



# Helping Us Heal: telephone versus in-person marital communication and support counseling for spouse caregivers of wives with breast cancer

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## Abstract

**Purpose** (1) To test the short-term impact of *Helping Us Heal (HUSH)*, a telephone-delivered counseling program for spouse caregivers of women with breast cancer. (2) To compare outcomes from *HUSH* with outcomes from a historical control group which received the same program in-person.

**Methods** Two-group quasi-experimental design using both within- and between-group analyses with 78 study participants, 26 in the within-group and 52 in the between-group analyses. Spouse caregivers were eligible if the wife was diagnosed within 8 months with stage 0–III breast cancer and were English-speaking. After obtaining signed informed consent and baseline data, 5 fully scripted telephone intervention sessions were delivered at 2-week intervals by patient educators. Spouses and diagnosed wives were assessed on standardized measures of adjustment at baseline and immediately after the final intervention session.

**Results** Within-group analyses revealed that spouses and wives in *HUSH* significantly improved on depressed mood and anxiety; spouses improved on self-efficacy and their skills in supporting their wife. Additionally, wives' appraisal of spousal support significantly improved. Between-group analyses revealed that outcomes from *HUSH* were comparable or larger in magnitude to outcomes achieved by the in-person delivered program.

**Conclusions** A manualized telephone-delivered intervention given directly to spouse caregivers can potentially improve adjustment in both spouses and diagnosed wives but study outcomes must be interpreted with caution. Given the small samples in the pilot studies and the absence of randomization, further testing is needed with a more rigorous experimental design with a larger study sample.

**Keywords** Spouses · Caregivers · Self-efficacy · Breast neoplasms · Telephone · Counseling

## Background and significance

There is growing evidence that spouse caregivers' distress during initial diagnosis and treatment for breast cancer goes well beyond simple caregiving burden [7, 37]. An estimated 22–32% of spouse caregivers reach or exceed clinical levels of anxiety or depressed mood or both [14, 21] and a

small but growing literature suggests that caregiving puts the spouse at risk for dysregulation of their inflammatory pathways [4, 9, 17, 25]. This dysregulation can occur either through activation of the hypothalamic–pituitary–adrenal (HPA) axis or the autonomic nervous system and may occur early during diagnosis and initial treatment. This early dysregulation has the potential to put the spouse caregiver at heightened risk for future health-related threats [25].

Significantly elevated levels of spousal distress (anxiety, depressed mood) have negative consequences for the diagnosed wife, diminishing the spouse's emotional accessibility and increasing the spouse's criticism of the patient, all of which negatively affect the support spouses are able to offer or how couples cope with the cancer [1, 3, 10, 18, 20, 31].

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Distress in the spouse is not about temporary sadness. In the seminal study by Northouse, spousal distress (BSI: brief symptom inventory) remained higher than a reference population of spouses at 3 days, 30 days, and 18 months post-surgically [21]. The woman's breast cancer impacts the assumptive world of the spouse and shatters it for some [39]. Spouses often feel helpless and emotionally overwhelmed—unable to assist themselves or their wives with the diagnosis. They report that their daily life and function are impacted; some suffer from excessive sleep loss or worry about having accidents at work [14]. Spouses struggle with what to say or do to support their wives, often feeling unsuccessful in their attempts [39].

Despite the magnitude of spousal distress, altered marital communication, and diminished interpersonal support, very few interventions have been designed or successful in affecting these outcomes. Prior research by Scott's team is a notable exception [27]. Testing the *United We Stand Program* with 94 couples facing cancer (57 with breast cancer and 37 with mostly cervical cancer), couples were randomly assigned to 1 of 3 treatment conditions: medical information education (MI), patient coping training (PC), or couple-coping training (CanCOPE). Interventions were delivered by registered psychologists and CanCOPE was offered as conjoint therapy to both members of the couple and involved five, 2-h sessions and two, 30-min telephone calls. Results were mixed. Compared to the other 2 groups, couples in CanCOPE demonstrated significantly lower “coping effort” and women were significantly less psychologically distressed. However, there were no significant effects on spouses' psychological distress. The study's authors also identified multiple methodological limitations that constrained their own enthusiasm: attrition rates between pre- and post-intervention measures were high; the measure of “couple communication,” a major outcome variable, did not vary across the 3 measurement periods and therefore could not be used to assess the effects of the intervention.

The intervention to be tested in the current study, the *Helping Us Heal Program (HUSH)*, was designed to reduce spouse caregivers' and patients' distress, not require conjoint delivery, be easily delivered, be offered by telephone, be administered by trained patient educators, consist of fewer and briefer sessions than interventions in prior studies, be fully manualized, and be potentially sustainable.

The current study has two study aims: (1) to test the short-term impact of the *HUSH* program on spouse caregivers' and wives' behavioral-emotional adjustment to recently diagnosed breast cancer and (2) to compare spouse caregivers' and diagnosed wives' outcomes from the *HUSH* telephone-delivered program with the same program delivered in-person.

## Methods

Study participants were recruited from medical providers in the Pacific Northwest. Spouses were eligible if they were married or co-inhabiting with a female intimate partner diagnosed with local or regional breast cancer (stages 0 through 3) within the recent 8 months and read and write English as one of their languages of choice. The study was reviewed and approved by the Human Subjects Committee at the study center and by the institutional review board at each recruitment site. All study participants completed the study prior to the COVID-19 pandemic.

**Study sample for within-group design** The study sample for the within-group design consisted of 13 spouses and 13 wives (Table 1). Six of the wives (46.2%) had stage I breast cancer. An additional 23.1% ( $n=3$ ) had stage II and 15.4% ( $n=2$ ) had stage III breast cancer. A small percent (15.4%,  $n=2$ ) was diagnosed with (stage 0) ductal carcinoma in situ. Most wives (92.3%,  $n=12$ ) were Caucasian; one was of Asian descent. The majority of spouses (92.3%;  $n=12$ ) were Caucasian; one was Filipino. Wives were diagnosed an average of 3.2 (SD 2.0) months prior, median 2.6 months. Nine (69.2%) received chemotherapy, radiation therapy, or both at the time of participation in the study. Most wives ( $n=12$ , 92.3%) were treated with breast-conserving surgery; 1 (7.7%) had a mastectomy. Spouses averaged 55.5 (SD 12.4) years of age and wives averaged 53.8 (SD 12.2) years. The majority of wives (69.2%) and spouses (76.9%) had college degrees or higher, and most wives (50%) and spouses (61.5%) worked full or part time. Spouses were married an average of 23.4 (SD 15.8) years.

**Study sample for between-group design** The historical control group involved 26 spouses and 26 wives, but no outcome data were obtained on the diagnosed wives. Spouses averaged 54.3 (SD 9.4) years of age and wives averaged 49.2 (SD 9.7) years. The majority of wives (73.1%) and spouses (80.8%) had college degrees or higher, and over half of the wives (53.8%) and spouses (88.5%) worked full or part time. Spouses were married an average of 19.0 (SD 11.7) years. All wives were Caucasian and 92.3% ( $n=24$ ) of the spouses were Caucasian; one spouse was of Asian descent and one spouse declined to identify his ethnicity. Wives were diagnosed an average of 4.9 (SD 1.5) months prior to enrollment, median 5.4 months. Sixteen (61.5%) received chemotherapy, radiation therapy, or both during their participation in the study. Twelve wives (46.2%) were treated with breast-conserving surgery; 11 (42.3%) were surgically treated with mastectomies; and three women had not had surgery at the time of entry into the study.

**Table 1** Study sample descriptions: demographic, diagnostic, and treatment data

Demographics	HUSH pilot		HHH pilot	
	Mean (SD)	Median	Mean (SD)	Median
Spouse age	55.5 (12.4)	53	54.3 (9.4)	53.5
Wife age	53.8 (12.2)	52	49.2 (9.7)	49
Years in relationship	23.4 (15.8)	23.8	19.0 (11.7)	17.5
	<i>N</i> (%)		<i>N</i> (%)	
Spouse college graduate or higher	10 (76.9%)		21 (80.8%)	
Wife college graduate or higher	9 (69.2%)		19 (73.1%)	
Spouse Employed full or part-time	8 (61.5%)		23 (88.5%)	
Wife employed full or part-time	6 (50%)		14 (53.8%)	
Spouse Caucasian	12 (92.3%)		24 (92.3%)	
Wife Caucasian	12 (92.3%)		26 (100%)	
Diagnosis and treatment information				
Months since diagnosis	3.2 (2.0)	2.6	4.9 (1.5)	5.4
Stage of breast cancer				
0	2 (15.4%)		2 (7.7%)	
I	6 (46.2%)		6 (23.1%)	
II	3 (23.1%)		7 (26.9%)	
III	2 (15.4%)		5 (19.2%)	
Unknown/NA	0		6 (23.1%)	
Receiving treatment at study entry	9 (69.2%)		16 (61.5%)	
Type of surgery				
Breast biopsy or breast conserving	12 (92.3%)		12 (46.2%)	
Partial or full mastectomy	1 (7.7%)		11 (42.3%)	
Surgery not yet performed			3 (11.5%)	

**Study measures** Standardized self-report measures of adjustment were used to assess outcomes. Demographic and background information were obtained through self-report. Disease staging was verified by the site intermediary.

**Depressed mood** Depressed mood was measured by the Center for Epidemiological Studies-Depression Scale (CES-D) [23, 26, 28, 35, 36]. The CES-D is a 20-item self-report scale measuring the frequency with which symptoms of depressed mood are experienced within the past week [23]. The scale is sensitive to changes in depressed mood over time [34] and the internal consistency reliability (Cronbach's alpha) is 0.85 or higher [5, 24]. Total scores on the CES-D range from 0 to 60; the mean score for a community sample was 9.25 [23]. A score of 16 or greater is a cutoff score for clinically elevated depressed mood [23].

**Anxiety** Anxiety was measured by the 20-item state anxiety scale of Spielberger's State-Trait Anxiety (STAI-Y) Scale [30]. The state anxiety scale evaluates current feelings of apprehension, tension, nervousness, and worry, with a higher score indicating greater anxiety. Internal consistency reliability (Cronbach's alpha) is 0.90 or above in community and

population samples [6, 8, 19, 30]. A score of 40 or higher is a cutoff point for clinically elevated anxiety.

**Spouse skills** Spouse skills were measured by a 27-item questionnaire, What I Do for Her Checklist, that is completed by the spouse and consists of 2 subscales: support to the wife and spouse's self-care skills. The 6-item wife support subscale measures the spouse's interpersonal and emotional support to his wife about the breast cancer. Example items include, "I try to get my wife to talk about her breast cancer when it is bothering her" and "I ask my wife about specific ways I can be supportive to her about her breast cancer." The 6-item self-care subscale measures the spouse's ways of managing the cancer-related stress in the caregiver's own life, including obtaining support from others. Example items include, "I take regular time out for myself;" and "I use support from others to help me cope with her breast cancer." The alpha reliability coefficient for the Spouse Skills Checklist for the wife support subscale was 0.64 and the self-care subscale was 0.51 [15].

**Cancer self-efficacy** Cancer self-efficacy was measured by a 19-item self-report measure of the spouse's self-confidence

in their own self-care and their confidence to support their wife. Structured response options range from “Not at all confident” (1) to “Very confident” (10). Higher scores denote higher self-efficacy. The scale has two dimensions: a self-care subscale and a wife-focused subscale. Example items from the self-care scale include, “I can keep myself calm even when my wife’s tense or anxious” and “I know what resources to use to help me personally cope with my wife’s breast cancer.” Example items from the wife-focused subscale include, “I know what to do to be supportive to my wife about the breast cancer” and “I know how to ask my wife questions that help her talk about the breast cancer.” The internal consistency reliability for the 19-item version of the CASE was recently evaluated on a sample of 145 spouse caregivers of women diagnosed with stage 0–3 breast cancer (Lewis, HHH R01 Final Report). The internal consistency reliability for the total scale was 0.95 and 0.81 and 0.95 for the self-care and wife-focused subscales, respectively [15].

**Marital quality** Three aspects of marital quality were measured: marital adjustment, marital communication, and interpersonal support. Marital adjustment was measured by the Dyadic Adjustment Scale (DAS) [29], a 32-item self-report scale consisting of 4 theoretical subscales: affectional expression, consensus, cohesion, and satisfaction. Internal consistency reliabilities for each of the DAS subscales have been reported as 0.71, 0.85, 0.75, and 0.83, respectively [13]. In a study of 40 child-rearing women with breast cancer and their male partners, the internal consistency reliability was 0.94 for the male partners. The validity of the instrument has been established with significantly higher scores positively associated with higher levels of psychosocial functioning in households of mothers with chronic illness [38] and mothers with breast cancer [16] and its correlation with the Locke-Wallace Marital Adjustment Scale [29].

Marital communication was measured by the 23-item Mutuality and Interpersonal Sensitivity Scale (MIS), a self-reported questionnaire consisting of 2 dimensions: Open Communication and Expressing Sad Feelings. Response options range from “Never true” to “Always true” and higher scores reflect greater expressiveness and disclosure in the couple’s communication related to the breast cancer. The internal consistency reliabilities for the total scale of the MIS were 0.91 and 0.95 for spouses and wives, respectively. Reliabilities for the Open Communication subscale were 0.86 and 0.92 for spouses and wives, respectively, and 0.81 and 0.88 for the Expressing Sad Feelings subscale for spouses and wives, respectively (Lewis HHH R01 NCI Final Report).

The criterion validity of the MIS was examined by correlating the total and subscale scores on the MIS with total

and subscale scores on the Spanier Dyadic Adjustment Scale (satisfaction, cohesion, consensus, and affectional expression), calculated separately for spouses and diagnosed wives in a comparable sample. The MIS total scale correlated 0.58 ( $p < 0.001$ , 2-tailed) with the total scale score of the DAS for data obtained from spouses and 0.56 ( $p < 0.001$ , 2-tailed) for data obtained from diagnosed wives. The 3 subscales of the MIS were all significantly correlated with the 4 subscales on the DAS for both wives’ and spouses’ data. Correlation coefficients ranged from 0.20 to 0.55 for wives’ data and 0.33 to 0.50 for spouses’ data; all  $p$ -values were  $< 0.001$  (Lewis HHH R01 NCI Final Report).

**Appraised spouse support** Two measures were obtained of wives’ appraised interpersonal support from their spouse, a cancer-specific measure, What He Does for Me, and the Personal Resource Questionnaire, a general measure of spouse support.

What He Does for Me is an 18-item cancer-specific measure of support that a diagnosed woman with breast cancer completes about her spouse/partner. The self-report scale measures the wife’s perception of specific, observable behaviors of support that she received from her spouse related to her breast cancer. Each item asks the wife whether the statement described her spouse’s behavior within the past 2 weeks on a scale of 1 (“Never”) to 5 (“All of the time”). Example items read, “My husband listens to me when I tell him sad or negative things about my breast cancer;” “My husband starts up conversations with me when I’m sad or worried about my breast cancer;” “My husband accepts my feelings about my breast cancer, no matter what my feelings;” and “My husband talks with me in ways that draw out my fears or concerns about my breast cancer.” The internal consistency reliability of the scale was 0.88 in a recently completed randomized clinical trial of caregivers of women with breast cancer [15].

The Personal Resource Questionnaire (PRQ-S) is a self-report measure of perceived support from the wife’s spouse/partner [32]. The PRQ contains 25 items rated on a 7-point scale ranging from (1) “strongly disagree” to (7) “strongly agree.” (The scale was adapted by Lewis with permission from the author of the measure to focus on the spouse’s behavior, not social support from everyone in the patient’s network.) Scores range from 25 to 175; higher scores denote higher levels of perceived social support.

The PRQ correlated with the Spanier Dyadic Adjustment Scale (DAS) and a measure of family functioning [22]; coefficients ranged from 0.30 to 0.44,  $p > 0.01$ . The internal consistency reliability for the total scale has been reported as 0.90 or above [33]. Weinert and Brandt [32] reported Cronbach’s alpha coefficients ranging from 0.79 to 0.88 for the five subscales.

**Session 1: Anchoring Yourself to Be Strong for Her**

- Session 1 focuses on the spouse's personal experience with his wife's breast cancer and what he is doing to deal with it, including what is helping or not helping him. The session assists the spouse learn and practice personal stress-reducing strategies and better understand how personal stress affects the caregiver's ability to support the diagnosed patient.
- **Rationale:** To be attentive listeners to the diagnosed wife, spouse caregivers need to be able to self-regulate their own anxiety. Elevated anxiety results in a non-attentive, pre-occupied listener who can be interpreted by the wife as uncaring.

**Session 2: Listening and Not Fixing: Letting Go of Superman**

- Session 2 helps add to the spouse's skills to be an attentive, non-judgmental listener for the diagnosed patient and her breast-cancer related concerns. Skilled listening involves 3 distinct components, all of which are taught and practiced in the session. Listening in this special way is interpreted as a new way to protect and support the patient.
- **Rationale:** To be fully attentive and responsive to the patient's breast cancer-related concerns requires that the spouse be a special kind of listener for her. It also requires that the spouse control the tendency to prematurely reassure her or try to "fix" a problem at a time when the patient needs a listener, not a "fixer."

**Session 3: Gaining a Deeper Understanding of Her**

- Session 3 builds on skills from Session 2 but adds more advanced skills in helping the spouse gain competencies to help the patient fully elaborate her concerns or feelings about the breast cancer, particularly when she is reticent or withdrawn. These more advanced listening skills help the spouse discover new things about the patient's feelings and thoughts about the breast cancer and how to better support her in ways she views as supportive.
- **Rationale:** To draw out a wife who is not forthcoming requires a different set of skills than helping a wife talk about things she is already talking about. In the absence of Session 3, a spouse will try to guess the patient's thoughts or feelings, typically becoming exhausted or discouraged by guessing. Worse yet, the spouse may not "read" the patient's behavior accurately, including what she wants as support from him. These incorrect guesses lead to heightened tension in their relationship.

**Session 4: Connecting with Her: Creating Special Times**

- Session 3 introduces 3 new strategies the spouse can use when talking about the breast cancer is not all that is needed. These new strategies, unlike prior sessions, do not rely on verbally communicating and instead rely on ways to behaviorally connect as a couple.
- **Rationale:** Couple communication requires more than communication skills; it requires ways of physically relating to each other as a couple but does not require coitus when one or both members of the dyad is not ready or able. Non-verbal, physical, and other ways to intimately connect as a couple are also needed.

**Session 5: Putting the Pieces Together**

- Session 5 adds to the spouse's skills to identify ways to sustain the skills that were gained from the program. It explicitly engages the spouse in reflecting back on the acquired skills, using the caregiver's own words. It also involves the caregiver identifying skills and competencies the caregiver wants to take forward and sustain in future situations.
- **Rationale:** Changing skills is distinct from enhancing self-efficacy. Changes in self-efficacy require that the spouse caregiver reflect and evaluate the caregiver's own changed behavior or gains, thereby developing a new sense of self as competent and confident. Specific self-reflection exercises in the session that are designed to add to the spouse's efficacy, not just add to the caregiver's skills.

Used with permission from *PsychoOncology*[14]

**Fig. 1** Description and rationale for intervention sessions. Used with permission from *PsychoOncology* [14]

**Table 2** Spouses' outcomes in HUSH and HHH pilot study: pre- and post-intervention scores [within-group analysis]

	HUSH ( <i>n</i> = 13)			HHH pilot ( <i>n</i> = 26)		
	Mean (SD)	Median	<i>p</i> *	Mean (SD)	Median	<i>p</i> *
<b>Mood and anxiety</b>						
<b>CES-D Depressed Mood</b>						
Pre-test	17.23 (9.40)	17.00	0.007	8.88 (8.31)	6.0	0.005
Post-test	10.92 (6.92)	10.00		5.31 (5.01)	3.5	
<b>STAI-Y State Anxiety</b>						
Pre-test	40.54 (8.54)	40.0	0.041	33.04 (11.4)	31.0	0.001
Post-test	34.69 (8.71)	36.0		27.35 (9.39)	23.5	
<b>Self-efficacy</b>						
<b>CASE Total Scale</b>						
Pre-test	103.38 (29.28)	102.00	0.001	122.98 (28.35)	123.0	< .001
Post-test	155.69 (16.29)	157.00		158.83 (14.24)	151.0	
<b>CASE Wife-Focused Subscale</b>						
Pre-test	76.62 (24.12)	74.00	0.001	90.83 (20.88)	91.0	< .001
Post-test	116.54 (12.47)	117.00		117.35 (11.04)	118.0	
<b>CASE Self-Care Subscale</b>						
Pre-test	26.77 (6.27)	28.00	0.002	32.04 (8.46)	31.0	< .001
Post-test	39.15 (4.22)	39.00		41.48 (5.32)	43.0	
<b>Marital quality</b>						
<b>MIS—Total</b>						
Pre-test	88.00 (13.51)	88.00	0.753	84.16 (15.34)	84.0	0.797
Post-test	89.08 (10.32)	88.00		83.42 (13.37)	84.0	
<b>MIS—Open Communication Scale</b>						
Pre-test	30.15 (4.10)	30.00	0.362	28.93 (6.18)	29.0	0.586
Post-test	31.08 (3.80)	31.00		29.15 (5.23)	29.5	
<b>MIS—Expressing Sad Feelings Scale</b>						
Pre-test	33.62 (6.98)	32.00	0.478	31.51 (6.42)	32.0	0.670
Post-test	33.77 (4.55)	33.00		31.04 (5.92)	31.0	
<b>Spanier Dyadic Adjustment: Total Scale</b>						
Pre-test	111.51 (12.30)	112.00	0.136	112.94 (17.10)	115.6	0.345
Post-test	115.29 (14.26)	113.00		114.91 (14.21)	117.0	
<b>Spanier Subscale, Consensus</b>						
Pre-test	49.16 (6.70)	49.00	0.196	49.16 (8.58)	51.0	0.565
Post-test	51.08 (6.71)	49.00		49.72 (6.43)	51.0	
<b>Spanier Subscale, Satisfaction</b>						
Pre-test	38.15 (4.96)	38.00	0.281	38.68 (5.93)	41.0	0.170
Post-test	39.14 (5.18)	37.00		39.40 (5.57)	40.0	
<b>Spanier Subscale, Affectional</b>						
<b>Expression</b>						
Pre-test	8.27 (2.00)	9.00	0.085	8.22 (2.36)	9.0	0.032
Post-test	8.85 (2.34)	10.00		8.83 (2.17)	10.0	
<b>Spanier Subscale, Cohesion</b>						
Pre-test	15.92 (3.20)	16.00	0.465	16.88 (3.02)	17.0	0.951
Post-test	16.23 (2.92)	17.00		16.96 (3.38)	16.0	
<b>What I Do for Her Self-Care Subscale</b>						
Pre-test	17.62 (4.19)	18.00	0.233	17.40 (3.66)	18.0	0.008
Post-test	19.23 (2.55)	19.00		19.48 (3.31)	19.0	
<b>Wife-Support Subscale</b>						
Pre-test	21.07 (3.51)	19.00	0.008	22.52 (2.74)	22.0	0.016
Post-test	25.15 (2.70)	26.00		24.12 (2.95)	25.0	

\*Wilcoxon signed ranks test; 2-tailed test

**Table 3** Diagnosed wives' outcomes in *HUSH* [within-group analysis]

	HUSH ( <i>n</i> = 13)		<i>p</i> *
	Mean (SD)	Median	
<b>Mood and anxiety</b>			
<b>CES-D Depressed Mood</b>			
Pre-test	14.88 (9.53)	15.00	0.05
Post-test	10.31 (6.92)	12.00	
<b>STAI-Y State Anxiety</b>			
Pre-test	37.00 (6.03)	35.00	0.001
Post-test	27.77 (5.31)	28.00	
<b>Marital quality</b>			
<b>MIS—Total</b>			
Pre-test	89.06 (14.73)	90.00	0.89
Post-test	88.36 (13.16)	95.00	
<b>MIS—Open Communication</b>			
Pre-test	35.08 (6.24)	37.00	0.78
Post-test	35.23 (5.48)	36.00	
<b>MIS—Talking About Sad Thoughts</b>			
Pre-test	36.14 (6.44)	39.00	0.84
Post-test	35.97 (5.77)	38.00	
<b>Spanier Dyadic Adjustment: Total</b>			
Pre-test	114.31 (18.63)	121.00	0.68
Post-test	113.37 (17.40)	119.00	
<b>Spanier Subscale, Consensus</b>			
Pre-test	50.23 (8.96)	50.00	0.72
Post-test	49.69 (8.79)	47.00	
<b>Spanier Subscale, Satisfaction</b>			
Pre-test	39.69 (5.07)	41.00	0.81
Post-test	39.44 (5.22)	39.00	
<b>Spanier Subscale, Affectional Expression</b>			
Pre-test	8.77 (2.17)	9.00	0.96
Post-test	8.77 (2.24)	9.00	
<b>Spanier Subscale, Cohesion</b>			
Pre-test	15.62 (4.33)	17.00	0.42
Post-test	15.46 (3.10)	14.00	
<b>What He Does for Me</b>			
Pre-test	68.23 (11.39)	71.00	0.07
Post-test	71.91 (8.53)	76.00	
<b>Personal Resource Questionnaire</b>			
Pre-test	139.31 (20.16)	139.00	0.03
Post-test	146.38 (15.38)	148.00	

\*Wilcoxon signed ranks test; 2-tailed test

## Description of the Helping Us Heal Program

The theoretical framework for the *HUSH* program is based on an integration of the Relational Model of Adjustment to Cancer and Bandura's Social-Cognitive Theory [2, 11, 12, 12] (see Fig. 1 for a brief description of each session

and its rationale [14]). Telephone-delivered sessions were scheduled at 2-week intervals.

Dosage and fidelity were monitored and protected in four ways: through initial training of the nurse patient educators; discussing the intervention sessions during weekly meetings; and using a fully scripted intervention manual and spouse workbook to guide each intervention session.

The intervention manual and spouse's workbook for the *HUSH* program were the same intervention materials used for the in-person *Helping Her Heal* program. However, the *HUSH* program was delivered by telephone (cell or land line), and the spouse's workbook was mailed in advance of delivering the intervention sessions.

## Study results for study aim 1

Outcomes from the within-group design are summarized in Tables 2 and 3.

**Depressed mood and anxiety** Spouses were significantly less depressed ( $p=0.01$ ) and less anxious ( $p=0.04$ ) after the intervention compared to baseline. Wives were also significantly less depressed ( $p=0.05$ ) and less anxious ( $p=0.001$ ) post-intervention compared to baseline.

**Spouse support** Spouse interpersonal support significantly improved. Spouses scored significantly higher on their self-reported support to their wife compared to baseline ( $p=0.008$ ) on the standardized measure, What I Do for Her. Additionally, wives' appraisal of spousal support improved on two measures. It significantly increased on the Personal Resource Questionnaire compared to baseline ( $p=0.03$ ) and it tended to significantly increase on Appraised Spouse Support to Me ( $p=0.07$ ).

**Self-efficacy** Spouses scored significantly higher on the CASE total scale and the two subscales compared to baseline. More specifically, spouses significantly improved on total self-efficacy ( $p=0.001$ ), in their confidence to manage the impact of the cancer on their wife ( $p=0.001$ ), and in their confidence to carry out their own self-care compared to baseline ( $p=0.002$ ).

**Marital quality** Contrary to expectation, spouses' and wives' scores on marital adjustment (Spanier Dyadic Adjustment) and marital communication (MIS) did not significantly change. There were no improvements in either the total or subscales of these measures.

In addition to examining pre- and post-intervention scores on the standardized measures, the proportion of spouses and wives scoring in the clinical range of distress at baseline

**Table 4** Changes in spouses' and wives' clinical cutoff scores on CES-D, STAI, and DAS in *HUSH* and HHH pilot

	HUSH pilot		HHH pilot	
	Above cutoff at baseline	Above cutoff at post-test	Above cutoff at baseline	Above cutoff at post-test
<b>Spouses' scores</b>	<i>n</i> = 13		<i>n</i> = 26	
CES-D Depressed Mood $\geq 16$				
Yes	8	3	6	1
No	5	0	20	1
STAI-Y State Anxiety > 39				
Yes	7	3	7	3
No	6	0	19	0
Spanier—Total Scale < 100				
Yes	3	2	4	3
No	10	1	21	1
<b>Diagnosed wives' scores</b>	HUSH pilot			
	<i>n</i> = 13			
CES-D Depressed Mood $\geq 16$				
Yes	6	1		
No	7	2		
STAI-Y State Anxiety > 39				
Yes	4	0		
No	9	0		
Spanier—Total Scale < 100				
Yes	2	2		
No	11	2		

were calculated and compared with their scores post-intervention (see Table 4). In all cases, the proportion of wives and spouses who scored in the clinical range of distress at post-intervention decreased compared to baseline and there was no evidence of backsliding.

## Study results for study aim 2

Results from the between-groups analyses are summarized in Table 5, comparing *HUSH* outcomes with outcomes from the in-person historical comparison group [14].

To compare *HUSH* outcomes with outcomes from the comparison group, difference scores were first computed between baseline and post-intervention scores for each group. These difference scores (*d*) were calculated on each standardized measure. The calculated difference or *d* score was then compared between groups using the Mann–Whitney *U* statistic for independent samples.

Results revealed that difference (*d*) scores on virtually all the *HUSH* outcome measures were comparable in magnitude to scores obtained from participants in the in-person

delivered program. That is, there were no statistically significant differences in *d* scores on any of the outcome variables between the telephone-delivered and in-person delivered program. This means there were no differential benefits for spouses receiving the in-person program compared to those receiving the telephone-delivered program. Additionally, the *HUSH* appears to work more effectively than the HHH in improving spouse caregivers' self-efficacy. Increases in the total scale score of the CASE in *HUSH* improved 50.6%; the wife-focused and self-focused subscales improved 52.1% and 46.3%, respectfully. In contrast, the in-person program showed an improvement of 29.3% for the total score of the CASE and 29.2% and 29.4% for the wife- and self-care-focused subscales, respectively.

## Discussion of results

Results from these two small sample pilot studies suggest that the *Helping Us Heal (HUSH)* program may be of potential benefit to spouse caregivers and their diagnosed wives. Both wives and spouses became significantly less anxious and depressed. Spouses significantly improved in their skills (What I Do for Her), in their self-confidence to



**Table 5** Comparison of difference scores on spouse outcomes between HHH pilot study ( $n=26$ ) and *HUSH* ( $n=13$ ) [between-group analysis]

	Mean (SD)	Median	$p^*$	Percent change
<b>Mood and anxiety</b>				
CES-D Depressed Mood				
HHH pilot	3.58 (6.10)	3.0	0.12	
HUSH	6.31 (6.07)	7.0		
STAI-Y State Anxiety				
HHH pilot	5.69 (7.68)	3.0	0.83	
HUSH	5.85 (8.42)	6.0		
<b>Self-efficacy</b>				
CASE Total Scale				
HHH pilot	35.96 (26.72)	33.0		29.3
HUSH	52.31 (32.22)	48.0	0.23	50.6
CASE Wife-Focused Subscale				
HHH pilot	26.52 (21.54)	35.0	0.19	29.2
HUSH	39.92 (25.59)	35.0		52.1
CASE Self-Care Subscale				
HHH pilot	9.43 (8.54)	11.0	0.44	29.4
HUSH	12.38 (7.81)	11.0		46.3
<b>Marital quality</b>				
MIS—Total				
HHH pilot	-0.74 (12.12)	0.0	0.55	
HUSH	1.08 (13.29)	5.0		
MIS—Open Communication Scale				
HHH pilot	0.23 (4.72)	0.5		
HUSH	0.92 (4.29)	2.0	0.665	
MIS—Expressing Sad Feelings Scale				
HHH pilot	-0.47 (5.63)	0.0		
HUSH	0.15 (6.09)	2.0	0.40	
Spanier Dyadic Adjustment: Total Scale				
HHH pilot	1.97 (7.61)	0.0		
HUSH	3.78 (7.94)	3.0	0.51	
Spanier Subscales, Consensus				
HHH pilot	0.56 (4.74)	0.0	0.40	
HUSH	1.92 (5.02)	2.0		
Spanier Subscales, Satisfaction				
HHH pilot	0.72 (2.59)	0.0	0.78	
HUSH	0.98 (2.74)	0.77		
Spanier Subscales, Affectional Expression				
HHH pilot	0.61 (1.33)	0.0	0.92	
HUSH	0.58 (1.15)	0.0		
Spanier Subscales, Cohesion				
HHH pilot	0.08 (1.68)	0.0	0.54	
HUSH	0.31 (1.60)	1.0		
<b>Spouse skills</b>				
Self-care Subscale				
HHH pilot	2.08 (3.46)	2.0	0.84	
HUSH	1.62 (4.54)	2.0		
Wife-support Subscale				
HHH pilot	1.60 (3.38)	1.0	0.12	
HUSH	4.08 (4.00)	5.0		

\*Mann–Whitney  $U$  test, 2-tailed: between-group analysis comparing difference score ( $d$ ) between *HUSH* and HHH pilot study

better manage the pressures of the cancer on themselves (CASE-self-care subscale), and in their self-confidence in communicating with and supporting their wife about her breast cancer (CASE wife-focused subscale). Wives also increased significantly in their positive appraisal of their spouses' support (Personal Resource Questionnaire). Given the pre-experimental design of the study design, caution is in order. Results for the within-group analysis cannot be unconditionally attributed to the intervention; over time, for example, spouses could have gained competencies and become better adjusted from other sources or on their own, not because of *Helping Her Heal*.

When outcomes from the *HUSH* were compared to outcomes from the in-person historical comparison group, the magnitude of changes in outcomes were comparable, suggesting that caregivers' and patients' adjustment might benefit equally from a telephone intervention as an in-person delivered program. Furthermore, improvements in caregivers' self-efficacy in *HUSH* were greater than improvements from the in-person program. To verify the validity of this result, we tested baseline variances on the CASE for the in-person and the by-telephone intervention for the total scale score and for the two subscales. There were no significant differences between variances at baseline between the two study samples on the total or subscale scores of the CASE.

Contrary to expectation, the telephone-delivered program did not significantly change scores on measures of marital quality. Rather the impact of the *HUSH* was limited to variables that were directly targeted by the intervention: spouses' and wives' anxiety and depressed mood, spouses' confidence in their own self-care and ability to manage the impact of the cancer on their wife, and spouse- and wife-reported interpersonal support and communication.

Results from the *HUSH* compare favorably to Scott's results [27]. Although Scott's study evaluated the impact of a relationship-enhancing program on couple communication and spouses' adjustment, only wives benefited from that intervention, not spouses. In *HUSH*, both wives and spouse caregivers benefited. Furthermore, Scott's intervention required conjoint delivery suggesting it is less scalable and sustainable than the telephone-delivered *HUSH*.

Results raise an important methodological and theoretical question: Are couples able to improve communication and interpersonal support if only the spouse receives the intervention. The answer appears to be yes. Wives and spouse-caregivers both improved on post-intervention measures even though the spouse was the only member of the dyad who received the intervention. Conjoint sessions were not needed.

Results should be viewed with caution; changes occurred with primarily well-educated Caucasian couples within long-term marriages. The small sample sizes and the absence of randomization precludes unconditionally

attributing improvements to *HUSH*. Recall that single-group designs do not control for multiple threats to the internal validity of study results.

Despite study limitations, current study outcomes suggest that a fully scripted telephone-delivered educational counseling program for spouse caregivers has the potential to positively affect caregivers' communication and support skills, self-management competencies and confidence, and minimize distress in both spouse caregivers and diagnosed wives. Independent of spouses' report of their support and communication with their wives, wives attributed significant improvements in the support they received from their spouses. Taken together, results suggest, but cannot unconditionally claim, that the *HUSH* changed spouses' behavior and wives experienced that difference. A future study is warranted using a more rigorous experimental design with a larger and more diverse study sample.

**Author contribution** All authors agreed with the content and gave explicit consent to submit and obtained consent from the responsible authorities at the institute/organization where the work has been carried out, before the work was submitted.

All authors whose names appear on the submission (1) made substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data; or the creation of new software used in the work; (2) drafted the work or revised it critically for important intellectual content; (3) approved the version to be published; and (4) agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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**Availability of data and material** The data that support the findings of this study are available on request from the corresponding author.

**Code availability** N/A.

## Declarations

**Ethical approval** Approval was obtained from the ethics committee of University of Washington, Institutional Review Board (*HUSH* file # 06–3782-J01 & *Helping Her Heal* file # 02–2002-C01). The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

**Consent to participate** Written informed consent was obtained from all participants included in the study.

**Conflict of interest** The authors declare no competing interests.

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