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Patterns and Predictors of Physical Functional Disability at 5 – 10 Years after Heart Transplantation

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Abstract

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Background—Researchers have not examined relationships between perception of physical functional disability and demographic, clinical, and psychological variables at 5-10 years after heart transplantation. Therefore, the purposes of this study were to describe physical functional disability over time and identify predictors of physical functional disability from 5 to 10 years after heart transplantation.

Methods—Five hundred fifty-five patients who were between 5-10 years post heart transplant enrolled in our study (age = 54 ± 9 years, 78% male, 88% white, 79% married). Patients completed six instruments that measure physical functional disability and factors that may impact physical functional disability. Statistical analyses included calculation of frequencies, means ± standard deviation (plotted over time), Pearson correlation coefficients, and multiple regression coupled with repeated measures.

Results—Between 5-10 years after heart transplantation, physical functional disability was low, and 34-45% of patients reported having no functional disability. More physical functional disability was associated with having more symptoms; having depression / mood / negative affect / and lower use of negative coping strategies; having more co-morbidities and more specific co-morbidities (ex., more orthopedic problems and diabetes); higher NYHA class; having more acute rejection, infection, or cardiac allograft vasculopathy; being female, older, less educated, and unemployed; higher BMI; and more hospital readmissions (explaining 46% of variance [$F=84.75$, $p<0.0001$]).

Conclusions—Demographic, clinical, and psychological factors were significantly related to physical functional disability. Knowledge of these factors provides the basis for development of therapeutic plans of care.

Perception of improvement in physical function from before to after heart transplantation has been reported through 5 years after transplant[1-5]. Researchers have also determined that perception of improvement in physical function has been greater than perception of improvement in either psychological status or social functioning after heart transplantation[6, 7]. However, there is also evidence of reduced physical activity[8], functional limitations[9], and physical functional disability[2, 5, 10] at 1-2 years after heart transplantation.

A few cross-sectional studies have examined perception of physical function ≥ 5 years after heart transplant. These studies revealed no more than mild limitations in activities of daily living[11], reduced physical activity[12], and conflicting data regarding perceived physical function as compared to a general population[13, 14, 15].

Multivariate analyses have also been conducted to examine physical function long-term after heart transplantation. Demographic, clinical, and psychosocial factors have been found to be predictors of physical function at 5-6 years after heart transplantation[16, 17] as well as at ≥ 10 years after transplant[13, 14]. Researchers have not examined predictors of physical functional disability at 5-10 years post transplant.

Therefore, the purposes of this study were to describe physical functional disability over time and identify predictors of physical functional disability from 5 to 10 years after heart transplantation. We defined physical functional disability as a heart transplant recipient's perception of his/her inability to perform activities (as related to health status) in three areas of function: mobility, ambulation, and body care/movement.

Methods

Sample

Patients were from a large, prospective, longitudinal, multi-site study of quality of life, long-term after heart transplantation who were transplanted between July 1, 1990 and June 30, 1999 at four medical centers in the United States. Eight hundred eighty-four patients were potentially

eligible to participate in our study. Patients were included in the study if they were ≥ 4.5 years post orthotopic heart transplantation, ≥ 21 years, fluent and literate in English, and physically able to participate. Five hundred ninety-seven patients who met inclusion criteria volunteered to participate in our study, and 555/597 patients completed one or more booklets of quality of life instruments. Thus, our final sample size was 555 patients who were between 5-10 years post transplant. Reasons for patient non-enrollment have been discussed previously[18].

Instruments

Patients completed six instruments that measure physical functional disability and factors that may impact physical functional disability in < 1 hour. These self-report instruments were selected for this study based on their relevance to long-term heart transplant recipients and the purpose of our study. Instruments included the Sickness Impact Profile[19], Heart Transplant Symptom Checklist[20], Jalowiec Coping Scale[21], Assessment of Problems with the Heart Transplant Regimen[22], Positive and Negative Affect Schedule – Expanded version[23-25], and Cardiac Depression Scale[26]. Table 1 provides additional information about each instrument; only those instrument subscales used for these analyses were included. Instruments were combined into a booklet of questionnaires, and the order of instruments was varied for each time period in order to control for response bias, fatigue, and sensitization.

Physical functional disability was a composite score (composed of 45 items from three subscales) of the Sickness Impact Profile[19]. The subscales are ambulation (12 questions, ie., I walk more slowly and I do not use stairs at all); mobility (10 questions, ie., I stay away from home only for short periods of time and I stay home most of the time); and body care and movement (23 questions, ie., I have trouble getting shoes or stockings on and I make difficult moves with help such as getting into or out of cars).

Reliability and validity have previously been demonstrated to be adequate for the instruments (Sickness Impact Profile[19, 27, 28], Heart Transplant Symptom Checklist[20, 29], Jalowiec Coping Scale[21], Assessment of Problems with the Heart Transplant Regimen[22], Positive and Negative Affect Schedule[23], and Cardiac Depression Scale[26]). The adequacy of psychometric support has been demonstrated in patients with chronic illnesses and associated therapies, including heart failure and heart transplantation.

Chart review data (including demographic data and clinical data) were collected from patient medical records (including both inpatient and outpatient records) and a large heart transplant registry (the Cardiac Transplant Research Database [CTRD]).

Procedures

Institutional Review Board approval was received by all 4 institutions for conduct of this study and the CTRD. Patients who were ≥ 4.5 years post heart transplantation were informed about the study, and patients who volunteered to enroll in the study signed a written informed consent form. Enrollees were subsequently given a booklet of questionnaires to complete every 6 months (based on the date of their heart transplant) from 5 to 10 years post transplantation. All booklets and chart reviews were screened and cleaned at Rush University and sent to the University of Alabama at Birmingham for data entry.

Statistics

Data were analyzed using SAS version 8.2 (Cary, NC). Data were converted to standardized scores (range=0.00 – 1.00) for items, subscales, and total scale scores by dividing the items, subscales, and total scale scores by the maximum possible score for most questionnaires. Statistical analyses included calculation of frequencies, means ± standard deviation (plotted

over time), Pearson correlation coefficients, and multiple regression coupled with repeated measures.

Four separate regression analyses were run with the following four dependent variables: physical functional disability (the composite score for the subscales of ambulation, mobility, and body care / movement), and each of the three subscales of ambulation, mobility, and body care / movement. Correlations with the dependent variable were examined and correlations were generally ≤ .50. Inter-item correlations among the independent variables were also examined, and multicollinearity was identified among < 0.001% of variables and therefore was not a problem. Thirty-four independent variables were entered into each of the regression analyses in groups in the following order: seven demographic variables, eighteen clinical variables, and nine psychological / behavioral variables. While the ratio of cases to independent variables (16:1) was generally acceptable for multiple regression[30], we also conducted a post-hoc power analysis. A sample size of 555 would achieve 99% power to detect an R-Squared of 0.3 (the R^2 ranged from 0.31 to 0.45 in our regression models) attributed to 34 independent variables using an F-Test with a significance level (alpha) of 0.05. Thus, our sample should provide adequate statistical power. All subjects were retained in the analyses as no influential outliers were identified. The model fit was tested and acceptable. The level of significance was set at p=0.05 for all analyses.

Results

Descriptive analyses

Demographic and clinical characteristics—At time of transplant, patients (n=555) were primarily middle aged, white, married males who were fairly well educated (59% > high school education and mean = 14 ± 3 years). See table 2. The etiology of heart failure was primarily ischemic and dilated cardiomyopathy. At time of transplant, 61% of patients were United Network for Organ Sharing (UNOS) status 1 (ie., 1A or 1B). Patients had 5 ± 3 co-morbidities as listed in Table 2. Between 5 and 10 years after transplant, 14% of patients experienced ≥ 1 episode of hospitalization. Cumulative rates of acute rejection were 2.2 ± 2.0 episodes, and rates of infection were 0.8 ± 1.3 episodes. During this time period, 42% of patients showed evidence (via coronary angiography) of cardiac allograft vasculopathy.

Patterns of physical functional disability at 5-10 years after transplant—Between 5-10 years after heart transplantation, physical functional disability was low (mean=0.06 ± 0.09, 0 = no functional disability and 1 = most functional disability), and 34-45% of patients reported having no functional disability. See table 3 and figure 1. Similarly, from 5 to 10 years after heart transplantation, functional disability was low related to the subscales of ambulation, mobility, and body care / movement. Patients reported no disability as follows: ambulation, 50-59% (mean= 0.09 ± 0.14); mobility, 62-79% (mean=0.05 ± 0.11); and body care / movement, 49-59% (mean=0.04 ± 0.08), (0 = no functional disability to 1 = most functional disability for all subscales). When these patterns of disability were examined over time, there were no significant changes, except for mobility, for which there was a trend that suggested that patient mobility decreased further from the date of transplant. See table 3 and figures 2-4.

Multivariate analyses

Four separate multivariate analyses, adjusted for time, were conducted with physical functional disability, ambulation, mobility, and body care / movement as dependent variables. Thirty-four independent variables were entered into each regression analysis in the following order: demographic variables, clinical variables, and psychological / behavioral variables. For physical functional disability, 20 candidate variables were significant and explained 46% of variance (F=84.75, p<0.0001). Thus, more physical functional disability was associated with

having more symptoms (neurological / muscular, genito-urinary, and cardiopulmonary); depression / mood / negative affect / and lower use of negative coping strategies; having more co-morbidities and more specific co-morbidities (more orthopedic problems and diabetes, and fewer genitourinary problems and malignancies); higher NYHA class; having more acute rejection, infection, or cardiac allograft vasculopathy; being female, older, less educated, and unemployed; higher BMI; and more hospital readmissions. See table 4.

Similar candidate variables that were related to physical functional disability were also related to disability regarding ambulation, mobility, and body care / movement. Twenty-two variables explained 40% of variance in disability related to ambulation ($F=60.03$, $p<0.0001$). These variables were identical to variables associated with physical functional disability, except that two additional variables were associated with disability related to ambulation: less compliance with an exercise regimen and renal dysfunction.

For mobility and body care / movement, candidate variables that were similar to those that predicted physical functional disability were noted, but there were more differences. Sixteen candidate variables were related to mobility ($F=56.18$, $p<0.0001$), explaining 31% of variance. See table 5. Lastly, 16 candidate variables explained 38% of variance in body care / movement ($F=76.45$, $p<0.0001$). See table 6.

Post-hoc correlational analyses

Post-hoc correlational analyses were run between each of the 29 items of the neuromuscular subscale (regarding presence or absence of the symptom) in the Heart Transplant Symptom Checklist and three of the four dependent variables (physical functional disability, ambulation, and body care / movement) since the neuromuscular subscale accounted for the most variance in these outcomes. The symptoms that were significantly correlated at $r \geq 0.30$ for all three outcomes were weakness in the whole body, arms, and legs. In addition, problems with taste, fatigue, blurred or unclear eyesight, trouble speaking, and confusion or disorientation were correlated at $r \geq 0.30$ for physical functional disability, and blurred or unclear eyesight and confusion or disorientation were correlated at $r \geq 0.30$ for body care / movement.

Discussion

Demographic, clinical, and psychological / behavioral factors were significantly related to all four dependent variables in our regression equations: physical functional disability, ambulation, mobility, and body care / movement. Three factors (neuromuscular symptoms, higher NYHA class, and depression) explained more than 1% of variance in the four dependent variables; four factors (having more co-morbidities, orthopedic problems, negative affect, and increased BMI) explained more than 1% variance in three of the four dependent variables, and four factors (having acute rejection, infection, or cardiac allograft vasculopathy; mood, female, and lack of employment) explained 1% variance in two of the four dependent variables. Despite low levels of functional disability, (also reported by other researchers[2, 5, 17, 31] ≤ 5 year post heart transplant) these findings have important therapeutic implications.

Neuromuscular symptoms were highly related to physical functional disability, ambulation, mobility, and body care / movement. Symptom frequency and distress have been described after heart transplantation[5, 15, 20, 31-35]. Specifically, neuromuscular symptoms have been previously described within 2 years after heart transplant (ie., fatigue[5, 20, 31, 32], weakness[20, 32], restlessness[20], insomnia[20, 31], concentration and memory disorders[31, 32], and tremors[31]) and similarly at more than 2 years after transplant (fatigue[33-35], weakness[15, 35], insomnia[15, 33, 35], concentration and memory disorders[33], and tremors[33]). These symptoms, as a unique subset, have not previously explained variance in physical disability. Thus, our findings strengthen support for persistence of these symptoms and their

strong association with physical dysfunction long-term after heart transplantation. It is incumbent upon clinicians to serially assess these symptoms, and depending upon etiology, develop a plan of care.

Higher NYHA class has not been previously reported as significantly related to physical functional disability, ambulation, mobility, and body care / movement in patients after heart transplantation; although increased NYHA class has previously been correlated with reduced exercise capacity[36]. This relationship may suggest possible cardiac pathology, given that higher NYHA class reflects the impact of worsening symptoms of heart failure on activities of daily living. This relationship has been demonstrated in the findings of Butler et al.[16] regarding the relationship of acute rejection and / or allograft vasculopathy with physical functional disability, as well as the findings of Schwaiblmair et al.[37] demonstrating the influence of vasculopathy on exercise capacity.

Psychological status was also strongly related to limitations in physical function. Psychological symptoms, depression, and anxiety disorders have been well documented during the first few years after heart transplantation, with evidence of improvement over time[20, 31, 33, 38-40]. Findings of long-term psychological dysfunction have also been reported[4, 14, 41, 42]. Only a few researches have reported a relationship between psychological dysfunction and physical disability[5, 14, 17, 43, 44]. More recently, Type D personality has been reported to be related to impaired physical functioning[45]. This “mind-body” connection demonstrates the need for expanded assessment when considering therapeutic approaches. Patients with serious physical limitations may well have concurrent psychological problems, and both areas of dysfunction may need to be addressed.

The relationship between physical functional disability, ambulation, and body care / movement with increased number of co-morbidities (specifically orthopedic problems and increased BMI) provides a focus for treatment as well. We have previously reported that orthopedic problems were related to limitations in ambulation at 5 years post heart transplant[17] and Rosenblum et al.[35] have reported a relationship between musculoskeletal-neurological impairment and worse physical function up to 10 years post heart transplantation. This small, but compelling body of evidence suggests the need for evaluation of orthopedic problems and tailoring of treatment plans including surgical intervention, physical therapy, and occupational therapy.

Obesity is a common problem after heart transplantation. Pre-operative obesity has been found to be a risk factor for morbidity and mortality after heart transplantation[46], while postoperative obesity has been associated with poor clinical outcomes[47] and poor functional outcomes[16]. Obesity was noted by Butler et al.[16] to directly impact functional performance, while increased BMI was reported by Leung et al.[48] to be correlated with reduced exercise capacity. Thus, considering our current findings and those of other researchers, post transplant obesity confers significant physical risk. If any modicum of success in weight reduction and maintenance of weight loss is to be gained, behavioral therapies, dietary programs, and exercise must be individualized and incorporated into a patient's lifestyle.

Lastly, being female and unemployed explained a significant amount of variance in overall physical functional disability, ambulation, and / or mobility. These findings have been supported in reports of perception of physical functional disability earlier after heart transplantation[5, 17]. In addition, Evangelista et al.[8] have previously reported that 85% of female heart transplant recipients engage in low or minimal levels of physical activity, and Renlund et al.[49], and Leung et al.[48] have reported that female gender is related to worse exercise capacity after heart transplantation. The evidence suggests that female transplant recipients have limitations in physical function. Therefore, careful screening for disability and

appropriate treatment and referral (perhaps for occupational therapy and / or physical therapy) may be indicated.

The relationship between unemployment and physical disability has been reported by other researchers after heart transplantation[12, 13, 50]. Rates of unemployment have varied from 22% to 86% over time after transplant[9, 35, 51-54]. Given the extent and yet variability of post transplant unemployment, it is incumbent upon clinicians to determine reasons for not working and provide assistance to patients who desire to return to work. Clearly, this area requires further research given its significant impact on patients, families, and society.

Our study has limitations. While our sample size was large and geographically diverse, we none-the-less studied patients who survived long enough to consider enrollment in our study, met study criteria, enrolled in our study, and were willing to complete booklets of questionnaires. This limitation may result in underestimation of physical functional disability (ie., not including patients who were too sick to enroll) or overestimation of physical functional disability (ie., not including patients who met criteria and did not enroll in our study because they were active and too busy). Also, our study sample was composed of primarily older, white, married men. We attempted to enroll all eligible patients, but were constrained by the imposed limits of patients who were transplanted 5 – 10 years earlier at the four institutions. Lastly, while our intention was to study long-term post-transplant physical functional disability, we did not have baseline pre transplant data.

Conclusion

We have demonstrated a low rate of perceived physical functional disability in patients from 5 – 10 years after heart transplantation. We have further identified strong relationships between physical functional disability and demographic, clinical, and psychological factors. Knowledge of these factors provides the basis for development of therapeutic plans of care that uses a holistic approach to heart transplant patient management.

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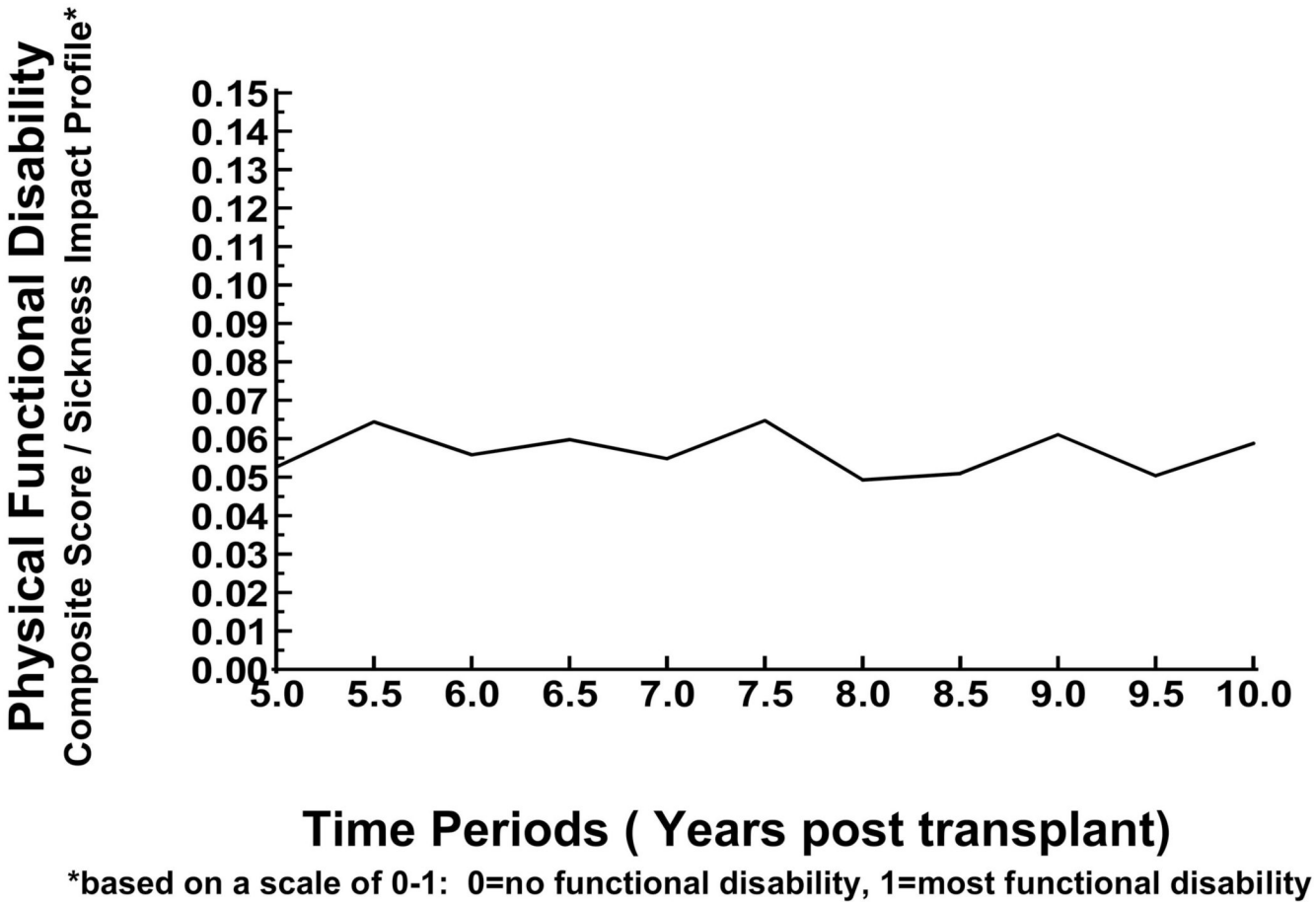

Figure 1.
Physical Functional Disability at 5-10 years after Heart Transplantation

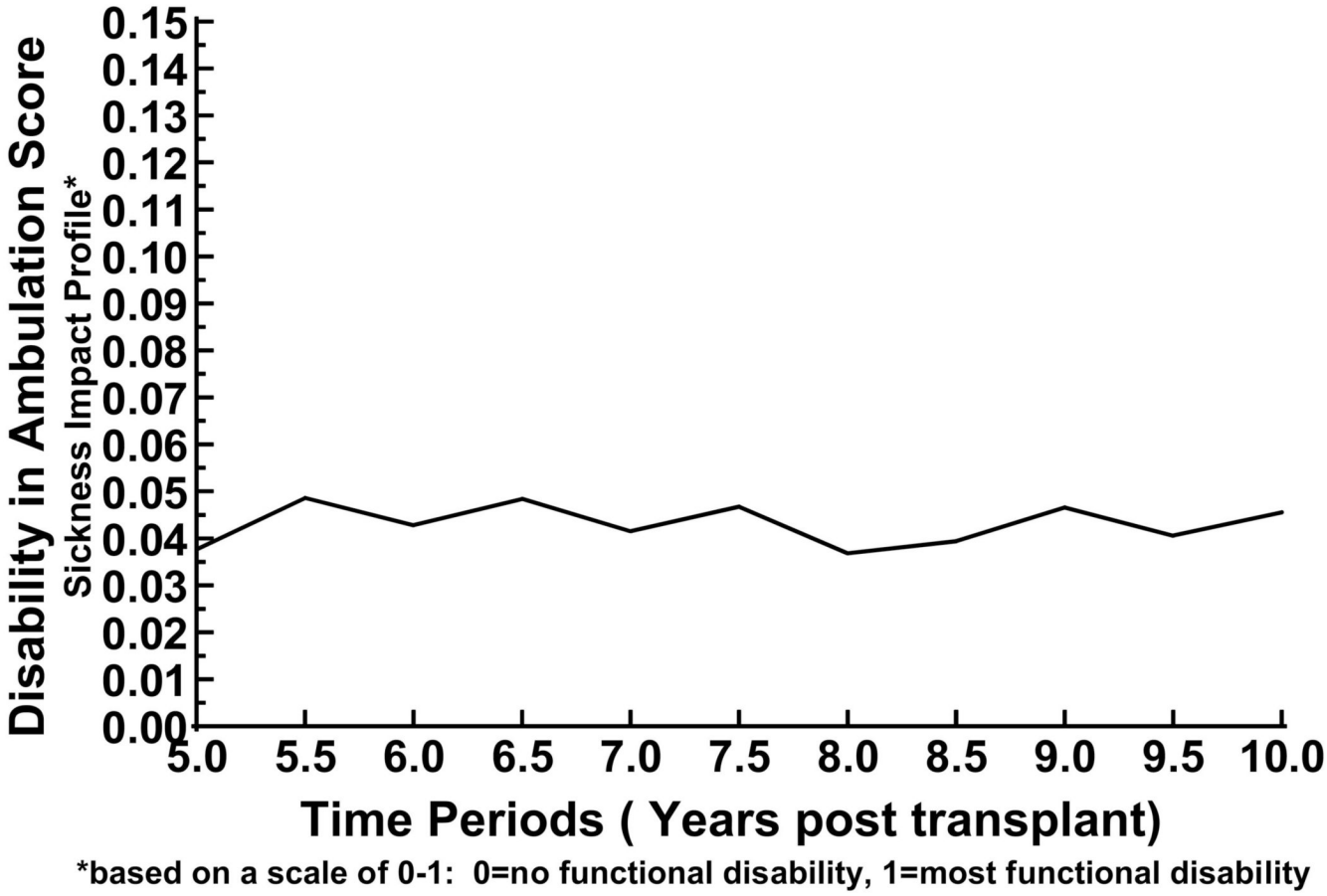

Figure 2.
Disability in Ambulation at 5-10 years after Heart Transplantation

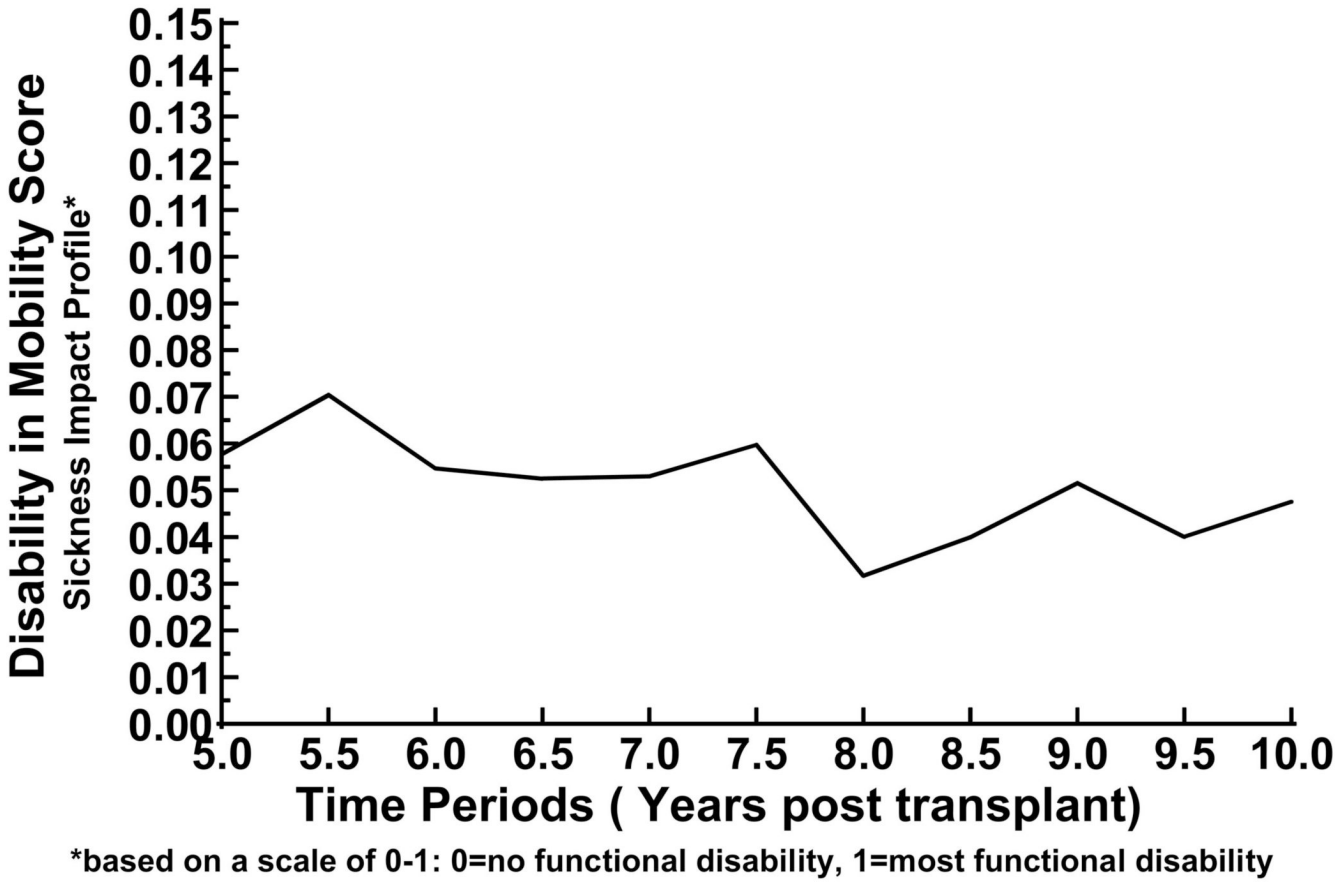

Figure 3.
Disability in Mobility at 5-10 years after Heart Transplantation

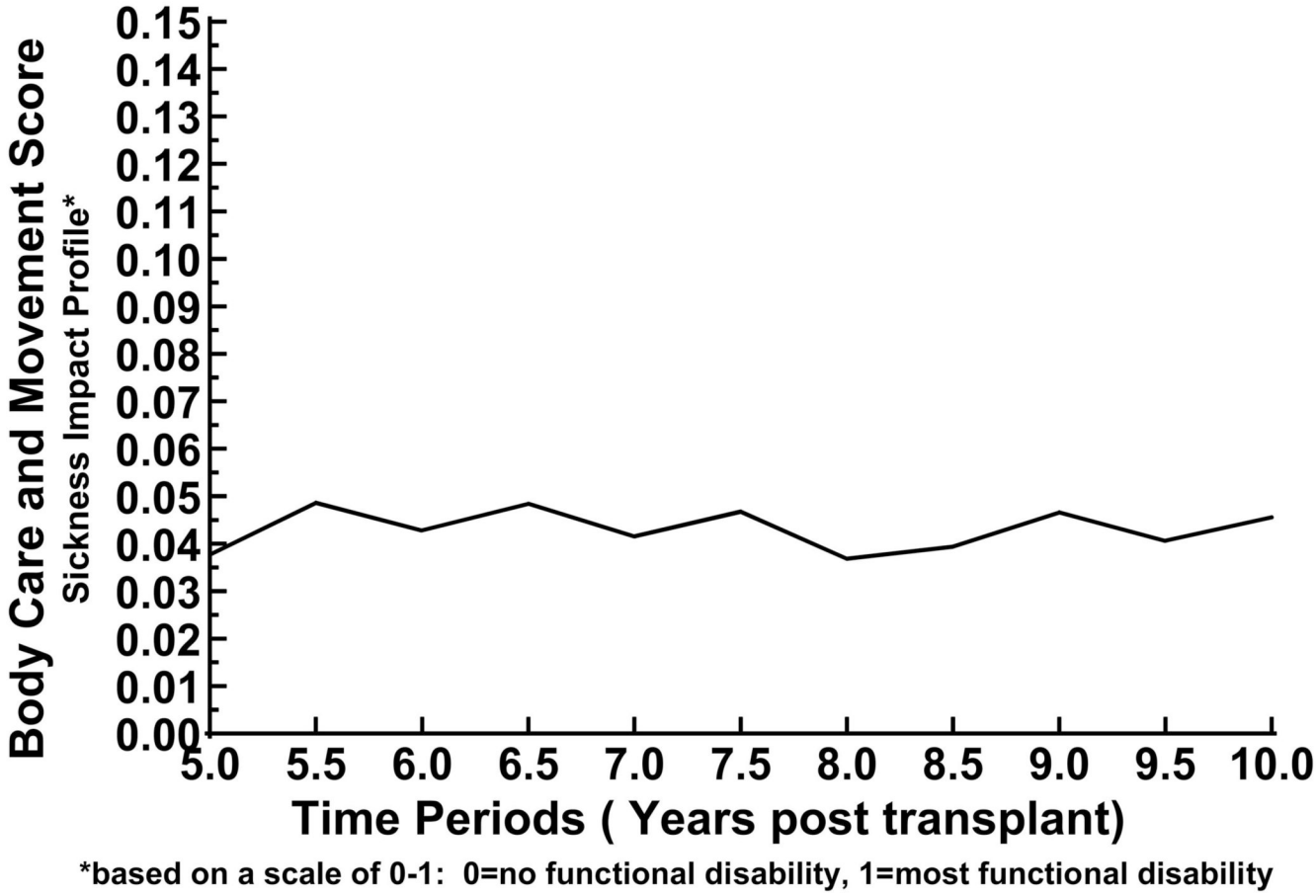

Figure 4.
Disability in Body Care and Movement at 5-10 years after Heart Transplantation

Table 1

Self-report Instruments Used to Measure Physical Functional Disability and to Measure Factors Impacting on Physical Functional Disability

Instruments/authors	Number of items used	Sub-scales used	Scoring
Sickness Impact Profile (Bergner et al, 1981)[18]	45	Body care/movement Mobility Ambulation	Yes/No Yes responses are weighted by amount of disability indicated
Heart Transplant Symptom Checklist (Grady, Jalowiec, & Grusk, 1988)[19] [modified, 1999]	75	Cardiopulmonary Gastrointestinal Genitourinary Neurological/muscular Dermatological/soft tissue	Yes/No Presence of symptoms
Jalowiec Coping Scale (Jalowiec, 1987)[20]	25	Evasive Fatalistic Emotive Palliative	Use of coping strategy: 0-3 0 = never used 3 = often used
Assessment of Compliance with Transplant Regimen (Grady, Grusk, & Jalowiec, 1988)[21] [modified, 1999]	2	Difficulty with compliance (exercise) Actual compliance (exercise)	Difficulty: 1-4 1 = no difficulty 4 = a lot of difficulty Compliance 1-4 1 = all of the time 4 = hardly ever
Positive and Negative Affect Schedule (Watson & Clark, 1991)[22]	10	Negative affect	1-5 1 = very slightly or not at all 5 = extremely
Cardiac Depression Scale (Hare, 1993)[25]	16	Sleep Uncertainty Mood Hopelessness	1-7 Agreement or disagreement with individual anchors for each question

Table 2

Characteristics of enrolled patients

Characteristics	Enrolled in Study (n=555)
Demographic Characteristics	
Age at transplant (years) (mean ± SD)	53.8 ± 9.9
Gender (%)	
male	78%
female	22%
Race/ethnicity (%)	
White	88%
Black	9%
Hispanic	1%
Other	2%
Marital Status (%)	
Married	79%
Divorced/separated	11%
Single	6%
Widowed	4%
Current Employment (%)	
Working	32%
Not Working	68%
BMI (kg/m^2) (mean ± SD)	29 ± 5.3
Clinical Characteristics	
Co-morbidities (%)	
Hypertension	87%
Hyperlipidimia	78%
Renal dysfunction	37%
Cancer (including skin cancer)	27%
Diabetes	27%
Orthopedic problems	26%
Gastrointestinal problems	22%
Gout	18%
Genitourinary problems	12%

Table 3

Percent of Patients with no Physical Functional Disability from 5-10 years after Heart Transplantation

Target Time (years)	Physical Function Composite Score (%)	Ambulation Score (%)	Mobility Score (%)	Body Care and Movement Score (%)
5.0	45	59	69	59
5.5	34	54	62	49
6.0	39	59	68	50
6.5	36	53	67	49
7.0	45	57	68	55
7.5	40	50	70	56
8.0	44	57	79	56
8.5	40	51	68	54
9.0	38	50	65	54
9.5	39	55	71	55
10.0	37	52	70	51

* from the Sickness Impact Profile

Table 4

Predictors of Physical Functional Disability

Variable	Beta Weights	Partial R-Square	Model R-Square	F Value	P Value
Neuro-muscular symptoms	0.12	0.317	0.317	932.74	< .0001
Depression	0.001	0.032	0.350	99.32	< .0001
Number of co-existing illnesses	0.003	0.020	0.370	64.75	< .0001
NYHA class	0.02	0.016	0.390	53.26	< .0001
Transplant event	0.003	0.012	0.400	39.93	< .0001
Male	-0.02	0.008	0.407	28.33	< .0001
Employment	-0.01	0.006	0.413	20.61	< .0001
Body mass index	0.002	0.006	0.418	19.60	< .0001
Orthopedic problems	0.02	0.006	0.424	20.81	< .0001
Mood	-0.06	0.005	0.429	16.60	< .0001
Negative affect	0.07	0.006	0.435	19.25	< .0001
Genitourinary symptoms	0.04	0.005	0.439	16.23	< .0001
Number of readmissions	0.01	0.004	0.443	12.97	0.0003
Cardiopulmonary symptoms	0.04	0.003	0.446	10.60	0.001
Age at transplant	0.001	0.003	0.449	12.32	0.0005
Cumulative malignancies	-0.005	0.003	0.452	11.75	0.0006
Education	-0.002	0.003	0.455	10.90	0.001
Diabetes mellitus	0.009	0.002	0.458	7.93	0.005
Genitourinary/urological problems	-0.01	0.001	0.459	5.17	0.02
Use of negative coping	-0.02	0.001	0.460	5.13	0.02

NYHA= New York Heart Association

Transplant Event = composite score of acute rejection, infection and cardiac allograft vasculopathy

Table 5

Predictors of Disability in Ambulation

Variable	Beta Weights	Partial R-Square	Model R-Square	F Value	P Value
Neuro-muscular symptoms	0.16	0.245	0.245	652.26	< .0001
Number of co-existing illnesses	0.004	0.029	0.274	80.05	< .0001
NYHA class	0.04	0.022	0.296	62.85	< .0001
Depression	0.001	0.017	0.313	49.32	< .0001
Transplant event	0.006	0.120	0.325	35.41	< .0001
Body mass index	0.004	0.010	0.335	29.53	< .0001
Orthopedic problems	0.03	0.009	0.345	28.75	< .0001
Employment	-0.02	0.008	0.352	23.08	< .0001
Cardiopulmonary symptoms	0.08	0.009	0.361	27.66	< .0001
Following a schuled exercise program	0.01	0.006	0.367	18.55	< .0001
Diabetes mellitus	0.02	0.004	0.371	13.56	0.0002
Male	-0.03	0.005	0.376	15.07	0.0001
Age at transplant	0.001	0.004	0.380	13.52	0.0002
Genitourinary symptoms	0.07	0.003	0.383	10.77	0.001
Mood	-0.07	0.004	0.387	12.75	0.0004
Cumulative malignancies	-0.006	0.003	0.390	8.08	0.005
Negative affect	0.07	0.002	0.392	7.42	0.007
Genitourinary/urological problems	-0.02	0.002	0.394	6.06	0.01
Number of readmission	0.01	0.002	0.396	5.65	0.02
Use of negative coping	-0.03	0.001	0.397	4.77	0.03
Renal problems	0.01	0.001	0.398	4.56	0.03
Education	-0.002	0.001	0.400	4.07	0.04

NYHA= New York Heart Association

Transplant Event = composite score of acute rejection, infection and cardiac allograft vasculopathy

Table 6

Predictors of Disability in Mobility

Variable	Beta Weights	Partial R-Square	Model R-Square	F Value	P Value
Depression	0.001	0.186	0.186	458.33	<.0001
Neuromuscular symptoms	0.08	0.042	0.228	109.93	<.0001
Male	-0.02	0.018	0.246	47.39	<.0001
Number of readmissions	0.01	0.012	0.258	32.24	<.0001
NYHA class	0.03	0.010	0.268	26.67	<.0001
Caucasian	-0.03	0.008	0.276	21.87	<.0001
Education	-0.003	0.006	0.282	17.15	<.0001
Negative affect	0.09	0.005	0.287	15.14	0.0001
Mood	-0.08	0.006	0.293	15.62	<.0001
Transplant event	0.003	0.004	0.297	11.51	0.0007
Genitourinary symptoms	0.04	0.004	0.301	10.94	0.001
Employment	-0.01	0.002	0.306	5.40	0.02
Diabetes mellitus	0.01	0.002	0.308	4.84	0.03
Cumulative malignancies	-0.004	0.002	0.308	4.53	0.03
Following a scheduled exercise program	-0.006	0.002	0.310	4.97	0.03
Number of co-existing illnesses	0.002	0.001	0.311	4.16	0.04

NYHA= New York Heart Association

Transplant Event = composite score of acute rejection, infection and cardiac allograft vasculopathy

Table 7

Predictors of Disability in Body Care/Movement

Variable	Beta Weights	Partial R-Square	Model R-Square	F Value	P Value
Neuromuscular symptoms	0.12	0.283	0.283	792.92	<.0001
Depression	0.0006	0.021	0.304	59.67	<.0001
Number of co-existing illness	0.003	0.018	0.322	52.90	<.0001
NYHA class	0.01	0.007	0.329	20.75	<.0001
Cumulative rejections	0.004	0.008	0.337	24.99	<.0001
Orthopedic problems	0.12	0.008	0.345	24.09	<.0001
Negative affect	0.06	0.005	0.350	15.75	<.0001
Mood	-0.05	0.005	0.356	16.49	<.0001
Body mass index	0.002	0.006	0.361	17.31	<.0001
Age at transplant	0.0008	0.004	0.365	12.77	0.0004
Cardiopulmonary symptoms	0.03	0.004	0.369	13.30	0.0003
Education	-0.002	0.004	0.373	11.87	0.0006
Number of readmissions	0.009	0.003	0.376	9.52	0.002
Caucasian	-0.01	0.002	0.378	6.04	0.01
Male	-0.008	0.001	0.379	4.58	0.03
Dermatologic symptoms	0.02	0.001	0.381	4.12	0.04

NYHA= New York Heart Association