Published in final edited form as:

Support Care Cancer. 2016 February ; 24(2): 763–771. doi:10.1007/s00520-015-2840-4.

Cancer and quality of life in spousal dyads: Spillover in couples with and without cancer-related health problems

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Abstract

Purpose—Poor health of one spouse can adversely influence the partner’s health outcomes (“spillover”). This study aimed to estimate quality of life spillover among spouses, and to determine how presence of cancer influenced these effects.

Methods—We examined data on husband-wife dyads with cancer-related health problems, medical events, or disabilities (n=910) and matched comparison dyads from the 2004-2012 Medical Expenditures Panel Survey, a population-based survey of the U.S. Mental and physical health-related quality of life and depressed mood were reported at two time points (T1 and T2, 11 months apart on average). Dyadic multilevel models evaluated the cross-lagged impact of HRQoL and depressed mood at T1 on spouses’ HRQoL at T2, controlling for sociodemographics and health conditions.

Results—Small but statistically significant spillover was observed for mental and physical HRQoL among couples with cancer. Spillover occurred from both the spouse to the survivor, and from survivor to spouse. Depressed mood, in particular, showed stronger spillover effects from the spouse to the survivor than the inverse. Similar effects were not observed in dyads without cancer.

Conclusions—Screening for and treating poor HRQoL and depressed mood concurrently in both cancer survivors and their spouses may positively influence HRQoL outcomes. Future research is needed to further elucidate these findings and determine whether a concurrent approach to psychosocial care in survivors and their spouses may improve long-term outcomes.

Keywords

caregivers; quality of life; depressed mood; spillover; dyadic

INTRODUCTION

Cancer adversely impacts both cancer patients and their families. In addition to helping the patient through their illness, family members often struggle with their own emotional

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Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Disclosures: None

distress as well as family disruptions [1] and are included in some definitions of ‘cancer survivor’ [2,3]. Spouses in particular often experience greater burden, strain, or distress than other family caregivers [4,5] and non-caregiving spouses [6-10], which may amplify their risk of adverse health outcomes [11,12].

Theory and research suggest that the well-being of one spouse may influence the other spouse [13]. While family members, and spouses in particular, may be influenced directly by cancer via their caregiving role (e.g., tasks related to care for the patient [6]), there is also evidence that they may be influenced indirectly via changes in the survivors’ well-being. The emotional responses of cancer survivors and their spouses to illness and its treatment have been reported to be highly correlated [14]. Further, couples may react as an emotional unit [15] such that each partner may affect his/her spouse throughout all phases of the illness (from initial diagnosis to treatment and survivorship and, for some, end-of-life care) [16].

The family caregiving literature (both cancer-specific and general) suggests that patient health, quality of life, symptoms, and dependency are adversely related to caregivers’ mental and physical health, social functioning, and distress [17-21]. Less research has examined the impact of caregiver or spousal well-being on the cancer patient or survivor, or the dyadic or bi-directional effects of cancer patient-spouse well-being. Recent longitudinal work in couples with cancer has explored how quality of life and depressed mood spill over from one spouse to another, with conflicting findings [22-25]. As others have pointed out [15], studies in longitudinal, population-based datasets are necessary to further elucidate these findings. In addition, little research has examined how quality of life spillover in couples with a cancer diagnosis may compare with spillover in healthy couples.

Therefore, this study sought to determine how quality of life and depressed mood influence subsequent quality of life outcomes, in couples with cancer-related health problems and comparison couples. The findings from this study will improve our understanding of the role of spillover in outcomes for cancer survivors and their spouses, a phenomenon which could potentially be leveraged to improve interventions targeting survivor and family well-being.

METHODS

This study used publically-available data from the Medical Expenditures Panel Survey (MEPS). The MEPS is a household-based national sample of the civilian non-institutionalized population in the United States. Data were collected on each individual in the household at five timepoints (“rounds”) over a two and a half-year period, with a new panel beginning each year. This study included complete data from Panels 9-16, collected between 2004 and 2012. We used sociodemographic data and data from the self-administered questionnaire. This questionnaire was administered only in Rounds 2 and 4; for simplicity, we will refer to these as Time 1 (T1) and Time 2 (T2) (11 months apart on average). Additional information about MEPS methodology and data can be obtained at <http://meps.ahrq.gov>.

Sample Selection

The sample included four types of husband-wife dyads: 1) dyads in which the husband had cancer-related health problems (Husband Cancer [HC] n=483); and 2) comparison dyads without cancer-related health problems, frequency-matched to the HC group (n=483); 3) dyads in which the wife had cancer-related health problems (Wife Cancer [WC] n=427); 4) comparison dyads without cancer-related health problems, frequency-matched to the WC group (n=427). Comparison dyads were frequency-matched on age (quartiles) and race/ethnicity (white non-Hispanic or other) of the spouse with cancer.

General eligibility—Respondents were eligible for this study if they were married at the beginning of the panel (Round 1) and their spouse had data in the questionnaire. Participants were linked to their spouses by a spousal identifier. Dyads missing data on one or more covariates were not eligible for this study; 29% of the dyads meeting all other eligibility criteria were dropped due to missing data. Those with missing data were older, more likely to be non-white or Hispanic or have low income, more likely to have public insurance/no insurance or ADL/IADLs, and had less education and worse psychosocial profiles (see Online Resource 1).

Identifying survivor dyads—We used the MEPS medical conditions file to identify adults who reported having a cancer-related health-problem, medical event or disability in Rounds 1 or 2 of the MEPS (hereafter referred to as “with cancer”). Truncated three-digit International Classification of Diseases, Ninth Revision (ICD-9) codes were generated from the respondent interview and aggregated using Clinical Classification Software. Adults with any type of cancer or malignancy were categorized as survivors, except those with only non-melanoma skin cancer. Dyads in which both spouses had cancer-related problems were excluded from this study. For dwelling units in which more than one couple with cancer was identified (n=2), one couple was selected at random. The final sample consisted of 427 WC dyads, and 483 HC dyads.

Identifying non-cancer dyads—The non-cancer comparison groups consisted of dyads with complete covariate data in which neither spouse reported a cancer-related diagnosis, medical event, or disability (hereafter referred to as “without cancer”). In total, >13,000 cancer-free dyads met the eligibility criteria. Using this full sample would have resulted in overpowered analyses in the comparison group; therefore, we selected subsamples of dyads without cancer, frequency-matched to the cancer dyads on the age (quartiles) and race/ethnicity (white non-Hispanic versus other) of the spouse with cancer.

Measures

Sociodemographic characteristics—Participant age, gender, race/ethnicity (white non-Hispanic, other), education level (high school or less vs some college or more), poverty status (<100%, 100%–<200%, 200%–<400%, 400% of the federal poverty level), and family size were determined from the household component of the MEPS.

Health factors—Health conditions were coded as the number of MEPS priority conditions, excluding cancer. The number of activities of daily living or instrumental

activities of daily living with which the participant reported needing help (ADLs/IADLs, e.g. feeding him/herself, getting groceries) was dichotomized (0, 1+).

Quality of Life—The *Short Form-12 (SF-12) version 2*, a widely used measure of health status, was used to assess the overall mental and physical HRQoL of participants over the past month [26]. The *SF-12* has eight subscales that were condensed into physical and mental health component scores standardized to population norms (mean=50; standard deviation=10). Higher scores indicated better HRQoL.

Depressed mood—Participants' tendency towards depressed mood during the last two weeks was measured with the two-item *Patient Health Questionnaire (PHQ-2)* [27], which assessed the frequency of depressed mood and decreased interest in usual activities on a 4-point Likert scale (Not at all [0] to Nearly every day [3]). Items were summed and dichotomized: a score of 3 or greater was used to indicate depressed mood [27].

Statistical Approach

Descriptive statistics were calculated as percentages or means with standard deviations. The characteristics of dyads with and without cancer were compared using Wilcoxon and chi-squared tests. Dyadic multilevel models with random intercepts were constructed following the Actor-Partner Interdependence Model (APIM) framework; two-intercept models were used [28]. Gender was used as the distinguishing variable. These models produced four estimates of interest: the actor effect of the wife's independent variable at T1 on her HRQoL at T2 (wife actor effect); the actor effect of the husband's independent variable at T1 on his HRQoL at T2 (husband actor effect); the partner effect of the husband's independent variable at T1 on his wife's HRQoL at T2 (husband partner effect); and the partner effect of the wife's independent variable at T1 on her husband's HRQoL at T2 (wife partner effect). Six separate models were constructed regressing mental or physical HRQoL at T2 (dependent variables) on mental HRQoL, physical HRQoL, or depressed mood at T1 (independent variables; HRQoL coded per 10 points on the SF-12) and covariates. All models controlled for sociodemographic characteristics, health factors, and HRQoL at T1. SAS 9.3 was used for all analyses. Detailed description of the APIM approach is available (Online Resource 2).

RESULTS

Table 1 shows the characteristics of the four groups of dyads. HC dyads were had a mean age of 65 years (husbands: 66.3 years; wives: 63.0 years). WC dyads were significantly younger, with a mean age of 57 years (husbands: 57.7 years; wives: 55.6 years). HC dyads were also more likely to have one or more health conditions (other than cancer), and had worse physical HRQoL than WC dyads. Overall, the comparison dyads were well matched to the cancer dyads. However, the comparison dyads had slightly less education than the cancer dyads (WC: 12.8 vs. 13.3, $p=0.02$; HC: 12.7 vs. 13.2, $p=0.01$). Comparison dyads for the HC group were also less likely to have income greater than 400% of the federal poverty level ($p<0.01$). Most cancer patients had prostate or breast cancer (40% of the HC and WC samples, respectively) and were not receiving cancer treatment.

Tables 2 and 3 show the actor and partner effects for physical HRQoL, mental HRQoL, and depressed mood for HC and WC groups, respectively. The actor effects were generally in the expected directions; better HRQoL at T1 was associated with better HRQoL in the same individual at T2, while depressed mood at T1 was associated with worse HRQoL at T2. Significant partner effects were also observed; *husband partner effect* refers to the association between husbands' characteristic at T1 and wives' HRQoL at T2, while *wife partner effect* refers to the association between wives' characteristic at T1 and husbands' HRQoL at T2.

Partner Effects

HC Dyads – Husband Partner Effect—When a husband had cancer, his mental HRQoL and depressed mood at T1 were associated with his wife's HRQoL at T2 (Table 2). Specifically, better mental HRQoL at T1 in husbands with cancer was associated with better mental HRQoL at T2 in wives (Beta=1.11, $p<0.01$) and depressed mood at T1 in husbands with cancer was associated with worse physical HRQoL at T2 in wives (Beta: -2.36, $p=0.03$). These effects were not observed in the comparison group, where the betas were smaller and non-significant. However, in the comparison dyads, better physical HRQoL in husbands at T1 was associated with better mental HRQoL in their wives at T2 (Beta=0.66, $p=0.05$); this effect was not observed in the dyads with cancer.

HC Dyads – Wife Partner Effect—In addition, wives' physical and mental HRQoL and depressed mood at T1 were associated with their cancer survivor husbands' HRQoL at T2. Specifically, better physical and mental HRQoL at T1 in wives was associated with better mental HRQoL at T2 in husbands with cancer (Beta=1.21, $p<0.01$ and Beta=0.81, $p=0.05$). Depressed mood at T1 in wives was associated with worse physical and mental HRQoL at T2 in their husbands with cancer (Beta=-4.29, $p<0.01$ and Beta=-3.99, $p<0.01$). The corresponding associations in the comparison group were smaller and only some were statistically significant.

WC Dyads – Wife Partner Effect—When wives had cancer, her physical and mental HRQoL at T1 were associated with her husband's HRQoL at T2 (Table 3). Specifically, better physical HRQoL at T1 in wives with cancer was associated with better physical HRQoL at T2 in husbands (Beta=0.67, $p=0.05$). Better mental HRQoL at T1 in wives with cancer was associated with better mental HRQoL at T2 in husbands (Beta=1.03, $p=0.01$). In addition, depressed mood at T1 in wives with cancer was borderline associated with worse mental HRQoL at T2 in husbands (Beta=-1.89, $p=0.10$). These associations were not observed in the comparison dyads.

WC Dyads – Husband Partner Effect—Husbands' physical and mental HRQoL and depressed mood at T1 were associated with their cancer survivor wives' HRQoL at T2. Specifically, better physical HRQoL at T1 in husbands was borderline associated with better physical HRQoL at T2 in wives with cancer (Beta=0.67, $p=0.06$). Better mental HRQoL at T1 in husbands was borderline associated with better mental HRQoL at T2 in wives with cancer (Beta=0.83, $p=0.05$). Depressed mood at T1 in husbands was associated with worse

mental HRQoL at T2 in wives with cancer (Beta=-3.49, p=0.02). The corresponding effects in the comparison dyads were smaller and not statistically significant.

DISCUSSION

This study used a population-based sample to examine the spillover of HRQoL and depressed mood of one spouse onto subsequent HRQoL of the other spouse in couples with cancer, as well as couples without cancer. Overall, the results indicate small but significant spillover of HRQoL and depressed mood between spouses in dyads with cancer. Corresponding spillover in the cancer-free comparison groups was rarely observed. This suggests that couples in which one spouse has cancer may experience increased spillover compared to other couples even well into the survivorship period, with important implications for clinical care and interventions targeting cancer survivors and their families.

The few previous studies on the spillover of HRQoL in cancer survivors and their spouses have been conflicting. One study found no partner effects on the HRQoL of either the spouse or the cancer survivor, although spillover was observed in other areas (i.e., older age of the spouse was associated with negative appraisal and uncertainty in survivors, and survivor health symptoms and uncertainty were associated with spouses' hopelessness and coping styles[22]). Another study in a convenience sample found significant HRQoL spillover between prostate cancer patients and their spouses up to 18 months after cancer treatment [23]. These studies both examined prostate cancer survivor couples exclusively and used convenience samples that were considerably smaller than the current study (~100-200 subjects). Differences may also stem from the independent variable examined, as the first study focused on theory-driven person, social, and disease treatment factors [22] while the second examined HRQoL [23] similar to the current study.

Our previous work in the same sample showed spousal spillover impacts of HRQoL and depressed mood on subsequent depressed mood in partners [25]. Specifically, cancer survivors whose spouses reported depressed mood were more than four times more likely to subsequently report depressed mood; this effect was stronger for female survivors. Further, better spousal mental and physical HRQoL were associated with a 30% decrease in survivor depressed mood risk 11 months later. The present study extends this work to show that spillover impacts HRQoL, in addition to depressed mood. In the current study, a 10 point increase in the mental or physical HRQoL of one spouse was associated with an increase in HRQoL ranging from 0.7 to 1.2 points in the other spouse, while reporting depressed mood was associated with a 2.4 to 4.3 point change in spousal HRQoL. Although these effects are objectively small (with effect sizes ranging from <0.10 to 0.39 [29]), they are akin to the associations with HRQoL (measured, as in this study, with the SF-12 or SF-36) reported for illness uncertainty (Betas≈0.1 [30]), having a greater number cancer-related symptoms (Betas ranging from -0.34 to -0.51 [31]), increasing physical activity after diagnosis (Beta=3.28 [32]), and the longitudinal effect of cancer treatment on HRQoL (Beta=-2.26 [33]). This supports the clinical relevance of change in HRQoL related to spillover from the spouse.

It is interesting to note the directionality of the spillover observed in this study. HRQoL and depressed mood spilled both from the spouse to the cancer survivor and from cancer survivor to spouse. Depressed mood, in particular, showed more spillover (i.e., considerably larger beta estimates) from the spouse to the cancer survivor than from the cancer survivor to the spouse. This suggests that spousal depressed mood may have an amplified impact on the survivor's HRQoL. This differs from the findings of Kim et al. [24], who reported that some lung and colorectal cancer patients' depressive symptoms were associated with their caregivers' mental and/or physical health-related quality of life (HRQoL), while caregiver depressive symptoms were not associated with patient HRQoL. Kim's study, however, examined survivors who were much closer to diagnosis, and examined family caregivers nominated by the cancer patient, rather than spouses specifically. Our study population included cancer survivors with any type of cancer, and breast and prostate were the most common. Because prognosis and the trajectory of care differ by cancer site, future research will be needed to explore differences in these findings.

Given the prevalence of depression and poor quality of life in spouses and family caregivers of cancer survivors (between 10 and 53% for depression [9], with some evidence that rates among caregivers are significantly higher than among norms or non-caregivers [34,35]), addressing these issues in clinical care or via public health education may be an important component of improving outcomes for cancer survivors and their spouses or caregivers. In particular, clinical care may benefit from strategically leveraging this spillover. Intervening concurrently on survivors and their spouses may synergize the effectiveness of interventions by inducing a "virtuous cycle" of good HRQoL. Existing interventions have typically demonstrated small to moderate effects on caregiver outcomes [36]. Further, there is little evidence that current caregiver- or family-interventions have a tangible impact on cancer survivor outcomes [37], possibly due in part to their limited effect on caregivers themselves. Targeting both cancer survivors and their spouses concurrently (e.g., by screening for and treating distress and depression in spouses as well as survivors) may be more effective at improving outcomes than either alone.

These findings also highlight several potential points of intervention in the clinical setting. Oncology and survivorship care is a clear first-line opportunity to address these issues in survivors, in accordance with cancer care and after-care standards [38]; programs that enable spouses or family caregivers to also be screened at these appointments may facilitate survivor care. In addition, primary care providers may be able to enhance their care by ascertaining whether patients' spouses have illnesses such as cancer or disabilities, and utilizing this information to identify patients at particularly high risk of poor outcomes. Once a survivor or their spouse has been referred to mental health services, mental health providers may be a resource to facilitate the treatment of mental health issues in the partner, as well. Finally, collaborative care has been effective for depression treatment in cancer patients [39] and has been shown to be cost effective [40]; incorporating spouses or family caregivers into the collaborative care model may further enhance the benefits for such programs.

Several potential limitations should be considered when interpreting the results of this study. First, the population-based MEPS includes a heterogeneous sample of cancer survivors, and

we had limited information about the clinical characteristics of the cancer diagnosis (e.g., stage) and the caregiving situation (e.g., spouses' role in caregiving, intensity or duration of care), or the spousal relationship (e.g., family cohesion). Second, same-sex and cohabitating couples could not be included in this study. Third, dyads with missing data were excluded from our analyses. Because those excluded dyads generally had worse psychosocial profiles than those dyads retained in the study sample, our results may be an underestimate of the effects of spousal well-being on depressed mood in cancer survivors. The results may similarly be influenced by survival bias, as survivors who died of their disease or other causes would not be included in this study. Fourth, the measures used in this study were brief scales, necessitated by the scope and depth of the MEPS and should not be interpreted as clinical assessments. Fifth, multiple comparisons were made in this study. These comparisons were complementary and planned in advance, but the results should nevertheless be considered accordingly. Finally, the population in this study consisted of those who are still impacted by their disease (i.e., had a cancer-related health problem, medical event or disability at T1); spousal spillover may differ immediately following diagnosis, or among long-term cancer survivors who are not experiencing late effects or disabilities. These limitations are balanced by the strengths of this study, which used a sample that was both population-based and longitudinal and compared spillover in couples with cancer to spillover in couples without cancer, further elucidating the relationships of interest.

In conclusion, this study examined how quality of life and depressed mood in one spouse influences the quality of life of their partner longitudinally. We found evidence for spillover between spouses in couples with cancer; the effect of depressed mood for the spouse on the survivor was particularly potent. Similar effects were not seen in dyads without cancer, suggesting that couples with cancer may be particularly vulnerable to quality of life spillover. Future research will be needed to further elucidate these findings and determine whether a concurrent approach to psychosocial care in survivors and their spouses may improve long-term outcomes.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements

Authors are federal employees and this work had no specific funding. The findings and conclusions in this report are those of the authors and do not represent the official position of the National Cancer Institute.

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Table 1

Characteristics of dyads in which the husband or wife had cancer and matched comparison dyads without cancer, Medical Expenditures Panel Survey (2004-2012)

	Husband Cancer				Wife Cancer			
	Cancer Dyads n=483		Comparison Dyads n=483		Cancer Dyads n=427		Comparison Dyads n=427	
	Husband (Survivor) % or Mean (SD)	Wife (Spouse) % or Mean (SD)	Husband % or Mean (SD)	Wife % or Mean (SD)	Husband (Spouse) % or Mean (SD)	Wife (Survivor) % or Mean (SD)	Husband % or Mean (SD)	Wife % or Mean (SD)
<i>Sociodemographic Characteristics</i>								
Age ^a	66.3 (12.0)	63.0 (12.1)	64.7 (14.1)	61.0 (14.4)	57.5 (13.4)	55.6 (13.2)	57.6 (13.7)	55.5 (13.4)
Race/Ethnicity								
White (non-Hispanic)	66.87	66.25	66.87	65.01	61.36	63.93	64.87	63.93
Other	33.13	33.75	33.13	34.99	38.64	36.07	35.13	36.07
Education (Years) ^{bc}	13.3 (3.3)	13.1 (2.7)	12.8 (3.6)	12.6 (3.5)	13.3 (2.8)	13.3 (2.7)	12.8 (3.4)	12.9 (3.0)
Education								
HS or less	45.96	49.9	50.52	53.83	47.78	45.43	51.99	50.12
Some college or more	54.04	50.1	49.48	46.17	52.22	54.57	48.01	49.88
% Poverty Line ^c								
<100%	8.07	8.07	11.59	11.8	7.49	7.73	8.20	8.43
100-<200%	15.53	15.53	15.53	15.53	16.16	15.93	17.33	17.33
200-<400%	28.78	28.78	31.06	30.85	29.27	29.74	28.57	28.1
400% or higher	47.62	47.62	41.82	41.82	47.07	46.6	45.9	46.14
Family Size ^{ac}	2.5 (1.0)	2.5 (1.0)	2.7 (1.2)	2.7 (1.2)	2.8 (1.2)	2.8 (1.1)	2.9 (1.3)	2.9 (1.3)
<i>Health Factors</i>								
Presences of ADLs/IADLs at T1	7.04	3.93	4.55	3.93	3.28	6.79	3.04	4.22
Number of health conditions* ^a								
0	41.82	50.93	45.96	49.28	56.67	58.08	52.46	57.61
1+	58.18	49.07	54.04	50.72	43.33	41.92	47.54	42.39
<i>Psychosocial Characteristics</i>								
Physical HRQoL								
Time 1 ^{abc}	41.7 (12.2)	44.7 (12.1)	45.8 (11.4)	46.0 (11.7)	47.7 (10.6)	44.0 (12.5)	47.7 (11.1)	48.1 (11.0)
Time 2 ^{abc}	42.3 (11.7)	44.8 (11.6)	45.0 (11.9)	46.3 (10.9)	47.2 (11.6)	44.3 (12.2)	47.8 (11.3)	47.8 (11.3)
Mental HRQoL								
Time 1 ^a	52.6 (10.1)	52.4 (9.0)	52.9 (9.8)	51.6 (9.9)	52.5 (9.5)	50 (10.1)	52.5 (9.0)	50.9 (10.4)
Time 2	52.1 (10.2)	53 (9.5)	52.6 (9.7)	51.7 (10)	53.4 (8.7)	51.1 (10)	53 (9.2)	51.7 (9.8)
Depression (Yes vs No)								

	Husband Cancer				Wife Cancer			
	Cancer Dyads n=483		Comparison Dyads n=483		Cancer Dyads n=427		Comparison Dyads n=427	
	Husband (Survivor) % or Mean (SD)	Wife (Spouse) % or Mean (SD)	Husband % or Mean (SD)	Wife % or Mean (SD)	Husband (Spouse) % or Mean (SD)	Wife (Survivor) % or Mean (SD)	Husband % or Mean (SD)	Wife % or Mean (SD)
Time 1	11.59	7.66	7.45	9.32	6.79	10.07	7.26	9.6
Time 2	9.94	7.66	7.66	8.28	5.62	9.6	7.49	7.49
<i>Cancer Characteristics</i>								
Treatment Status								
–Off treatment	70.60					64.17		
–On treatment	29.40					35.83		
Type of Cancer								
Blood	9.73					6.56		
Breast	--					40.05		
Colorectal	5.59					4.92		
Prostate	39.75					--		
Multiple	11.59					9.37		
Other/Unknown	33.33					39.11		

SD: Standard deviation

^a Husband cancer vs wife cancer $p < 0.05$

^b Wife cancer vs comparison $p < 0.05$

^c Husband cancer vs comparison $p < 0.05$

Table 2

Adjusted associations among physical HRQoL, mental HRQoL, and depressed mood in spousal dyads in which the husband had cancer (n=483), and matched comparison dyads without cancer (n=483).

	Physical HRQoL (T2)				Mental HRQoL (T2)			
	Cancer Dyads		Comparison Dyads		Cancer Dyads		Comparison Dyads	
	Beta	SE	p-value	Beta	SE	p-value	Beta	SE
<i>Physical HRQoL (T1)</i>								
Wife Actor Effect	6.90	0.29	<0.001	6.38	0.30	<0.001	1.12	0.31
Husband Actor Effect	6.24	0.31	<0.001	6.67	0.36	<0.001	0.87	0.30
Husband Partner Effect	0.03	0.27	0.911	0.46	0.29	0.114	-0.13	0.30
Wife Partner Effect	0.32	0.30	0.285	0.47	0.34	0.164	1.21	0.29
<i>Mental HRQoL (T1)</i>								
Wife Actor Effect	0.87	0.39	0.020	1.32	0.33	<0.001	5.27	0.42
Husband Actor Effect	0.97	0.38	0.012	1.34	0.41	0.001	6.09	0.37
Husband Partner Effect	0.37	0.35	0.291	-0.47	0.33	0.159	1.11	0.37
Wife Partner Effect	0.58	0.43	0.172	0.47	0.39	0.226	<i>0.81</i>	<i>0.42</i>
<i>Depressed Mood (T1)</i>								
Wife Actor Effect	-0.04	1.31	0.978	-0.85	1.11	0.443	-6.21	1.52
Husband Actor Effect	-0.13	1.19	0.915	-2.42	1.46	0.099	-1.92	1.34
Husband Partner Effect	-2.36	1.07	0.028	-0.04	1.19	0.974	-1.26	1.14
Wife Partner Effect	-4.29	1.37	0.002	-2.61	1.26	0.039	-3.99	1.33

Note: Actor effect refers to the impact of the individual's characteristic at Time 1 on his/her outcome at Time 2. Time 1 and Time 2 were 11 months apart on average. Models controlled for age, age squared, presence of ADL/IADL limitations, number of priority conditions (not including cancer), race/ethnicity, education level, federal poverty level, number of children in the household, MEPS panel number, and the level of the dependent variable (physical HRQoL, mental HRQoL) at T1. Data are from the Medical Expenditures Panel Survey (2004-2012).

^a Post-hoc comparison between cancer and non-cancer estimates; p<0.05

^b Post-hoc comparison between cancer and non-cancer estimates; p<0.10

Table 3

Adjusted associations among physical HRQoL, mental HRQoL, and depressed mood in spousal dyads in which the wife had cancer (n=427), and matched comparison dyads without cancer (n=427).

	Physical HRQoL (T2)				Mental HRQoL (T2)			
	Cancer Dyads		Comparison Dyads		Cancer Dyads		Comparison Dyads	
	Beta	SE	p-value	Beta	SE	p-value	Beta	SE
<i>Physical HRQoL (T1)</i>								
Wife Actor Effect	7.25	0.33	<0.001	6.77	0.35	<0.001	0.66	0.35
Husband Actor Effect	7.09	0.42	<0.001	6.53	0.38	<0.001	0.80	0.37
Husband Partner Effect	0.67	0.36	0.064	0.31	0.34	0.358	0.47	0.39
Wife Partner Effect	0.67	0.33	0.046	0.31	0.36	0.398	0.33	0.29
<i>Mental HRQoL (T1)</i>								
Wife Actor Effect	1.01	0.40	0.013	0.74	0.35	0.036	5.19	0.42
Husband Actor Effect	1.01	0.45	0.025	1.07	0.44	0.017	4.43	0.39
Husband Partner Effect	-0.33	0.40	0.413	0.34	0.41	0.406	0.83	0.43
Wife Partner Effect	-0.21	0.43	0.632	0.27	0.38	0.479	1.03	0.37
<i>Depressed Mood (T1)</i>								
Wife Actor Effect	-4.39	1.28	0.001	0.04	1.24	0.976	-3.93	1.54
Husband Actor Effect	-1.86	1.61	0.248	0.34	1.56	0.829	-4.35	1.65
Husband Partner Effect	0.14	1.42	0.921	-1.33	1.38	0.335	-3.49	1.54
Wife Partner Effect	-0.36	1.32	0.784	-0.91	1.32	0.491	-1.89	1.14

Note: Actor effect refers to the impact of the individual's characteristic at Time 1 on his/her outcome at Time 2. Partner effect refers to the impact of the individual's characteristic at Time 1 on his/her spouse's outcome at Time 2. Time 1 and Time 2 were 11 months apart on average. Models controlled for age, age squared, presence of ADL/IADL limitations, number of priority conditions (not including cancer), race/ethnicity, education level, federal poverty level, number of children in the household, MEPS panel number, and the level of the dependent variable (physical HRQoL, mental HRQoL, or depression) at T1. Data are from the Medical Expenditures Panel Survey (2004-2012).

^a Post-hoc comparison between cancer and non-cancer estimates; p<0.05

^b Post-hoc comparison between cancer and non-cancer estimates; p<0.10