Published in final edited form as:
J Cardiopulm Rehabil Prev. 2014 ; 34(2): 130–137. doi:10.1097/HCR.0b013e3182a528ba.

Health-related Quality of Life Outcomes in Coronary Artery Bypass Surgery Patients and Partners

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Abstract

PURPOSE—The purpose of this pilot study was to examine health-related quality of life (HRQOL) outcomes in coronary artery bypass surgery (CABS) patients and partners enrolled together in cardiac rehabilitation (CR) versus a usual care (UC) group.

METHODS—After CABS, couples were randomly assigned to the Partners Together in Health (PaTH) intervention (n=17) or usual care (n=17) groups. HRQOL was operationalized as physical function (SF-36 Physical Functioning subscale), depression (Patient Health Questionnaire), and marital adjustment (Dyadic Adjustment Scale). Data were measured in patients and partners at the start (T1) and end of CR (T2), and 3 months after CR (T3). Nonparametric statistics were used to examine changes over time and differences between groups.

RESULTS—Patients in both groups, and partners in the PaTH group, significantly improved physical function between T1 and T2. At T1, 18% of patients and 6% of partners were depressed. At T2 and T3, only 3% of patients and no partners were depressed. Almost 12% of patients and partners were maritally distressed at T1. At T2 and T3, patients' marital distress was unchanged, but more partners reported marital distress (15%).

CONCLUSIONS—This study adds to our understanding of the trajectory of HRQOL outcomes following CABS for patients and partners. These findings demonstrated promise for the PaTH intervention. Future testing of the intervention is warranted in a larger sample. Because patients and partners are impacted by CABS as a shared life experience, couple-centered interventions may improve HRQOL outcomes more than individually focused interventions.

Key words or phrases

health-related quality of life; physical function; depression; marital adjustment; couple-centered interventions

Patients often report diminished health-related quality of life (HRQOL) following coronary artery bypass surgery (CABS).[1–4] Studies examining patient physical and psychosocial HRQOL have generally shown improvement by 6 months post-CABS.[4–6] Although family members often take on extra caregiving responsibilities during this time, few studies were found that examined HRQOL in partners. Couple-centered interventions in chronic illnesses

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Statement of submission

All authors have read and approved submission of the manuscript and the manuscript has not been published and is not being considered for publication elsewhere in whole or in part in any language except as an abstract.

such as cancer and dementia have reported positive HRQOL outcomes including reduced depression and improved marital quality for patients.[7] Since many CABS patients are in long-term dyadic relationships,[8] interventions aimed at the patient-partner dyad may result in improved and longer-lasting HRQOL outcomes than interventions aimed solely at the patient. The purpose of this study was to test the effects of the Partners Together in Health (PaTH) intervention (patients and partners both participate in cardiac rehabilitation (CR) versus a usual care (UC) group on the HRQOL outcomes of CABS patients and their partners.

For this study, the conceptual HRQOL domains of interest were based on the Ferrans et al[9] HRQOL model. Physical, psychological, and relational domains were operationalized as physical function, depression, and marital quality. The combined interaction of patients and partners working together towards common goals (PaTH group) was believed to be more beneficial in improving HRQOL outcomes, as compared to usual CR participation (UC group).[10]

Physical function was 1 of the most frequently reported HRQOL variables for patients after CABS. Patient physical function was typically the lowest during the first 2 to 6 weeks post-CABS, and gradually improved.[1,11–13] Early improvements in physical function following coronary heart diseases (CHD) events,[1] CABSs,[14] and CR programs[15,16] are well documented during the first 3 months. However, while some studies found improvements in physical function between postevent to 6 months,[2,17] others do not show improvements occurring between 3 and 6 months[15,16] or later.[5] Findings are confounded by the different instruments used to measure physical function[2,15–17] and varying time intervals examined.[2,15–17] Often partners take on significant physical burdens such as additional housework and patient-related caregiving activities following CHD events.[18,19] Very few studies examined partners physical HRQOL. In 1 study, significant others reported higher levels of moving ability and usual activities than CABS patients at 1, 6, and 12 months postsurgery.[6]

In patients with CHD, 20 to 25% have reported major depressive symptoms.[4,20] While most patients depressive symptoms improve over time, findings have been inconsistent. CABS patients have been found to have no significant change in depression from pre-CABS to 3 months postsurgery.[4] However, another study found that depressed patients had significant improvements from inpatient post-CABS to 8 months after CABS.[21] In CHD patients enrolled in a 6-month long CR program, psychological HRQOL did not improve between CR entry to 3 months; but significantly improved from 3 to 6 months.[16]

One study found that 66% of spouses of CHD patients met the criteria for psychological distress.[22] Symptoms included feeling stressed, trouble falling asleep, and feeling emotionally fragile. Other studies identified reduced psychological HRQOL in partners compared to the CHD patients themselves and to the age-matched general population.[23,24] However, Rantanen et al[6] found that CABS patients reported worse depression than spouses at 1 month postsurgery; but over time, both the patients and partners depression improved significantly.

Dyadic relationships, such as married couples, are one of the most enduring and intimate of family relationships and family social support.[25] Family members both influence, and are influenced by the patients physical, behavioral, and psychological responses to acute and chronic illnesses.[26] Marital status alone has been associated with better overall QOL, morbidity, and mortality[27] and with long-term survival post-CABS.[28] The quality of the couple relationship, and specifically marital adjustment, influenced health outcomes in CHD patients and their partners.[18,28] Higher levels of marital quality were found to predict lower

levels of dysphoria.[25] A recent meta-analysis examined 33 randomized couple-centered interventions in chronically ill patients and their partners.[7] Partner outcomes were examined in less than half of these couple-centered studies. However, 35% of the studies included in this meta-analysis found improved partner psychological functioning, marital quality and coping in the couple-oriented groups compared to UC. Thus, couple-centered interventions need to be examined for their impact on improving HRQOL in patients and their partners after CABS.

The purpose of this study was to examine changes over time and differences between groups in physical, psychological, and relational HRQOL outcomes of patients (aim 1) and partners (aim 2) in the PaTH group versus the UC group.

METHODS

The parent study[29] Partners Together in Health (PaTH) was an experimental, 2-group, repeated measures design. A convenience sample from a midwestern university medical center and a community hospital was used. Inclusion criteria for patients were: (a) diagnosis of CABS, (b) age 19 years or older, (c) enrollment in outpatient CR, (d) married or living with spouse/partner for more than 1 year, (e) spouse/partner willing to participate, (f) no history of psychiatric illness, and (g) classified as low to moderate risk for occurrence of cardiac events during exercise.[30] Inclusion criteria for partners were the same except for the CABS diagnosis and they needed permission from their primary care physician to participate. Exclusion criteria for patients and partners were orthopedic problems that would prevent walking on a treadmill.

Couples assessed for eligibility were n=158 with 86 couples excluded and 33 declining participation. Of the 39 eligible couples (54% participation rate), 4 couples could not be scheduled for baseline data collection. Thus, 33 couples were randomly allocated to the PaTH group (n=18) and to the UC group (n=17). One patient in the PaTH group did not tolerate the baseline exercise treadmill test due to orthopedic problems and the couple was withdrawn from the study. No couples were lost to followup.

Physical HRQOL was examined using the Physical Functioning (PF) subscale of the SF-36 (SF-36v2TM).[31,32] The PF subscale consists of 10 items representing physical activity limitations. Scores range from 0 to 100 with higher scores indicating better physical functioning. Internal consistency reliability estimates were reported to be excellent (Cronbach's alpha =.93).[32] Cronbach alphas in the current sample ranged from .80–.93 in patients and .80–.88 in spouses.

Psychological HRQOL was measured using the Patient Health Questionnaire (PHQ-9). PHQ-9 scores range from 0 to 27, with higher scores indicating greater severity of depression.[33] PHQ-9 scores may be categorized as minimal (0–4), mild (5–9), moderate (10–14), moderate-severe (15–19), and severe (20–27).[34] Internal consistency reliability of the PHQ-9 has been very good (Cronbach alphas of .86 to .89).[33] The PHQ-9 has been used in several studies investigating depression in CHD patients[20,35] and has been recommended by the American Heart Association for depression screening in cardiac patients.[36] Cronbach alphas in the current sample ranged from .65–.84 in patients and .70–.90 in partners.

Relational HRQOL was measured using the 7-item Dyadic Adjustment Scale (DAS-7).[37,38] The DAS-7 is a self-report measure of relationship adjustment for married or cohabitating couples revised from the full length DAS.[39] Respondents indicate the degree to which they agree or disagree on specific relationship issues. Six items are rated on a 6-point Likert-type scale and the seventh item is rated on a 7-point scale. Total scores range from 0 to 36, with higher scores indicating greater relational adjustment. Internal consistency was satisfactory

with Cronbach alpha reported at .80.[38] Cronbach alphas in the current sample ranged from .79–.82 in patients and .81–.88 in spouses.

Treatment Groups

Patients in both groups and partners in the PaTH intervention group began CR 2 to 3 weeks posthospital discharge. Both CR programs employ MS-prepared exercise specialists and primarily BSN-prepared RNs; and are nationally certified by the AACVPR.[30] Individualized exercise plans were implemented in a hospital-based, rehabilitation facility that included aerobic, strength, and flexibility exercises, 3 days a week for 6 to 12 weeks (18 to 36 sessions). Group education classes in nutrition, exercise, smoking cessation, cardiac knowledge, stress management, medications, and lifestyle change were regularly offered. In the PaTH group, patients and partners received the individualized treatment plan and counseling. In the UC group, only patients received the individualized treatment plan and counseling and spouses in this group attended the group educational sessions. However, the CR program at the community hospital had an established program which allowed spouses/family members to exercise in the facility. The effects of this variation on the planned intervention were analyzed by comparing differences between partners at both sites.

Institutional Review Board approvals were obtained. Privacy, confidentiality, and voluntary participation were addressed in the informed consent. Questionnaires were mailed to the participants' homes and participants returned them during the data collection visit at each time point. Subjects were paid a total of $30 for completing the 3 time points.

Data Analysis

Data were entered into SPSS Version 20.0 (IBM) software program. Three percent (n=1) of patients and partners were excluded from the PHQ-9 analysis due to 1 missing item. Six percent (n=2) of partners missed 1 item from the DAS-7. Data analyses were performed on the variables with complete data only. Nonparametric statistics were used at the .05 level of significance (two-tailed tests). Demographic characteristics were compared between groups using χ^2 for categorical variables and Mann-Whitney U tests for continuous variables. Wilcoxon Signed Ranks tests were used to examine changes over time in each dependent variable for patients and partners. Finally, a change score was computed for each HRQOL variable between T1-T2 and T2-T3. Mann Whitney U test statistics were used to compare differences between groups (PaTH vs. UC).

RESULTS

The majority of CABS patients and spouses were Caucasian, employed outside the home, and reported moderate household incomes. Eighty-eight percent (n=15) of the partners were female, median age 62 (range 33–76) years. There were no differences between patient groups in demographic characteristics (see Table 1), or for partners. There was a significant difference between CR sites in the number of days from date of surgery to start of CR ($z = -3.85$, $P<.000$). Patients at the medical center started CR a median of 21 days from surgery (range 15–27 days); patients at the community hospital site started CR a median of 11 days (range 7–26 days) from surgery.

Patients in both the PaTH and UC groups reported low to moderate levels of physical function at T1 (see Table 2). Patients significantly improved their physical function from T1 to T2; but not between T2 and T3. Patients' median PHQ-9 scores indicated low levels of depression at all 3 time points. At T1, 18% of patients (n=6) met the cutpoint criteria for major depressive symptoms. Patients in the both groups showed significant improvements in depressive symptoms from T1 to T2; but there was no evidence of a difference in patients'

depression from T2 to T3. Patients' average DAS-7 scores showed moderately high marital adjustment at all time points with little change over time, and no differences between time points. Finally, there was no evidence of a difference between patients in the PaTH group versus the UC group on the 3 HRQOL variables.

Patients at the community hospital (started CR *Mdn*=11 days) had worse PF and depression scores at T1 than patients at the medical center (started CR *Mdn*=21 days) CR site. However, at each time point there was no evidence of a difference between groups by site on any of the HRQOL variables. By 3 and 6 months, patients at the community hospital had similar scores for physical function and depression as patients at the medical center CR program.

Partners in both groups reported high levels of physical function at all 3 time points (Table 3). Partners in the PaTH group had significant improvement in physical function between T1 and T2; however, partners in the UC group did not improve between T1 and T2. Between T2 and T3, there was no significant improvement in physical function for partners in either group. Partners' depression scores indicated relatively low levels of depression across the 3 time points. At T1, 6% (n=2) of partners met the cutpoint criteria for major depressive symptoms; but none were above the cutpoint at T2 and T3. There was no evidence of change over time in the PaTH and UC partners' depression scores or dyadic adjustment scores from T1 and T2, or from T2 and T3. Similarly, there were no differences between partners in the PaTH versus UC groups on the change scores of the 3 HRQOL variables. Further analyses by site indicated that the only differences between clinical sites were in the UC groups. Partners in the UC group at the medical center reported a greater improvement in physical function and depression between T2 and T3 than partners at the community hospital. However, these partners had slightly lower scores at all 3 time points than UC partners at the community hospital.

DISCUSSION

In our study, patients in both groups had significant improvements in physical function between T1 and T2. Patients began the CR program with somewhat lower physical functioning levels than other published findings, despite similar age and gender demographics.[14–16] However, patients in our study achieved a higher level of physical function (mean PF scores >82) at the completion of the CR program (T2), compared to other studies.[14–16]

The PHQ-9 median scores indicated minimal levels of depression (score 0–4)[32] at all 3 time points. At baseline, 18% (n=6) of patients were categorized as depressed, using the cutpoint PHQ-9 score ≥10.[33,34,40] This finding was similar to the 20% of patients with CAD in outpatient clinics who were identified as depressed.[20] Depression has been found to be a barrier to CR participation[41] and may have resulted in fewer depressed patients agreeing to participate in the study. The PHQ-9 survey was recommended for screening depression in patients with CHD in primary care settings such as physician offices, outpatient clinics, and CR programs.[36] When using the cutpoint (PHQ-9 ≥10) the PHQ-9 has been found to have an 88% specificity and 88% sensitivity (likelihood ratio=7.1) for major depressive disorder and satisfactory sensitivity to change over time when used to monitor treatment.[33,34,41] A recent meta-analysis[40] of 17 validation studies, found that the PHQ-9 had good diagnostic properties for major depressive disorder in most medical populations except for cardiac patients. In future studies, the PHQ-9 may need to be supplemented with other measures of depression to capture these CABS patients' depressive symptoms.

In our study, patients in both groups rated their marital adjustment as satisfactory (DAS-7, mean score >25) at all time points with very little change over time. Hunsley et al[38] previously found that 16% of a community sample reported marital distress. Couples who were maritally distressed had mean scores on the DAS-7 less than 20.8.[39] Only 12% (n=4) of patients fell below this mean score for distressed marital quality. Dissatisfying interactions are likely to worsen relational quality of life during CABS recovery and fail to provide the emotional and instrumental support needed for lifestyle changes.[42]

Partners in the PaTH group showed evidence of significant improvement in physical function from the T1 to T2; while UC partners did not. Partners in the PaTH group may have shown a significant improvement because of the addition of exercise and group participation as part of the PaTH intervention. In our study, partners in the PaTH group may have experienced closer relationships working as a couple in CR, which may have contributed to their better physical function improvements from baseline to the end of CR.

Partners' PHQ-9 scores indicated very minimal levels of depression throughout the study; which, like patients, may have resulted from fewer partners with depressive symptoms agreeing to participate in the study. In the general population, only 4.8% of people who do not have a comorbid illness were found to have major depression; compared to a prevalence range of 8% to 17% for those people with a chronic illness.[36] In our study, about 6% (n=2) of partners reported depression at baseline. The sensitivity of the PHQ-9 instrument may have limited the findings for depression in this study; and while it may be useful as an initial screening tool, other instruments for measuring psychological HRQOL may be more useful in this healthy adult sample.

Average scores for marital adjustment indicated that spouses rated their marriages as adjusted (DAS-7 median score >25) at all time points. Similar to patients, 12% (n=4) of all partners had scores that fell below the mean score for distressed marital quality at T1. However, this increased to 15% (n=5) at T2 and T3.

In our study, there were significant differences between partners in the UC group at the medical center site compared to the community hospital. UC partners at the medical center reported a greater improvement in physical function and depression between T2 and T3 than partners at the community hospital. These partners had slightly lower scores at all time points than UC partners at the community hospital and thus had more leeway to increase their scores. These findings by site need to be viewed with caution, however, as the number of partners in the UC groups was small.

Limitations

Generalizability was limited due to the convenience sample, small sample size, limited diversity, and possibly low sensitivity of the depression instrument. Another limitation occurred because one CR site had an established program that allowed family members to exercise in the facility. Potential threats to internal validity were reduced due to the randomization of subjects to two groups. Selection bias was a potential threat in that couples who work well together may have been more inclined to participate in the study than couples who have lower marital quality.

CONCLUSIONS

This study adds to our understanding of HRQOL outcomes for both patients and partners following CABS. CR personnel are in unique positions to assess and intervene with patients, and also partners, who present with poor levels of HRQOL after CABS. Although the role of the family is often acknowledged, partners are rarely included in outcomes research. More

studies are needed that examine changes in the partner physical, psychological, and relational HRQOL, which may ultimately impact patient recovery following CABS.

Acknowledgments

Funding:

We would like to acknowledge the following funding support for this study: Nellie House Craven Scholarship 2010–2012 to L. Macken. Grant #NR010923 from National Institute for Nursing Research, National Institutes of Health, and the University of Nebraska Clinical Research Center, Research Support Fund to B. Yates.

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J Cardiopulm Rehabil Prev. Author manuscript; available in PMC 2015 March 01.

Table 1

Comparison of Patients' Demographic and Illness Characteristics by Group

	PaTH		UC		Mann-Whitney	
Patients (N= 34)	**Median**	**Range**	**Median**	**Range**	***z***	***P value***
Age, y	64	33–77	66	40–77	−0.99	.34
Grafts, n	4	1–5	3	2–5	−0.76	.45
CR sessions, n	18	11–36	18	12–36	−1.27	.20
CR sessions planned, n	18	18–36	18	12–36	−0.44	.66
Education sessions, n	18	7–19	14	9–18	−0.53	.60
	n	**%**	**n**	**%**	χ^2	***P value***
Gender						
Male	15	88.2	13	76.5	0.81	.37
Female	2	11.8	4	23.5		
Race and Ethnicity						
White	15	88.2	17	100	2.13	.14
Hispanic	2	11.8	0	0		
Education Level						
High school or less	7	41.2	5	29.4	2.22	.33
Some college	3	17.6	1	5.9		
College degree or postgraduate	7	41.2	11	64.7		
Employment Status						
Employed	14	82.3	10	58.9	2.67	.26
Not employed	1	5.9	1	5.9		
Retired	2	11.8	6	35.2		
Household Income						
Below $40,000	3	17.6	3	17.6	0.15	.93
$40,000 – 79,999	9	53.0	8	47.1		
$80,000 or more	5	29.4	6	35.3		
Marital Status						
Married	17	100	15	88.2	2.13	.14
Cohabitating	0	0	2	11.8		

	PaTH		UC		Mann-Whitney	
Patients (N= 34)	**Median**	**Range**	**Median**	**Range**	***z***	***P value***
Site						
Medical center	4	44	5	56	0.15	.70
Community	13	52	12	48		
Comorbidities						
Arthritis	7	41.0	7	41.0	0.00	1.00
Asthma	1	5.9	0	0	1.03	.31
COPD	3	17.6	0	0	3.29	.07
PVD	2	11.8	1	5.8	0.37	.54

Abbreviations: PaTH, Partners Together in Health group; UC, Usual care group; COPD, chronic obstructive pulmonary disease; CR, cardiac rehabilitation; PVD, peripheral vascular disease.

Table 2

Changes in Patients' HRQOL over 3 Time Points by Wilcoxon Signed Ranks Tests

	T1	T2	*z*	*p*	T2	T3	*z*	*P*
Patients in PaTH (n=17)								
Physical Function (SF-PF)								
Median	55	85	−3.52	.000	85	90	−0.04	.97
Range	15–95	50–100			50–100	40–100		
Depression (PHQ-9)								
Median	4	2	−2.85	.004	2	1	−0.05	.96
Range	0–15	0–3			0–3	0–4		
Marital Quality (DAS-7)								
Median	28	28	−0.60	.55	28	28	−0.97	.33
Range	11–33	17–33			17–33	17–32		
Patients in UC (n=17)								
Physical Function (SF-PF)								
Median	55	90	−3.23	.001	90	95	−0.44	.66
Range	10–100	50–100			50–100	40–100		
Depression (PHQ-9)								
Median	2	1	−2.56	.01	1	2	−1.19	.23
Range	0–19	0–19			0–19	0–10		
Marital Quality (DAS-7)								
Median	26	28	−1.55	.12	28	28	−0.95	.34
Range	19–32	18–34			18–34	16–35		

Abbreviations: DAS-7, 7-item Dyadic Adjustment Scale; PaTH, Partners Together in Health intervention; PHQ-9, Patient Health Questionnaire; SF-PF, SF-36 Physical Functioning; UC, Usual care group.

Table 3

Changes in Partners' HRQOL over 3 Time Points by Wilcoxon Signed Ranks Tests

	T1	T2	z	p	T2	T3	z	P
Partners in PaTH (n=17)								
Physical Function (SF-PF)								
Median	85	95	−1.99	.046	95	95	−0.59	.56
Range	50–100	65–100			65–100	70–100		
Depression (PHQ-9)								
Median	0	0	−1.37	.17	0	2	−1.22	.22
Range	0–9	0–5			0–5	0–6		
Marital Quality (DAS-7)								
Median	28.5	29	−1.27	.21	29	29	−0.86	.39
Range	13–34	17–33			17–33	17–33		
Partners in UC (n=17)								
Physical Function (SF-PF)								
Median	95	90	−0.63	.53	90	95	−0.98	.32
Range	15–100	40–100			40–100	45–100		
Depression (PHQ-9)								
Median	1	0.5	−1.28	.20	0.5	1	−0.42	.67
Range	0–20	0–9			0–9	0–6		
Marital Quality (DAS-7)								
Median	26.5	26.5	−0.09	.93	26.5	28	−0.60	.55
Range	9–32	19–31			19–31	15–33		

Abbreviations: DAS-7, 7-item Dyadic Adjustment Scale; PaTH, Partners Together in Health intervention; PHQ-9, Patient Health Questionnaire; SF-PF, SF-36 Physical Functioning; UC, Usual care group