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Influence of a Symptom Management Telehealth Intervention on Older Adults' Early Recovery Outcomes following Coronary Artery Bypass Surgery (CABS)

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Introduction

Health related quality of life (HRQOL) generally improves for most patients following coronary artery bypass surgery (CABS).¹⁻⁴ However, age-related factors (e.g., multiple comorbidities, more impaired physical functioning prior to their CABS) may contribute to older adults experiencing slower recovery or poor outcomes.^{5,6} Older adults may also experience ongoing symptoms after CABS and may have more impaired physical and psychosocial functioning, as well as limitations in their physical activity.^{7,8} Cardiac rehabilitation (CR) is a standard of care and is routinely prescribed to facilitate recovery of functioning and physical activity, as well as promote coronary artery disease (CAD) risk factor lifestyle modification after CABS. However, CR alone may not be able to adequately address the needs to improve physical activity and functioning among older adults at risk for impaired recovery after having CABS.^{9,10} Specific interventions to address the age-related recovery needs of older CABS patients, such as managing frequently occurring symptoms, may in turn improve patients' functioning and physical activity abilities.^{6,11} Therefore, one of the major goals of this randomized clinical trial (RCT) was to examine the effect of a symptom management (SM) intervention on older adult patients (≥ 65 years) following CABS. Patients who were eligible to participate were randomly assigned using a previously generated randomization schedule. The primary aim of this study was to determine if there were differences between the symptom management (SM) and usual care (UC) groups on physical activity, physiological and psychosocial functioning. A secondary aim was to describe the healthcare utilization of older adults following CABS.

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Background

Heart surgery is routinely performed on older adults.¹² Recovery of older adults can be hampered following CABS due to having more symptoms (e.g., fatigue, shortness of breath, sleep problems)^{4,7}, impaired functional capacity¹³, as well as being at higher risk for declines in physical functioning due to coexisting cardiac disease and other comorbidities.^{14,15} Outcomes following CABS surgery, such as surgery related morbidity and mortality, have significantly improved over the last several years for patients regardless of age.¹⁶ However, there is a need to examine clinically sensitive outcomes that are indicative of the recovery variability following CABS.^{17,18} Examining early recovery outcomes, such as physical activity, physiological and psychosocial functioning, can help to determine the efficacy of interventions delivered to older adults after CABS.

Physical Activity

Physical activity and exercise are recommended for older adults,¹⁹ and are considered essential for all patients following a CABS.^{20,21} Unequivocally, physical activity at moderate levels, for 30 minutes daily or most days, has cardiovascular benefits;^{20,21} with high energy expenditure physical activity even halting and causing regression of coronary atherosclerosis.²² Improved health perception, satisfaction and quality of life at five to six years after CABS is related to engaging in regular exercise.²³ However, initiating and maintaining physical activity and exercise regardless of age, is extremely difficult as evidenced by only 15-50% of patients still exercising six months after cardiac rehabilitation.²⁴⁻²⁶ Physical activity is an important indicator of early recovery outcomes as it is a predictor future morbidity, mortality and impaired physiological and psychological functioning for older adults.^{19,27,28}

Physiological and Psychosocial Functioning

Numerous studies have examined recovery of functioning among older adults following CABS and report improvements of both physical and psychosocial functioning over time.^{1,4,29} These studies indicate that physical functional abilities improve; usually peaking at approximately three months, then plateauing; and in some cases improvements continue up through the first year after CABS. Cardiac rehabilitation facilitates further improves physical functioning in older CABS patients; specifically increasing extremity strength, ankle range of motion, balance, and gait.²⁷

By three weeks after CABS, regardless of age, patients' tension, anger, confusion and depression begins to dissipate.³⁰ Overall mood and perceptions of tenseness,³¹ as well as anxiety and depression,³² and psychosocial functioning (role-emotional, social and mental functioning)¹ improves for patients over the first three to six months following CABS. Although most patients recover after a cardiac event (CABS or myocardial infarction) with relative equanimity, although approximately 25% of subjects (N=174)³³ had long-term problems in psychosocial recovery which were related to failure to return to work, leisure and sexual activities despite being physically fit. There is also a close association between CABS patients' levels of physiological and psychosocial functioning; with poorer physical functioning associated with higher levels of depression at one and three months after surgery.³⁴ Poor functional health recovery after CABS is predictive of long-term survival.³⁵ These studies demonstrate patients' functioning after CABS can be impaired, regardless of age. Therefore, a closer examination of functioning as an early recovery outcome following CABS is warranted.

Healthcare Utilization

Hospital readmission, attributable to cardiac-related problems, is a commonly recognized measure of health care utilization following cardiac surgery.^{4,36-38} Hospital readmission rates within one month (30-days) to 6-weeks following heart surgery have ranged from 8-34%.^{4,}

36,37,39-41 Cardiac-related problems necessitating hospitalization within 30 days of CABS (N=110) were related to wound infection (19%), atrial fibrillation (13%), pleural effusions (11%) and thromboembolic events (10%).³⁶ Other reported problems requiring rehospitalizations have included respiratory and cardiac problems (i.e., cardioversion, chest inflammation);⁴² as well as chest pain (with or without shortness of breath), incision problems, and analgesic reactions (e.g., nausea, vomiting, itching, constipation, and general malaise).
41 These studies support the importance of measuring health care utilization as an important outcome associated with early recovery following CABS.⁴³

Design and Methods

This study used a randomized, two-group (N = 280) repeated measures design with measurements taken at time of discharge (baseline measures), 3- and 6-weeks, and 3- and 6-months postoperatively among older adult patients (65 years or older). One group received usual care (UC) and the symptom management (SM) intervention and the comparison group received usual care (UC) only. The study sample size of 280 was based on a power analysis of pilot data on the primary variables of physiological functioning. Pilot data using the physical, role-physical and vitality functioning subscales of the MOS SF-36 were measured at 3 follow-up times in subjects after CABS. Based upon the correlation among the observations from the same subject that was no greater than 0.55; a sample size of 123 subjects per group was recommended as it would provide at least 80% power (testing at the 5% level of statistical significance [2-sided] to detect a difference in the true means of the outcome variables of 0.3 standard deviation (a difference characterized as small to medium effect for social science research). To allow for an ineligibility rate and loss to follow-up equivalent to the loss of $\approx$ 15% of the observations, and therefore had a targeted accrual for this study of 280 subjects based on the power analysis.

The investigators⁴⁴ developed the symptom management (SM) telehealth intervention implemented in this study to improve patients' self-efficacy and skills related to self-care management of early recovery symptoms. The six-week SM intervention was delivered via the Health Buddy ® telehealth device; for a total of 42 daily sessions. The SM intervention provided subjects with strategies (e.g., adequate rest, pain management, progressing physical activity incrementally) designed to address commonly occurring symptoms experienced after recovery from CABS, as a means to improve outcomes (physical activity, functioning); and a long term outcome of having less healthcare utilization.

Age-eligible postoperative CABS participants were recruited from December 2002 through August 2006 from four Midwestern tertiary hospitals. Initially, 280 patients consented to participate in the study. Data analyses were conducted on 232 subjects, as there were 34 (23.8%) subjects that did not receive the allocated intervention in the intervention group, compared to 15 subjects (11%) that did not receive the allocated intervention in the UC group. Reasons for not receiving the treatment as allocated, in both groups, included the following: a) subject burden (n=36), b) rehospitalizations or transfer to extended care facility (n=4), c) equipment malfunction (n=3), d) inability to reach subject per telephone for follow-up data collection (n=2); and e) inability to complete the intervention protocol (n=3). Figure 1 depicts the study enrollment and attrition for a total of 123 subjects in the usual care group and 109 in the SM group.

Measures

Besides the demographic and clinical data collected as reported in Table 1, other data measures used included the Modified 7-day Activity Interview, RT3® accelerometer, Physical Activity and Exercise diary and Medical Outcome Study Short Form-36 (MOS SF-36).

Physical Activity—In this study physical activity data were collected using the Modified 7-Day Activity Interview (for baseline), the RT3® accelerometer (Stayhealthy, Inc.) and the Physical Activity and Exercise Diary (for follow up times).

a) *Modified 7-Day Activity Interview*⁴⁵ was used to assess the subject's baseline physical activity level before surgery (average kcal/kg/day expended and average minutes/day spent in moderate or greater activity). Data collected from the tool includes hours per day spent in sleep and in light, moderate, hard and very hard activity (based on MET levels) and yield the total kilocalories per kg of body weight expended per day and total calories expended per day are derived from the tool. The instrument has acceptable test-retest reliability.⁴⁶ Construct validity and criterion validity have been reported.⁴⁷

b) *RT3® Accelerometer* was used as an objective measure of physical activity at follow-up times of 3- and 6-weeks and 3- and 6 months after CABS. It is approximately the size and weight of a pager. Subjects wore the accelerometer on their waistbands continuously, except during bathing and sleeping times, for three consecutive days each data collection period. Results from Hertzog et al.⁴⁸ demonstrated additional support for using 3 days of data collection as used in this study. Reliability estimates (interclass correlations) for 3-days of self-reported recorded data collection of minutes of moderate or higher physical activity in a diary and RT3® ranged from .76-.84 at 3-weeks, 6-weeks and 3-months after CABS. The RT3® yields “activity counts” of the subject's amount of activity; which can be converted to kcals expended. In this study, average daily activity counts and average kcal/kg/day expended were evaluated. The RT3® is a triaxial accelerometer which measures body motion (specifically, the electrical energy of acceleration and deceleration) during activities that involve energy cost. Triaxial accelerometers have documented validity with indirect calorimetry, with correlations ranging from .48 - .92.⁴⁹⁻⁵¹ Reliability of this instrument has also been reported.⁵²⁻⁵⁴

c) *Physical Activity and Exercise Diary* was a daily log used by subjects for each of the same three days that each subject wore the RT3® accelerometer at each follow-up time (3- and 6-weeks and 3- and 6-months after CABS). Subjects recorded the amount of time they spent in the various categories of activity levels (light, moderate, hard, very hard activities) and sleep. These categories were adapted from the Modified 7-Day Activity Interview.⁴⁵ Diary data included: a) average kcal/kg/day expended and b) mean number of minutes spent in light, moderate, hard, and very hard levels of physical activity. Three-day activity diaries such as the one proposed for this study have been used successfully as estimates of physical activity.^{55,56} The correlations between estimates of 3-day diary reports and the RT3® accelerometer demonstrated high generalizability coefficients (ICCs); with the RT3® accelerometer estimates of energy expenditure compare with the 3-days of data at three data collection points ranging from .85 - .97.⁴⁸

Physiological and Psychosocial Functioning—The Medical Outcomes Study Short Form-36 (MOS SF-36, version 2.0)⁵⁷ consists of eight subscales measuring both physiological and psychosocial functioning (general health, physical, role-physical, role emotional, social, bodily pain, mental health, and vitality functioning). Measurement of the MOS SF-36 were taken at baseline during hospitalization (based on the subject's report of pre-procedure level of functioning) and at 6-weeks and 3- and 6-months after CABS. In this study, measures were not taken at 3-weeks as clinically CABS patients are still recuperating from their acute hospitalization following CABS; and there was a need to minimize subject burden in the study. Subscale scores have a range of 0 to 100, with higher scores indicating better or higher functioning. Reported reliability, using Cronbach's alpha, have ranged from .78-.93.⁵⁸⁻⁶⁰ The instrument also has reported discriminant validity.⁵⁹ Physiological functioning was measured using three of the MOS SF-36 subscales: physical functioning (10 items), role limitations due to physical problems (4 items), and vitality (4 items) or the perceptions of energy and fatigue.

Psychosocial functioning was measured by three of the MOS SF-36 subscales: mental health (5 items), social (2 items), and role limitations due to emotional problems (3 items). In this study, the Cronbach's alphas for the both physiological subscales (physical, role physical and vitality) and the psychosocial subscales (role emotional, mental and social) for all data collection times ranged from 0.89-.90.

Health care utilization—At each follow-up time period subjects were queried about whether they had accessed any healthcare providers/services; specifically if they had been rehospitalized, been to the Emergency department, or to their healthcare provider (e.g., primary care provider, cardiologist and surgeon). If the subject had accessed any healthcare services, the frequency and purpose of the utilization was recorded. For those patients who reported use of healthcare, the hospital and/or healthcare provider was contacted by mail to validate the date of the hospitalization or healthcare visit, and to determine the reason for the healthcare encounter. This information cross-validated the subjects' self-reports.

Findings

The sample of subjects (n=232) was comprised of 83% men and 17% women; with 86% of the sample being married. There were 109 subjects in the symptom management group and 123 subjects in the usual care group. Subjects had a mean age of 71.2 ($\pm$ 4.7) years. The majority of subjects had an average of 13 or more years of formal education and approximately 80% of subjects in both groups participated in cardiac rehabilitation after hospital discharge. There were no statistically or clinically significant group differences on demographic (e.g., age, length of stay, race, and marital status) or baseline clinical variables (e.g., comorbidities, body mass index, discharge hemoglobin, and cardiac rehabilitation participation). Refer to Table 1 for an overview of the subjects' clinical and demographic characteristics.

Physical Activity

Using repeated measures analysis of covariance (RM-ANCOVA), there was no significant interaction or time effect for EEE (average kcal/kg/day expended) using the diary; however, there was a significant group effect $F(1,177)=8.2, p<.01$. The UC group had a higher mean kcal/kg/day expended compared to the SM group. However, the SM group did have a higher mean kcal/kg/day energy expenditure at the 3-week time period; corresponding to the time before most subjects had started in a CR program. Refer to Table 2 for results of RM-ANOVA's for physical activity and physical and psychosocial functioning measures. See table 3 for a summary of raw and adjusted mean scores for all of the physical activity variables. There were no significant ($p<.05$) interactions or main effects for group using baseline measures of physical activity as the covariate for the other 3 measures of physical activity. There were significant time effects [$F(3, 459)=17.3, p<.01$] for the RT3 average daily activity counts, with daily activity counts increasing over time. Similarly, the total group had significantly [$F(3, 531)=12.9, p<.01$] increased levels of moderate or greater activity, as measured by the diary, over time. The greatest improvements in both the activity counts and levels of moderate or higher activity intensity occurred between 6-weeks and 3-months following CABS. Although not significant, descriptively the SM group reported higher levels of engaging in “moderate or higher” levels of physical activity daily and had higher levels of EEE (kcal/kg/day) using the diary measure, specifically at the 3-week follow-up time period, in comparison to the UC group.

Physiological and Psychosocial Functioning

Physiological and psychosocial functioning were measured using subscales of the MOS SF-36. While there were no significant ($p<.05$) interactions or main effects for group, there were some significant time effects for both physiological and psychosocial functioning using RM-ANCOVA with baseline measures as the covariate; refer to Table 4 for physiological measures

of the MOS SF 36 and Table 5 for the psychosocial measures of the MOS SF 36. Physiological functioning peaked at 3-months and then plateaued at 6-months as compared to the psychosocial measures of functioning peaking at the 6-week time period and plateauing at 3- and 6-months. The significant time effects for physiological functioning indicated the total group had improvements in role-physical functioning (e.g., household chores) [$F(2, 414) = 4.3, p < .01$] and in vitality functioning (e.g., level of fatigue) [$F(2, 414) = 8.1, p < .01$] over time. Additionally, psychosocial functioning, specifically mental functioning significantly improved over time [$F(2, 414) = 8.1, p < .0005$].

Health Care Utilization

The groups in this study had very similar rates of rehospitalizations, ED visits and clinic visits for cardiac-related problems. In the SM group a total of 20/109 (18%) subjects, compared to 18/123 (15%) in the UC group were rehospitalized over the 6-months following CABS. There were 3 subjects (3%) in the SM group and 4 subjects (3%) in the UC group who had two to three rehospitalizations over the 6-months after CABS. Similarly, there were 20 patients (18%) in the SM group, compared to 18 in the UC group (15%) who had ED visits over the 6-month period after CABS. In relation to clinic visits, there were 66 subjects (60%) in the SM group and 65 subjects (53%) in the UC group who had one reported clinic visit during the study period. Some subjects had from two to three clinic visits during the 6-months after CABS; which included 13 subjects (12%) in the SM group and 4 subjects (3%) in the UC group. Clinic visits reflected routine types of care (e.g., follow-up of diagnostic studies such as lipid panels, routine follow-up with surgeon after CABS).

Discussion

The findings from this study have been useful in examining clinically relevant outcomes associated with the early recovery of patients following CABS. While traditional measures of morbidity, mortality and complications related to CABS are important to determining surgery success; these measures are not particularly sensitive to the health related quality of life (HRQoL) outcomes indicative of recovery after CABS. Study findings demonstrated the progressive increases in both physiological and psychosocial functioning trajectories that occur over time after CABS for both SM and UC groups. Psychosocial functioning peaked much sooner after CABS in comparison to physiological functioning. These findings are consistent with previous studies of the investigators^{1,4-61} and other researchers.^{29,32,62,63} By six months following CABS, subjects reported relatively high levels of functioning, which also reflects a high level of HRQoL. The improved functioning scores over time may also represent the sense of optimism patients often experience when they are satisfied with improvements in their health status following CABS.²³

Although it was disappointing that there were no significant differences in the levels of functioning by SM or UC groups; the sample of subjects in this study may have represented a group of patients that were less impaired or disabled prior to their CABS, as indicated by baseline functioning scores on MOS SF-36 which indicated a higher baseline status than reported by other researchers. Both Ballan et al.⁶⁴ and Elliott et al.¹⁷ reported mean physical and role-physical functioning scores < 55 on the MOS SF-36 subscales prior to cardiac surgery; compared to scores of ≥ 80 on these subscales in the current study. Psychosocial functioning subscales of social, mental and role-emotional functioning mean baseline scores < 60 ¹⁷, compared to mean scores of ≥ 80 in the current study. Furthermore, Elliott et al.¹⁷ also found mental and social functioning scores by six months after CABS had actually decreased, and were lower than baseline scores; whereas psychosocial functioning in this study had improved over time, with no declines observed in either the SM or UC group.

While there was only one significant group difference in physical activity between the SM and the UC groups in this study, the physical activity outcomes measured demonstrated that older adults achieved a return to a level of physical activity comparable to baseline or pre-procedure, by three months after their cardiac surgery. However, even by 6-months after CABS, neither group met the recommended levels of physical activity and exercise for cardiac patients.

¹⁹⁻²¹ The findings in this study, similar to other studies, reflect the need to further examine the way many older adults are unable to achieve and/or sustain levels of physical activity and exercise as recommended.

Overall, the subjects in this study had uneventful recoveries following CABS, as reflected by similar patterns of rehospitalization, ED and clinic visits. Although not significantly by group, the SM group did have slightly more health care resource utilization. This may reflect the SM group receiving intervention strategies recommending they seek additional health care or contact with their health care providers if symptoms or postoperative problems did not improve. Descriptive data related to healthcare utilization provided in this study has been lacking or very limited in other studies of patients' recovery after CABS.

Limitations

Study findings are limited due to the homogenous sample of subjects, who had fairly high levels of preoperative functioning; and therefore, findings may not be generalizable to the larger CABS population. In this study the use of two different measures of EEE was a limitation. The measure of baseline or preoperative physical activity was measured subjectively by patient self-report (Modified 7-day Activity Interview) and was measured at follow-up times using the RT3® accelerometer, an objective measure. In future studies more explicit measures of the patient's level of disability and physical activity is indicated, to identify determinants of and interventions for assisting patients with potential for impaired recovery after CABS. The baseline status of functioning prior to CABS was limited to the self-report data obtained from the MOS SF-36. Furthermore, the healthcare utilization findings in the study were limited to descriptive statistical analysis due to the types of healthcare resource utilization evaluated in this study and the relatively small number of subjects having ED visits or being rehospitalized. In this study the intent to treat was not initiated at the actual enrollment of subjects in the study. Subjects consented to participate in the study and were enrolled in the study during their hospital stay at tertiary medical centers; and were usually discharged within 5-7 days after CABS. We found that several patients were overwhelmed by their recovery when they returned home and elected not to participate any further in the study, therefore we had subjects who necessitated being dropped out of the study. In this study, it was optimal to enroll subjects while hospitalized as patients are discharged to home in rural communities at a distance from the tertiary hospital which would make it extremely challenging to enroll patients in a timely basis for studies of early recovery after cardiac events. Based on this finding related to attrition, for future studies we would recommend an attrition rate of 20% be utilized in determining sample size to account for this disparity.

Conclusions

The majority of CABS subjects in this study were able to return to preoperative levels of physical activity and functioning between three to six months after surgery. Although subjects in the SM group did not have significantly different physical activity recovery, a slightly higher performance of moderate or higher intensity physical activity early in recovery (3-weeks after CABS) was noted. The effects of CR may have diminished the effects of the SM intervention in the early recovery period. Subjects in this study had uneventful recoveries, resulting in only a small number of subjects requiring rehospitalization for cardiac-related problems. Although the SM group did not significantly impact the selected recovery outcomes targeted in this report, the intervention was able to be successfully delivered in the subject's home, for the 6-

week duration, to older adults following CABS, many of whom resided in rural communities throughout the Midwest.

While the overall trends of subjects' physical activity and functional recovery demonstrate improvement over time, researchers¹¹ have recommended consideration should be given to the level of baseline physical activity (e.g., level of sedentary activity), level of deconditioning and comorbidities⁶ when designing interventions. The degree of functional recovery directly relates to survival after cardiac surgery;³⁵ thus emphasizing the importance of identifying and intervening with patients who experience poor functioning cannot be underscored enough. Recent studies also point to the likelihood that there are distinct patterns of recovery after CABS that reflect those patients who have an improved versus non-improved health related quality of life.^{17,18} Based on study findings, subanalysis work is in progress to examine which subgroups of CABS patients (e.g., gender groups, subjects with higher disease burden) were the most responsive to the symptom management intervention used in this study to guide future research. Using strategies, such as the SM intervention, are warranted to optimize recovery for older adults after CABS, particularly related to improving physical activity and functioning.

Acknowledgments

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Figure 1.
Subject Enrollment and Attrition.

Table 1

Demographic and Clinical Characteristics of Study Participants (N=232).

Category		Total (N=232)	
Demographic Variables		n	(%)
Marital Status	Married	200	86.21
	Single	3	1.29
	Widowed	24	10.34
	Divorced	5	2.16
Currently Working	Yes	105	45.26
Type of Procedure	CABG	173	74.57
	OPCAB	57	24.57
	Other	2	0.86
Gender	Male	194	82.76
	Female	40	17.24
Clinical Variables		n	(%)
NYHA Classification	I	112	48.48
	II	95	41.13
	III	23	9.96
	IV	1	0.43
Ejection Fraction	< 50%	45	19.74
	≥ 50%	183	80.26
Previous MI	Yes	28	12.07
Diabetes	Yes	54	23.28
Hypertension	Yes	171	73.71
High cholesterol	Yes	172	74.14
History of Tobacco Use	Yes	118	50.86
History of Smokeless Tobacco	Yes	7	3.04
Family History of CAD	Yes	162	70.13
PVD	Yes	33	14.22
Participation in Cardiac Rehabilitation after CABS	Yes	181	80.44
Additional Variables		Mean	SD
Length of Stay		5.45	1.20
Age		71.21	4.91
Education Level		13.34	3.04
Discharge Hemoglobin		10.65	1.14
Body Mass Index		28.47	4.59
Charlson Comorbidity Index (Average # of Comorbidities)		1.13	1.23

Table 2
RM-ANCOVA for Physical Activity and Physical and Psychosocial Functioning Variables

Variables	Group		Time		Group * Time	
	F (df)	P	F (df)	p	F (df)	p
Physical Activity						
Average Daily Activity Counts (RT3)	1.6 (1,153)	.20	17.3 (3,459)	<.01	1.6 (3,459)	.20
Average kcal/kg/Day EEE (RT3)	1.5 (1,153)	.20	1.3 (3,459)	.20	1.4 (3,459)	.20
Average Total kcal/kg/Day EEE (Diary)	8.2 (1,177)	<.01	0.9 (3,531)	.40	6.7 (3,531)	.10
Average Daily Minutes in Moderate or Greater Activity (Diary)	2.0 (1,177)	.10	12.9 (3,531)	.01	1.3 (3,531)	.20
Physical Functioning (MOS SF-36 subscales)						
Physical	1.3 (1,207)	.25	.70 (2,414)	.49	.93 (2,414)	.39
Role-Physical	1.2 (1,207)	.26	7.2 (2,414)	<.01	1.39 (2,414)	.24
Vitality	.03 (1,207)	.80	4.3 (2,414)	<.01	.02 (2,414)	.90
Psychosocial Functioning (MOS SF-36 subscales)						
Role-Emotional	.06 (1,205)	.40	.30 (2,412)	.70	.50 (2,412)	.60
Social	.90 (1,204)	.40	.7 (2,410)	.50	1.8 (2,410)	.20
Mental	.10 (1,207)	.40	8.10 (2,414)	<.0005	.50 (2,414)	.60

Table 3

Raw and Adjusted Means for the Physical Activity Variables by group .

RT3: Average Daily Activity Counts					
Raw Means (SD)	N	3 wk	6wk	3 mo	6mo
Symptom Management	73	125768.2 (68981.9)	158004.1 (70062.1)	1910410.1 (115060.0)	175428.9 (99817.5)
Usual Care	83	128104.5 (76195.6)	170801.7 (114718.4)	209748.7 (130548.4)	213716.2 (132035.6)
Adjusted Means					
Symptom Management	73	125972.7	158650.8	191546.8	176064.1
Usual Care	83	127924.7	170233.0	209304.0	213157.6
RT3: Average Daily Kcal/Kg (EEE)					
Raw Means (SD)	N	3 wk	6wk	3 mo	6mo
Symptom Management	73	25.5 (3.0)	26.6 (2.9)	27.9 (4.6)	27.4 (4.0)
Usual Care	83	25.6 (3.1)	27.3 (4.6)	28.8 (5.4)	28.2 (5.3)
Adjusted Means					
Symptom Management	73	25.5	26.7	28.0	27.5
Usual Care	83	25.5	27.3	28.8	28.8
Diary: Average Daily Kcal/Kg (EEE)					
Raw Means (SD)	N	3 wk	6wk	3 mo	6mo
Symptom Management	81	25.1 (3.8)	26.6 (4.7)	28.7 (5.6)	28.3 (5.5)
Usual Care	99	24.3 (2.6)	26.2 (4.6)	28.6 (6.2)	30.0 (7.8)
Adjusted Means					
Symptom Management	81	25.1	26.6	28.6	28.3
Usual Care	99	24.3	26.3	28.7	30.2
Diary: Average Daily Minutes in Moderate or Greater Physical Activity					
Raw Means (SD)	N	3 wk	6wk	3 mo	6 mo

Symptom Management	81	111.9(99.1)	145.4(118.8)	196.0(144.5)	185.5(143.6)
Usual Care	99	92.9 (70.1)	126.9(195.7)	195.7(150.7)	223.8(179.2)
Adjusted Means					
Symptom Management	81	110.2	144.4	194.6	185.2
Usual Care	99	93.2	144.5	198.7	227.6

Table 4

Raw and Adjusted Means for Physiological Functioning MOS SF-36 Variables by group.

Physical Functioning: MOS SF-36 Subscale				
Raw Means and SD	N	6 Weeks M (SD)	3 Months M (SD)	6 Months M (SD)
Symptom Management Group	98	80.7 (13.5)	86.1 (15.6)	89.0 (16.5)
Usual Care Group	112	79.1 (15.7)	85.6 (14.4)	85.5 (18.9)
Adjusted Means				
Symptom Management Group	98	80.7	86.2	89.1
Usual Care Group	112	79.1	85.5	85.4
Role Physical Functioning: MOS SF-36 Subscale				
Raw Means and SD	N	6 Weeks M (SD)	3 Months M (SD)	6 Months M (SD)
Symptom Management Group	98	80.0 (22.1)	89.2 (18.4)	89.4 (20.7)
Usual Care Group	112	74.3 (24.5)	88.1 (18.2)	88.6 (21.0)
Adjusted Means				
Symptom Management Group	98	79.9	89.0	89.3
Usual Care Group	112	74.4	88.3	88.7
Vitality Functioning: MOS SF-36 Subscale				
Raw Means and SD	N	6 Weeks M (SD)	3 Months M (SD)	6 Months M (SD)
Symptom Management Group	98	71.4 (14.5)	75.8 (13.6)	76.0 (16.6)
Usual Care Group	112	69.5 (14.8)	74.4 (13.2)	74.3 (15.1)
Adjusted Means				
Symptom Management Group	98	70.6	75.1	75.3
Usual Care Group	112	70.2	75.0	74.9

Table 5

Raw and Adjusted Means for Psychosocial Functioning MOS SF-36 Variables by group.

Role-emotional Functioning: MOS SF-36 Subscale				
Raw Means	N	6 Weeks M (SD)	3 Months M (SD)	6 Months M (SD)
Symptom Management Group	97	98.9 (6.1)	99.2 (4.0)	99.0 (4.7)
Usual Care Group	112	98.6 (7.6)	100 (0.0)	98.7 (9.4)
Adjusted Means				
Symptom Management Group	97	98.9	99.2	99.0
Usual Care Group	112	98.6	100	98.7
Mental Functioning: MOS SF-36 Subscale				
Raw Means and SD	N	6 Weeks M (SD)	3 Months M (SD)	6 Months M (SD)
Symptom Management Group	98	90.5 (8.9)	92.0 (7.5)	90.0 (10.5)
Usual Care Group	112	89.7 (9.7)	91.8 (8.2)	90.3 (11.7)
Adjusted Means				
Symptom Management Group	98	90.3	91.8	89.6
Usual Care Group	112	89.9	92.0	90.7
Social Functioning: MOS SF-36 Subscale				
Raw Means And SD	N	6 Weeks M (SD)	3 Months M (SD)	6 Months M (SD)
Symptom Management Group	97	94.7 (14.0)	96.9 (14.9)	97.3 (10.7)
Usual Care Group	111	97.3 (10.0)	97.9 (10.1)	95.6 (14.8)
Adjusted Means				
Symptom Management Group	97	94.6	96.7	97.2
Usual Care Group	111	97.4	98.0	95.7