicate greater severity of symptoms experienced. On the basis of the community norms of the BSI-18, a *T*-score of greater than 62 on the Global Severity Index or on two of the three component scales was regarded as meeting clinical caseness criteria.

World Health Organisation Quality of Life-BREF

The questionnaire consists of 26 items that assess the physical, psychological, social and environmental QoL domains [38]. The authors have reported internal consistency coefficients ranging from 0.68 to 0.82 and good discriminant and construct validity. A higher score on a subscale represents better QoL for that domain.

Mental Adjustment to Cancer scale

The Mental Adjustment to Cancer Scale (MAC) has five scales, FS, Anxious-preoccupation, HH, Fatalism and Avoidance [39]. It has good concurrent validity as reflected by correlations with the Medical Coping Modes Questionnaire. Internal consistency coefficients range from 0.64 to 0.85. A higher score on a MAC scale depicts greater endorsement of a particular adjustment response. Clinical caseness criteria is defined as a combination of a

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high score on the Helpless/hopeless scale (raw score of more than 11) and a low score on the FS scale (raw score of less than 48).

Patient demographics and clinical history

Patient demographic and medical data were obtained from a questionnaire that was administered as part of the assessment. Data extracted for this study included age, gender, marital status, education level, occupation and employment status. Information about type of cancer, duration of illness (e.g., days since diagnosis date), disease status (e.g. in remission or active disease) and history of mental health problems (prior diagnosis of any psychological disorder) was also recorded. Diagnosis, time since diagnosis and disease status were collected from the patients' medical records.

Procedure

Ethics approval to conduct this study was obtained from The Alfred Human Research Ethics Committee. All data were collected between 2005 and 2011 as part of routine screening of patients to determine their supportive care needs, approximately 2 weeks prior to admission to hospital for allogeneic transplantation. In addition to a clinical interview, patients completed the previously described standardised psychological measures.

Statistical analyses

The prevalence of anxiety and depression and coping response in the sample was assessed through a comparison of the sample mean and established population norms. Because the World Health Organisation Quality of Life (WHOQOL)-BREF does not have an established cutoff score in the manual, Cummins' norms [40] regarding the population standard for QoL were used. This method is in line with a recent study in which WHOQOL-BREF scores in a community sample were assessed against Cummins' norms [41]. Thus, transformed scores below 75 were considered to represent impaired QoL.

The psychological QoL domain was excluded from univariate correlations and multivariate regression analyses. This is due to the potential confounding of psychological measures given the close relationship between psychological QoL and acute psychopathology and coping responses. Thus, Pearson's correlations were carried out to measure the univariate associations among QoL domains (physical, social and environmental), coping responses, psychological distress and continuous medical and demographic factors. Two-tailed independent sample *t*-tests were used to examine the relationship between outcome measures and categorical medical or demographic variables. Three hierarchical multiple regressions were subsequently performed to ascertain multivariate correlates of pre-transplant QoL across the physical, social and environmental domains. The demographic and medical variables were chosen on the basis of theoretical importance, whereas the psychosocial variables were selected on the basis of significant univariate analyses. The Avoidance subscale of the MAC was excluded from the regression analyses as it was a single-item scale assessing whether patients believed that they had cancer [42]. Scores for that scale were significantly skewed as few participants were in denial about their diagnosis by that stage of their treatment. In addition, the Avoidance scale was not correlated with any of the QoL domains. The demographic and medical variables were entered into the first block of each regression to determine if psychological factors predicted QoL over and above demographic and medical factors.

Results

The sample for the current study comprised 147 patients preparing to undergo allogeneic haematopoietic stem cell transplantation. The mean age of patients at the time of transplant was 43.78 years ($SD = 13.50$). The average time since diagnosis was 720 days ($SD = 826$). Patient characteristics are presented in Table 1.

Prior to conducting any analysis, it was identified that there were missing data on one or more of the key measures for 25 patients in the sample. Patients with missing data were excluded from the regression analysis, thus the final sample size was 122. A comparison was conducted between patients who were included in the analyses and

Table 1. Demographic and medical characteristics of the sample

	n (%)
Gender ($N = 147$)	
Male	81 (55.10)
Female	66 (44.90)
Relationship status ($N = 143$)	
Not in a relationship	42 (29.37)
Single	33 (23.08)
Divorced/separated/widowed	9 (6.29)
In a relationship	101 (70.63)
Defacto[a]	18 (12.59)
Married	83 (58.04)
Diagnosis ($N = 147$)	
Acute myeloid leukaemia/myelodysplastic syndrome	73 (49.66)
Acute lymphocytic leukaemia	24 (16.33)
Chronic myeloid leukaemia	4 (2.72)
Hodgkin lymphoma	8 (5.44)
Non-Hodgkin lymphoma	23 (15.65)
Multiple myeloma	15 (10.20)
Disease status ($N = 147$)	
Active disease	59 (40.14)
In remission	88 (59.86)
History of mental health problems ($N = 147$)[b]	30 (20.41)

[a]Defacto: In an established relationship, living together but not married.
[b]Prior diagnosis of any type of psychological disorder.

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those who were excluded. Independent sample *t*-tests indicated no significant differences in age ($p = 0.64$) or time since diagnosis ($p = 0.21$). Chi-squared tests of independence found no significant differences in proportion of gender ($p = 0.59$) and relationship status ($p = 0.83$). However, a greater proportion of patients with active disease were excluded from the analyses compared with those in remission ($p = 0.008$). Power for the regression analyses ranged between 0.97 and 0.99, using the Bonferroni-adjusted alpha level of 0.013.

Psychological and quality of life burden

Group means for psychological symptoms, coping responses and QoL domains are shown in Table 2. Regarding psychopathology as measured by the BSI-18, approximately 12% and 14% of the sample had significant levels of depressive and anxiety symptoms, respectively, 19% reported clinically significant levels of somatic symptoms and 15% met the criteria for clinical caseness. Of the sample, 7% met the caseness criteria on the MAC scale. Approximately, half of the sample reported impaired physical QoL as measured by the WHOQOL-BREF. A lesser proportion of people reported poor psychological (40%) and social (42%) QoL. Only a quarter of patients believed that their environmental QoL was diminished by their disease.

Table 2. Means, standard deviations and ranges of scores of psychological symptoms, coping styles and quality of life domains

Scale	Mean	*SD*	Range	Exceeding clinical cutoffs *n* (%)[a]
Psychopathology (*N* = 122)				
BSI-Somatic	3.40	3.55	0–19	23 (18.85)
BSI-Depression	3.07	3.70	0–19	14 (11.48)
BSI-Anxiety	3.85	3.90	0–20	17 (13.93)
BSI-GSI	10.43	9.56	0–52	16 (13.11)
BSI Caseness criteria	—	—	—	18 (14.75)
Coping style (*N* = 122)				
MAC-Fighting Spirit	51.66	5.69	35–64	25 (20.49)
MAC-Anxiety/preoccupation	22.17	3.64	14–33	—
MAC-Helpless/hopeless	9.16	2.75	5–20	21 (17.21)
MAC-Fatalism	17.54	3.67	8–26	—
MAC Caseness criteria	—	—	—	8 (6.56)
Quality of life domains (*N* = 122)				
Physical	26.88	4.71	12–35	60 (49.18)
Psychological	23.71	3.55	12–30	49 (40.16)
Social	11.86	2.04	5–15	51 (41.80)
Environmental	33.63	4.07	18–40	27 (22.13)

BSI, Brief Symptom Inventory, MAC, Mental Adjustment to Cancer Scale, GSI, Global Severity Index.

[a]Clinical cutoffs for some of the MAC scales are not listed as the developers of the test have only provided cutoff scores for the Fighting Spirit and Helpless–hopeless scales. Clinical caseness is determined through only these two scales.

Associations between quality of life domains and demographic, medical and psychological measures

Age and time since diagnosis were not associated with any QoL domain (all $p > 0.05$). Comparisons between male and female patients, as well as between patients with active disease and in remission, indicated no differences in mean scores on all measures (all $p > 0.05$). Relationship status was associated with psychological and social QoL. Patients in a relationship reported higher psychological QoL ($M = 24.03$, $SD = 3.72$) compared with those who did not have a significant other ($M = 22.49$, $SD = 3.71$), $t(129) = -2.18$, $p = 0.031$. Similarly, mean social QoL was higher for the group of patients in a significant relationship ($M = 12.24$, $SD = 1.95$) compared with the group of patients who did not have a partner ($M = 10.72$, $SD = 2.26$), $t(129) = -3.90$, $p < 0.001$. In addition, mean FS score was higher for the patients in a relationship ($M = 52.39$, $SD = 5.64$) compared with those who were not in a relationship ($M = 49.85$, $SD = 5.35$), $t(129) = -2.40$, $p = 0.018$.

Pearson's correlations between coping responses and key study variables are presented in Table 3. Physical QoL was significantly positively correlated with FS ($r = 0.38$) and negatively correlated with HH ($r = -0.26$). In addition, Anxious-preoccupation and Fatalism responses were significantly negatively correlated with the social and environmental domains of QoL ($r = -0.21$ to -0.34). Notably, both depression and anxiety symptoms were significantly negatively correlated with physical, social and environmental QoL ($r = -0.17$ to -0.59).

Multivariate correlates of quality of life domains

Results from the three hierarchical multiple regression analyses are presented in Table 4. The final regression models explained a significant amount of the variance in QoL for all four domains (all $p < 0.001$). Age and gender were not associated with QoL in any domain. Weaker FS was associated with lower physical and social QoL. There was a trend for depression severity being negatively correlated with physical, social and environmental QoL. Poorer social QoL was also associated with not having a partner and having active disease at the time of transplantation. In addition, a trend for better social QoL for female patients compared with male patients was observed.

Discussion

The current study was conducted to assess the level of psychological distress and QoL for patients immediately prior to undergoing an allogeneic stem cell transplant as a treatment for cancer. A second aim was to assess the extent to which cancer coping responses and acute psychological distress are associated with the level of

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Table 3. Correlation matrix of psychological variables with quality of life domains ($N = 122$)

	1	2	3	4	5	6	7	8	9
1 MAC-Fighting spirit									
2 MAC-Anxiety-preoccupation	−0.07								
3 MAC-Helpless/hopeless	−0.33***	0.42***							
4 MAC-Fatalism	−0.02	0.36***	0.49***						
5 BSI-Depression	−0.25**	0.49***	0.57***	0.36***					
6 BSI-Anxiety	−0.08	0.51***	0.38***	0.31**	0.73***				
7 WHOQOL-Physical	0.38***	−0.10	−0.26**	0.03	−0.32***	−0.17			
8 WHOQOL-Social	0.36***	−0.27**	−0.22*	−0.21*	−0.37***	−0.28**	0.37***		
9 WHOQOL-Environmental	0.29**	−0.30**	−0.38***	−0.22**	−0.50	−0.42***	0.56***	0.51***	

WHOQOL, World Health Organisation Quality of Life; BSI, Brief Symptom Inventory; MAC, Mental Adjustment to Cancer Scale.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

Table 4. Hierarchical multiple regression analyses predicting quality of life in the three World Health Organisation Quality of Life domains

	Physical QoL[a]			Social QoL[b]			Environmental QoL[c]		
Predictors	R^2 change	β*	p	R^2 change	β	p	R^2 change	β	p
Step 1	0.02			0.11			0.04		
Age		0.04	0.31		−0.01	0.64		0.05	0.11
Gender[d]		0.61	0.49		0.58	0.12		0.72	0.34
Relationship status[e]		−0.26	0.81		1.22	0.006**		−0.43	0.64
Disease status[f]		−0.95	0.31		−0.62	0.11		−0.42	0.60
Step 2	0.22			0.23			0.29		
Age		0.03	0.33		−0.01	0.39		0.04	0.19
Gender		−0.07	0.94		0.66	0.05		0.94	0.17
Relationship status		−0.97	0.34		1.14	0.006**		−0.22	0.80
Disease status		−1.14	0.18		−0.70	0.04***		−0.53	0.45
BSI depression		−0.38	0.04***		−0.16	0.03***		−0.33	0.03***
BSI anxiety		0.07	0.66		−0.03	0.67		−0.13	0.32
MAC-Fighting spirit		0.25	0.002**		−0.09	0.007**		0.10	0.13
MAC-Anxious-preoccupation		0.05	0.69		−0.04	0.43		−0.04	0.75
MAC-Helpless-hopeless		−0.19	0.36		0.11	0.18		−0.14	0.40
MAC-Fatalism		0.20	0.12		−0.10	0.05		−0.04	0.67

QoL, quality of life.
[a]Model statistics for Physical QoL: F (10, 111) = 3.51, $p < 0.001$.
[b]Model statistics for Social QoL: F (10, 111) = 5.79, $p < 0.001$.
[c]Model statistics for environmental QoL: F (10, 111) = 5.40, $p < 0.001$.
[d]Coded as 0 (men) and 1 (women).
[e]Coded as 0 (single) and 1 (in a relationship).
[f]Coded as 0 (in remission) and 1 (active disease).
*Unstandardised beta coefficients are presented.
**Bonferroni-adjusted $p < 0.013$.
***$p < 0.05$.

QoL across different domains immediately prior to undergoing a transplant.

Findings of the current study indicated relatively low levels of patient psychological distress, as measured by self-report questionnaires, in the pre-transplant phase. Approximately, 11–14% of patients reported clinical levels of depression or anxiety, with 16% reporting no anxiety or depressive symptoms. Furthermore, only 7% reported disturbance in coping responses. This contrasts with the results reported in previous studies. For example, it has been found that 20–34% of patients had significant depressive symptoms pre-transplant [35,43,44] and a greater proportion (33–68%) experienced clinical or subclinical levels of anxiety [15,35,37,47] or general distress [11] in this period. However, in line with the present findings, other authors have reported that mean levels of anxiety and depression were not clinically significant pre-transplant [13,31,35].

In the current study, the low levels of distress may be attributed to several factors. Given that 80% of patients in the present study reported a moderate-to-high level of FS in their adjustment to cancer, it is possible that patients were adopting a more confrontative approach to dealing with the challenges ahead of them. It has been postulated that patients may feel a greater sense of mastery over their

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medical circumstances during the pre-transplant period, as they are preparing themselves for the relinquishing of control during the impending isolation period [35]. Thus, the low levels of psychological symptoms reported may be indicative of this phenomenon, a possibility supported by the finding of a significant negative relationship in this study between pre-transplant FS and depression severity. Alternatively, it is possible that patients who are less distressed may be more inclined to employ confrontative coping approaches and experienced enhanced FS. The cross-sectional nature of the current study's design means that it is not possible to determine the direction of causality.

In contrast to the comparatively low proportion of the sample reporting clinical levels of depression or anxiety, a much larger proportion reported impaired QoL pre-transplant. Approximately, half of patients had reduced physical QoL compared with the general population, a finding that is consistent with previous research [8,43]. Although impaired physical QoL is not surprising given the nature of disease in this population [32], our finding of reduced psychological and social functioning at this stage of treatment merits attention. Notably, the high prevalence of impaired psychological QoL seems inconsistent with the low levels of clinical distress reported. However, psychological QoL as measured by the WHOQOL encompasses aspects other than mood, such as, body image, self-esteem, spirituality and cognition. Thus, patients who do not experience clinical levels of distress may nevertheless perceive their overall psychological well-being as less than satisfactory. According to Mosher *et al*., HSCT patients who are in the most need of psychological or social support may be the least likely to utilise mental health services [45]. This can be attributed to actual and perceived barriers, such as physical limitations in the ability to seek support and lacking knowledge of available services [45]. Thus, it is important that the treating health team is cognisant of this phenomenon in the pre-transplant phase.

To assist treating health teams in determining which patients are at greatest risk for reduced pre-transplant QoL, a number of psychological and demographic factors were found in the hierarchical regression to be uniquely associated with reduced QoL for single or multiple domains. Pre-transplant depression severity was associated either significantly or as a trend with all QoL dimensions, an association that has also been found with other studies of HSCT patients [43]. It has been reported that psychosocial distress in the form of depression is associated with noncompliance with physician recommendations and poorer medication adherence [11,46]. Given the present findings, it is possible that depressive symptoms may hamper the ability of individuals to care for themselves as the result of reduced motivation, fatigue and feelings of despair. Individuals who are depressed may also be less likely to seek social support, thus leading to a lowered QoL in various dimensions. Furthermore, it is possible that patients who are more depressed may perceive their QoL as poorer compared with nondepressed individuals [47].

Use of healthy coping responses to illness, such as FS, was associated with improved physical and social QoL. It is expected that individuals with high FS would be less likely to engage in denial, behavioural disengagement and self-blame, all of which have been associated with worse psychological outcomes in a previous study with HSCT survivors [48]. Similarly, FS may act as a buffer against adopting coping responses characterised by cognitive avoidance [31,34], acceptance and resignation to fate [31,35]. Individuals deemed to have greater FS may cognitively reappraise their illness and be more proactive in seeking information and involving themselves in the treatment process. The use of such strategies serves to empower patients by providing them with a greater sense of control [26]. This in turn may lead to improved levels of QoL across the different domains.

Whereas the panel of examined demographic and medical factors was limited, only relationship and disease status were uniquely associated with any QoL domain. Relationship status, particularly the absence of a partner, was associated with poorer social QoL in the present study, thus indicating that a relationship with a key person is important in the provision of social support. This is in line with the findings that patients in relationships report better family functioning, adequacy of social support and higher QoL compared with individuals who are single [49,50]. However, it has been reported elsewhere that social support can be either positive or problematic for HSCT patients. Problematic support is predictive of reduced social and emotional functioning [51], whereas adequate and readily available social support was associated with better QoL [50]. Thus, it is likely that patients in the current study who were in relationships received adequate and positive support from their partners.

Disease status (either in remission or in active disease) was found to be related to social QoL but not other QoL domains. Previous research has also highlighted some inconsistency with a number of studies finding an association [43,52–54], but others finding that medical variables such as stage of disease, treatment protocol and time since diagnosis did not predict QoL outcomes [16]. This inconsistency may be due to different methods being used for measuring QoL and medical variables. Nevertheless, current findings suggest that poorer social QoL was associated with active disease. Thus, individuals who have active disease prior to transplantation may have difficulties investing in personal relationships because of increased discomfort and various somatic symptoms. This may result in reduced satisfaction with perceived support.

Prior to discussing the clinical implications of study findings, a number of limitations must be considered. Firstly, it was a single-centre study, thus, other institutions may implement different methods of psychosocial screening as

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part of their protocol for patients undergoing HSCT. Findings may thus differ if the sample included patients from different institutions. The study was retrospective and cross-sectional, thus, we were not able to establish causal inferences or assess if the relationships between various factors at pre-transplant persisted during the transplant process and beyond. Furthermore, the WHOQOL is not a disease specific measure of QoL. Thus, some aspects of QoL that are pertinent to HSCT patients, such as treatment side effects, were not specifically assessed. In addition, psychological distress was assessed solely through self-report questionnaires as clinical interview data were not included. Thus, it is possible that the measures may have inadequately captured the psychological experience of patients. Further, a greater proportion of patients who had active disease were excluded from the analyses because of missing data compared with those who were in remission. Thus, the results may not be generalisable to patients suffering from more severe disease. Also, given the limited testing of medical covariates, these factors may not have been adequately controlled when determining the impact of psychosocial factors on QoL domains.

Study findings may have important implications for clinical practice. Being in a supportive relationship, adopting a cancer response that is characterised by FS, cancer being in remission and having few depressive symptoms were associated with better pre-transplant QoL in one or more domains. Given that pre-transplant psychosocial functioning may impact treatment adherence, engagement with the treating team [46] and post-transplant outcomes [2,11,13,32], routinely assessing for the presence of these factors may enable treating health teams to offer more targeted psychosocial support to potentially improve transplant outcomes. The conduct of assessment and intervention that commences pre-transplant may also be beneficial as patients are not as physically compromised at this point of the treatment process compared with when transplantation procedures have begun. This may enable patients to more effectively engage in psychosocial therapy that could continue throughout the transplant process to enhance their ability to cope with treatment.

Future research may benefit from employing longitudinal designs comparing the types of psychosocial factors that influence various QoL domains at key points prior to and following transplantation. Other factors such as social support or personality-related factors that may contribute to increased risk or resilience could be explored using measures such as the Multidimensional Scale of Perceived Social Support and Sense of Coherence Scale. Furthermore, the use of standardised disease/transplant-specific instruments (e.g. Functional Assessment of Cancer Therapy – Bone Marrow Transplantation) may be helpful in ensuring that the patient's QoL experience is adequately and consistently captured, something which may also allow for comparison with studies conducted in other institutions if the same measures are used.

Conclusion

In the current study, lower than expected levels of significant psychological distress were found in patients assessed prior to an allogeneic stem cell transplant as a treatment for haematological malignancy. This may in part be explained by the high proportion of patients adopting more helpful coping responses (e.g. FS), which may have enabled them to cope more effectively with the preparation for their transplant. Psychological and social QoL, however, were found to be impaired in almost half of the sample. Given that depressive symptoms and level of FS were associated with pre-transplant QoL, it is important that clinicians assess for and intervene with people displaying more problematic coping responses or acute distress prior to transplant. This may enhance patients' ability to adhere to treatment requirements and cope with the transplant experience, with the possibility of improving post-transplant QoL outcomes.

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