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Analysis

Employment Status as an Indicator of Recovery and Function One Year after Hematopoietic Stem Cell Transplantation



Eleshia J. Morrison^{1,*}, Shawna L. Ehlers¹, Carrie A. Bronars¹, Christi A. Patten¹, Tabetha A. Brockman¹, James R. Cerhan², William J. Hogan³, Shahrukh K. Hashmi³, Dennis A. Gastineau³

¹ Department of Psychiatry and Psychology, Mayo Clinic Rochester, Rochester, Minnesota

² Department of Health Sciences Research, Mayo Clinic Rochester, Rochester, Minnesota

³ Division of Hematology, Mayo Clinic Rochester, Rochester, Minnesota

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ABSTRACT

Employment after hematopoietic stem cell transplantation (HSCT) is an indicator of post-transplantation recovery and function, with economic and social implications. As survival rates for HSCT continue to improve, greater emphasis can be placed on factors affecting the quality of post-transplantation survival, including the ability to resume employment. A sample of recipients of autologous or allogeneic HSCT was accrued ($n = 1000$) to complete a longitudinal lifestyle survey before transplantation and at 1 year after transplantation. The present study examines associations between employment and patient characteristics, disease variables, illness status, and quality of life among 1-year survivors ($n = 702$). Participants had a mean age of 55 years (range, 18 to 78) and were predominately male (59.7%), married/partnered (77.1%), and non-Hispanic Caucasian (89.5%); most (79.4%) had received autologous transplantation. Of the 690 participants reporting some form of employment before illness diagnosis, 62.4% had returned to work by 1 year after HSCT. Full-time employment at 1 year after HSCT was significantly associated with remission of illness, improved illness, fewer post-transplantation hospitalizations, less fatigue and pain, higher quality of life, and higher rating of perceived health. Those unemployed because of their health reported the highest rates of fatigue and pain and lowest quality of life, and they were most likely to report poor perceived health. These findings highlight work reintegration as an important outcome and marker of survivors' overall adjustment after transplantation. Identifying factors affecting post-transplantation employment offers opportunities for behavioral interventions to target modifiable risk factors to optimize post-transplantation survivorship, inclusive of increased rates of return to work and decreased rates of associated disability.

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INTRODUCTION

Employment after cancer treatment is an important marker of recovery and functional status for cancer survivorship [1–3]. Cancer survivors are at increased risk for unemployment, reduced re-employment, and early retirement compared with the general population [4], yet most do return to work over time during the first several years after diagnosis [2]. Hematopoietic stem cell transplantation (HSCT) requires a significant change to daily functioning, including employment, to receive and rehabilitate from

treatment. Increasing rates of survival after autologous and allogeneic HSCT are well documented [5–7]; however, the passage of time is needed to observe post-HSCT recovery from the physical, functional, and psychological correlates of transplantation. As post-HSCT survival rates continue to improve, increasing emphasis can be placed on factors associated with optimizing survivorship after transplantation. This includes factors related to work reintegration, which remains understudied in HSCT recipients.

Predictors of reduced employment after HSCT include female gender, older age, and worse physical functioning [1]. Examination of age cohort effects suggests that recipients of HSCT ages 50 to 59 are less likely to return to work than their 40- to 49-year-old counterparts [8]. Employment is further affected by transplantation type and medical complications; allogeneic transplantation recipients with graft-versus-host

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* Correspondence and reprint requests: Eleshia J. Morrison, PhD, Mayo Clinic, 200 First Street SW, Rochester, MN 55905.

E-mail address: morrison.eleshia@mayo.edu (E.J. Morrison).

disease (GVHD) are less likely to return to work than those without GVHD [1,9]. Patient attributions regarding their health status help to explain reduced employment after transplantation. One study found that 90% of HSCT recipients identified health as the primary reason for not returning to work [8]. These findings are informative for understanding pretransplantation and post-transplantation factors that influence later employment.

The present study examined 2 aims to better conceptualize underemployment and its impact in the context of HSCT. The first aim was to identify pre-HSCT age, transplantation type, and diagnosis type (patient characteristics and disease variables) as predictors of 1-year post-HSCT employment. The second aim was to examine group differences in 1-year employment status across illness status, fatigue, pain, quality of life (QoL), and perceived health.

METHODS

Participants and Procedures

All study procedures were approved by the Mayo Clinic institutional review board. All patients undergoing multidisciplinary pretransplantation evaluation for an outpatient-based HSCT program from June 8, 2009 to October 22, 2012 were offered the opportunity to participate in a prospective cohort study of lifestyle factors among HSCT recipients, including an extra tube of blood during a routine draw for a separate research aim. Patients were considered eligible if they (1) were 18 years of age or older, (2) displayed no evidence of active psychotic or neurologic disorder, (3) were able to speak and read standard English, and (4) provided written informed consent. Participants completed the lifestyle survey before transplantation (baseline) and 1 year after transplantation. A total of 1074 HSCT candidates were eligible for this study, and 1000 participants enrolled (93% enrollment rate). Reasons for nonparticipation included not being interested ($n = 66$), not wanting to complete surveys ($n = 7$), and not wanting extra blood drawn ($n = 1$). Of 889 participants completing the survey at baseline, 702 completed the 1-year post-transplantation survey, 101 died before the 1-year survey, and 86 did not return the survey. The present study focused on baseline patient (age) and disease (diagnosis, transplantation type) variables and the 1-year post-HSCT survey ($n = 702$).

Measures

Sociodemographic and clinical information were collected from transplantation center data and patient medical records. This included age, gender, marital status, transplantation status, hematologic disease type, transplantation type (autologous/allogeneic), and remission status (active disease versus remission).

Past and current employment status were queried via the 1-year survey for 3 time points. Retrospective data were collected for 2 times points: before diagnosis of illness and just before transplantation. Employment status at 1 year after HSCT was queried concurrently at the time of the 1-year post-HSCT survey. For those who were not employed full-time, participants were asked to attribute their reduced employment to health or to reasons other than health. The 7 categories for employment status were full-time, part-time because of health, part-time not because of health, unemployed because of health, unemployed not because of health, retired because of health, and retired not because of health.

Illness status at 1 year after HSCT was assessed using the following 7 items: (1) number of HSCT-related hospitalizations since transplantation (>1 day duration), (2) hematologic illness in remission, (3) illness improved

but not in remission, (4) illness stayed the same or worsened, (5) no more treatment planned, (6) more treatment planned, and (7) currently receiving treatment. Number of hospitalizations was a continuous measure; the others were dichotomous.

Single items assessed physical symptoms and QoL. Fatigue and pain were rated on an 11-point scale ranging from 0 (none) to 10 (worst imaginable). QoL was rated on an 11-point scale, ranging from 0 (bad as can be) to 10 (good as can be). Current perceived health was assessed on a 5-point scale from 1 (excellent) to 5 (poor).

Analytic Strategy

Descriptive and inferential statistics were conducted using SPSS, version 21.0 [10]. Logistic regression was planned to test age, transplantation type, and diagnosis type as baseline predictors of 1-year employment, where employment outcome was dichotomized (employed full-time versus employment less than full-time). Analysis of variance with Bonferroni post-hoc testing and chi-square analysis with post-hoc comparison using the standardized residual method [11] were used to identify group differences in illness status, fatigue, pain, QoL, and perceived health across employment status at 1 year. A conventional alpha of $\alpha = .05$ was observed and adjusted based on post-hoc corrections to minimize type I error.

RESULTS

Seven hundred two (702) transplantation survivors completed the 1-year post-HSCT survey. Of those reporting some form of employment just before diagnosis ($n = 690$), 62.4% reported having returned to work at 1 year after transplantation. Of this employed subgroup, 39.3% reported a change in their employment status. From time of diagnosis through to 1 year after HSCT, employment rates decreased for full-time employment and increased for underemployment because of health reasons (part-time, unemployed, retired) (Table 1). A number of participants ($n = 196$) reported retirement at the time of transplantation (57 because of health, 139 not because of health). To focus the analyses on a group still considered to be eligible for the workforce, further analyses focused on the remaining subsample of 506 patients.

Table 2 demonstrates the significant relationship between employment at transplantation and employment at 1 year in this subsample of 506 survivors (chi-square, 471.8; Cramer's V, .49; $P < .001$). These results allow for an observation of the maintenance of employment status before and after transplantation. For example, 68.7% of patients who were employed full-time at the time of transplantation were employed full-time 1 year after transplantation, whereas nearly one-half (48.4%) of those unemployed because of health reported unemployment because of health at 1 year after transplantation.

Participants

Participants had a mean age of 55 years (range, 18 to 78) and were predominately male (59.7%), married/partnered

Table 1
Retrospective Data on Employment Rates for Transplantation Survivors Completing the 1-Year Post-Transplantation Survey ($n = 702$)

Employment Status	Employment at Time of Diagnosis	Employment at Time of Transplantation	Employment at One Year after Transplantation
Employed full-time	432 (62.4%)	252 (36.4%)	222 (32.1%)
Employed part-time because of health	9 (1.3%)	48 (6.9%)	45 (6.5%)
Employed part-time not because of health	62 (9.0%)	40 (5.8%)	44 (6.4%)
Unemployed because of health	9 (1.3%)	124 (17.9%)	105 (15.2%)
Unemployed not because of health	24 (3.5%)	23 (3.3%)	23 (3.3%)
Retired because of health	21 (3.0%)	57 (8.2%)	91 (13.2%)
Retired not because of health	134 (19.4%)	139 (20.1%)	152 (22.0%)
Missing	10 (.1%)	10 (1.4%)	10 (1.3%)

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