Supplementary Table 1. Demographics of studies included in the review

Authors	Year	Country	Study design	Participant focus	Sample size	% female	Mean Age	Ethnicity and race	Follow up period	Recruitment rate (%)	Retention rate (%)
Badger et al., [48]	2011	USA	RCT	Spousal partners and other family members	70	93	61	• White (81%)	8 weeks 16 weeks	39	T1[a] 100%, 8 weeks: 93% 16 weeks: 90%
Borji et al., [31]	2017	Iran	RCT	Spousal partners and other family members	80	40	IG[b] 39 CG[c] 40	NR[d]	4 weeks 8 weeks	NR	NR
Campbell et al., [49]	2007	USA	RCT	Spousal partners	40	100	59	NR	6 weeks	18	6 weeks: 75%
Chambers et al., [27, 28]	2015; 2019	Australia	RCT	Spousal partners	189	100	60	NR	3 months 6 months 12 months 2 years 3 years 4 years 5 years	47	3 months: 85% 6 months: 84% 12 months: 84% 2 years: 82% 3 years: 89% 4 years: 82% 5 years: 81%
Chien et al., [40]	2020	Taiwan	RCT	Spousal partners	103	Not reported	64	NR	6 weeks (T1) 10 weeks (T2[e]) 18 weeks (T3[f]) 24 weeks (T4[g])	20	Control 100% IG1 92% IG2 100% 10 weeks: Control 100% IG1 92% IG2 100% 18 weeks: Control 98%

											IG1 88% CG2 100% 24 weeks: Control 98% IG1 88% IG2 100%
Couper et al., [33]	2015	Australia	RCT	Spousal partners	62	100	IG 60 CG 62	NR	10 weeks (T1) 9 months (T2)	30	9 months: 87%
Karlsen et al., [41]	2021	Denmark	RCT	Spousal partner	35	100	60	NR	2 months (T1) 8 months (T2) 12 months (T3)	52	8 months: 85% 12 months: 80%
Lyons et al., [34]	2016	USA	RCT	Spousal partners	64	100	68	• White (92%)	3 months 6 months	22	3 months:100% 6 months: 100%
Malcarne et al., [39]	2019	USA	RCT	Spousal partners	164	Not reported	62	• White (82%) • African-American (5.5%) • Latino (5.5%) • Asian (5%) • Other (2%)	2-3 months (T2) 6 months (T3)	98	Intervention group only 2 months: 82% 6 months: 84%
Manne et al., [35]	2004	USA	RCT	Spousal partners	68	100	60	•White (84%) •African-American (12.5%) •Hispanic (1.8%) •Other (1.8%)	10 weeks (T1)	56	Intervention group only Post intervention: 88%

Manne et al., [43]	2019	USA	RCT	Spousal partners	237	99	57	• Non hispanic (97%) • White (74%)	5 weeks 3 months 6 months.	15	NR
McCaughan et al., [44]	2018	UK	RCT	Spousal partners	17	100	IG 64 CG 60	• Caucasian (100%)	Baseline (T1), Immediately post intervention (T2), 1 month follow-up post intervention (T3)	20	Post-intervention (T2): IG 92.3% CG 87.5% 1 month (T3): IG 84.6% CG 62.6%
Northouse et al., [45]	2007	USA	RCT	Spousal partners	263	Not reported	59	• Caucasian (84%)	Baseline 4 month 8 months 12 months	69	4 months: 90% (83%) completed all 3 follow-up assessments.
Walker et al., [46]	2013	Canada	RCT	Spousal partners	27	100	NR	NR	Baseline 6 months	30.3% at one site, no figures reported for the second site.	NR
Winters-Stone et al., [37]	2016	USA	RCT	Spousal partners	64	100	IG 67 CG 70	• Non-Hispanic (94%) • Caucasian (94%)	Baseline, 3mths (T2), 6mths (T3)	22	Baseline (T1) IG: 100% CG:100% 3 months IG: 100% CG: 91% 6 months

											IG: 100% CG: 84%
Wittman et al., [51]	2022	USA	RCT	Spousal partners	142	IG 95 CG 96	IG 60 CG 59	• IG 85% white • CG 74% white • 11% African American across both groups	3 and 6 months after treatment	44	3 months: 70% 6 months: 71%
Canada et al., [32]	2005	USA	Pilot	Spousal partners	51	100	Man alone group 61 Couple group 62	• White (88%) • Hispanic (8%) • African-American (4%)	3 months 6 months	NR	Post treatment 82% 3 months 75% 6 months: 73%
Carlson et al., [52]	2017	Canada	Pilot	Spousal partners	77	100	62	NR	Post-intervention 3 months post-intervention 6 months post-intervention	11	Post-intervention IG:84% CG:78% 3 months IG:71%, CG:75% 6 months IG: 80%, CG:75%
Hampton et al., [30]	2013	Canada	Pilot	Spousal partners	38	100	IG 58 CG 60	• White (93%)	2 months	Unknown	76%
Karlsen et al., [42]	2017	Denmark	Pilot	Spousal partners	7	100	not recorded	NR	8 months 12 months	14	71%
Levesque et al., [47]	2015	Australia	RCT,Pilot	Spousal partners	42	NR	60	NR	2 months	23	95%

Manne et al., [36]	2011	USA	RCT,Pilot	Spousal partners	71	97	56	• White (83%)	Baseline 2 months	21	IG: 95% CG: 81%
Robertson et al., [38]	2016	United Kingdom	RCT,Pilot	Spousal partners	42	98	64	• White (100%)	Baseline 4 months after baseline (T1) 6 months after the end of intervention (T2)	38	74%
Song et al., [50]	2021	USA	RCT,Pilot	Spousal partners	62	100	IG 62 CG 62	• White (71%) • Black (24%)	4-6 months Semi structured post exit interview after T2	42	IG: 90% CG: 81%

Supplementary Table 2. Impact of interventions on carers' outcomes

Authors	• Primary Outcomes	Intervention description	Intervention modality	Intervention format	Impact of intervention on carers outcomes
Badger et al., 2011 [48]	• Depression • Positive affect • Negative affect • Perceived stress • Fatigue • Social wellbeing • Social support from family • Spirituality	IG1[a] - Telephone interpersonal counselling (TIP-C[e]). Carers received four phone calls to address problem related to physical and emotional wellbeing. IG2[b] Health education attention condition (HEAC[f]) participants received National Cancer Institute prostate information booklets. Carers received 4 calls to review information.	Telephone	8 week course	IG1 group had improved depression symptoms over time ($p<0.05$). IG2 had significantly improved depression ($p<0.05$), fatigue ($p<0.01$), social wellbeing ($p<0.01$), social support from family ($p<0.05$) and spiritual wellbeing ($p<0.01$).
Borji et al., 2017 [31]	• Depression • Anxiety • Stress	1.5 hour twice weekly sessions x8 (followed by two summary session) based on cognitive behaviour therapy for managing stress.	Face-to-face	5 (4 weeks of twice weekly sessions, then two further session of summary)	Significant decrease in depression and anxiety symptoms between groups at 4 and 8 weeks (both $p=0.001$)
Campbell et al., 2007 [49]	• Self efficacy • Quality of life • Caregiver strain	1 hour sessions 6 Coping skills training - included information about prostate cancer and side effects, teaching problem solving skills and teaching cognitive coping skills	Telephone	6 week course	No significant effects for caregiver negative mood, strain or self efficacy. Moderate effect size for depression (0.46), fatigue (0.39), vigour (0.40), small effect size for strain (0.27) and self efficacy (0.30) between groups.

Chambers et al., 2015; 2019 [27, 28]	• Utilisation of erectile dysfunction treatments • Sexual function and satisfaction • Sexual supportive care needs • Sexual self-confidence • Masculine self-esteem • Marital satisfaction • Program evaluation	IG1 - participants received telephone calls from nurse consultants and sessions followed principals of cognitive behavioural sex and couples therapy. IG2 received peer support telephone intervention for others living with prostate cancer based on the sharing of common personal experiences. CG – usual care.	Telephone, Audio-visual DVD	6 weeks (post-surgery recruitment) or 8 weeks (pre-surgery recruitment)	No significant effects of intervention on the primary outcomes of sexual function, sexuality needs, sexual self-confidence, masculine self-esteem, marital satisfaction or intimacy were found for either men or women. For helpfulness of telephone calls, the mean rating for the nurse intervention at the 6-month assessment was 8.33 for females; the mean rating for the peer intervention was 7.47 for females. IG2 had improved sexual function and satisfaction at 2 years (p=0.002) and at 3 years (p=0.003) compared to usual care. Compared to IG1, IG2 had improved sexual function and satisfaction at 2 years (p=0.023) and at 3 years (p=0.035). IG1 had higher marital satisfaction compared to IG2 (p=0.006) at 4 years.
Chien et al., 2020 [40]	• Disease appraisals • Emotion status • Relationship satisfaction • Health-related quality of life • Satisfaction with intervention	IG1: The intervention included a psychosocial information package (PIP[g]) manual and telephone support for 6 weeks. Six-session psychosocial information manuals were provided. A trained nurse called the participants to guide their reading and to explain the manual content. IG2:The intervention included a weekly multimedia psychosocial intervention (MPI[h]) via the mobile messaging application	Online Telephone Hardcopy Multimedia films	6 week course	At T1[c] the PIP had high positive affect than control group (p=0.027). At T2[d] the MPI and PIP groups experienced significant improvements in negative affect compared with the control group (p=0.044). The PIP group had higher QOL[s] at T2 than control group (p=0.023).

		(MMA[i]), a psychosocial information manual and professional support for 6 weeks. The researchers confirmed that the MMA was installed on the smartphone of the participants in the MPI group. The participants could talk with the trained nurse separately, through the MMA or telephone, any concerns related to PCa. An experienced nurse in urology provided professional support. The trained nurse was to understand and clarify the participants' questions and difficulties in learning and using information and to listen to their problems and feelings separately. With regard to their problems and feelings, the trained nurse offered available information and encouraged them to use previously learned coping skills or referred them to the urologist or case manager.			
Couper et al., 2015 [33]	• Relationship function	Cognitive existential couples therapy (CECT[j]). Six sessions delivered once a week for 60-90 minutes each week focusing of supportive, existential and cognitive therapy. Sessions were adapted to address identified needs of each couple.	Face-to-face	6 week course	Younger carers had significantly lower distress (p=0.008), avoidance (p=0.04) intrusive thoughts (p=0.006) and hyper arousal (p=0.01) at T1. Significance was maintained to T2 for distress (p=0.04), avoidance (p=0.05) and intrusive thoughts (p=0.02). Partner who completed the CECT program showed significant improvements in cohesion (p=0.007) conflict

					resolution (p=0.01) and relational function (p=0.009)
Karlsen et al., 2021 [41]	• Sexual functioning • Sexual distress	ProCan - six counselling sessions and three pelvic floor muscle training sessions with a home video training program.	Face-to-face, video	24 weeks	No significant change in sexual function or sexual distress at T2 or T3 months, or between IG and CG. A significant improvement in carers physical function was seen between IG and CG (p=0.012)
Lyons et al., 2016 [34]	• Physical intimacy • Relationship quality	"Exercising together" Exercise sessions led by a physiologist. Twice weekly sessions for 1 hours, lasting for 6 months. Each partner in the dyad acted as the other persons coach and would monitor and assist one another to perform exercises.	Face-to-face	26 week course	Wives had significant increase in engagement in affectionate behaviours over time p<0.001
Malcarne et al., 2018 [39]	• Distress	Problem solving therapy - sessions were delivered in the dyads home and focused on problems identified by spouses. Therapy involved developing and choosing coping strategies and evaluating strategies. Partners were asked to complete homework sheets related to identified problems.	Face-to-face	6-8 sessions	IG showed significant improvements in distress at post-intervention (p=0.044) and 6 months (p=0.032). Dyadic adjustment was significantly improved at post intervention (p=0.049) but not 6 months. Constructive problem solving significantly improved from baseline to post intervention (p=0.014) and to 6 months (p=0.044).
Manne et al., 2004 [35]	• General distress, cancer specific distress • Coping • Post traumatic growth	Six one hour group sessions to learn about cancer care. Topics included: medical information, nutrition, stress management and coping training, communication and meeting needs, maintaining intimacy and survivorship issues. Homework activities	Face-to-face	6 week course	No significant impact on distress. Women in the intervention group had significant improvements in subsections of coping including denial and subsections of post traumatic growth including relating to others, spiritual growth, personal growth and

	• Cancer specific marital interactions (communication)	included relaxation activities, talking about feelings and asking for support.			appreciation for life (all p=0.00)
Manne et al. 2019 [43]	• General psychological adjustment • Depression • Cancer-specific distress • Cancer-related concerns • Relationship satisfaction	Intimacy-enhancing therapy (IET[k]) & General health and wellness intervention (GHW[l]). Both consisted of consisted of five 90-min couples' sessions and one 30– 45 min booster call. IEC focused on improving a couples' ability to share their thoughts and feelings regarding cancer, promoting mutual understanding and support, facilitating constructive discussions regarding cancer concerns, and enhancing emotional intimacy. GHW focused on a healthy lifestyle	Face-to-face Telephone	5x 90 minute couple sessions and one phone call (30-45 mins)	Among spouses in longer relationships, psychological adjustment increased in both IET (p < .001) and GWH (p p=0.09). Psychological adjustment was significant in IET (p<0.001) compared to GWH, but not compared to usual care.
McCaughan et al., 2018 [44]	• Self-efficacy • Quality of life • Symptom distress • Communication • Uncertainty and illness benefit • Social support	CONNECT: Based upon the FOCUS[m] program. 5 intervention sessions are delivered to prostate cancer patients and their partners over a 9 week period of time. The sessions consist of 3 2-hour small group sessions (on weeks 1, 3 and 9) and 2 telephone sessions (weeks 5 and 7) with men and their partners. The aim was to enhance the couple's belief in their ability to manage their cancer and related issues. The sessions consisted mainly of discussions on symptom	Face-to-face Telephone	9 week program (three group, two telephone sessions)	No statistical results due to low control numbers, only means for comparison.

		management, sexual and urinary dysfunction, uncertainty management, positive thinking and healthy lifestyles			
Northouse et al., 2007 [45]	• Quality of life • Appraisal variables: Appraisals of illness/caregiving • Uncertainty • Hopelessness • Coping resource • Coping strategies • Self-efficacy • Communication about the illness • Symptoms • Risk for distress	FOCUS: family based intervention focused on support and education. Has five core areas: Family involvement, Optimistic attitude, Coping effectiveness, Uncertainty reduction, and Symptom management	Face-to-face Telephone	8 week course	Spouses reported better physical QOL than controls at 8 months ($p<.05$) and at 12 months ($p<.01$), intervention spouses had better mental QOL scores ($p<.05$) and overall QOL scores ($p<.01$), Intervention spouses had significantly less negative appraisal of caregiving ($p<.01$), significantly less uncertainty about the illness ($p<.01$), and less hopelessness ($p<.05$) than control spouses at 4 months higher self-efficacy about ways to manage the illness than control spouses at 4 months ($p<.05$) and 12 months ($p<.05$), better communication with patients than control spouses at 4 months ($p<.01$), 8 months ($p<.05$), and 12 months ($p<.01$), used more active coping at 12 months than control spouses ($p<.05$), significantly less general symptom distress of their own than control spouses ($p<.01$) and had fewer problems related to their husbands' urinary incontinence at 4 months ($p<.05$) and at 8 months ($p<.01$).

Walker et al., 2013 [46]	• Intimacy in relationships • Dyadic Adjustment	Information Booklet: Androgen Deprivation Therapy: A Guide for Prostate Cancer Patients and Their Partners	Face-to-face Hardcopy	2 weeks provide to read booklet plus a subsequent 1hr education review session	Intimacy in relationships: e effect size for partners' change scores was observed at 0.04, treatment group scoring lower (M^{v}=−9.21, SD^{u}=24.80) than the control group (M=−8.38, SD=19.60), dyadic adjustment: medium effect size was observed at 0.50, with the treatment group scoring better (M=−9.12, SD=22.10) than the control group (M=−21.40, SD=26.90), sexual activity: baseline= 42.9% active in the last month, 6 month follow up= 30% active in the last month.
Winters-Stone et al., 2016 [37]	• Self-reported demographics • Health status • Body composition • Maximal muscle strength • Physical function • Self-reported physical & mental health • Self-reported moderate-vigorous intensity physical activity • Adherence	The Exercising Together Project - strength training program focused on the physical and mental health of prostate cancer survivors and their spouse caregivers.	Face-to-face	26 week course	Spouses in Exercising Together had slight gains in lean mass compared to no change in controls (p = 0.05), significantly improved their upper (p <0.01) and lower body (p<0.01) strength, chair stand time (p=0.02), and physical performance battery scores (p=0.01).
Wittman et al., 2022 [51]	• Satisfaction with sex life • Sexual	A tailored web-based platform for sexual intimacy delivered over 6 modules.	Online	6 modules, 28 weeks	No significant impact in sexual function between intervention and control group. Partners in

	function				the IG reported more sexual activity (p=0.037) between baseline and 3 months.
Canada et al., 2005 [32]	• Female sexual function index • Distress • Quality of life • Dyadic adjustment	Four sessions (approx. 60 mins each) with a counsellor focusing on sexual communication using CBT techniques specific to each partner. Participants were asked to complete homework. In the comparison group, men attended sessions alone.	Face-to-face	4 week course	Females sexual functioning scores significantly improved overtime from baseline to 6 month follow up (p<0.05). No impact on marital adjustment or distress.
Carlson et al., 2017 [52]	• Mood disturbance	Six weekly 1.5hr group Supportive Expressive Therapy (SET[n]) sessions focused on coping with distress through emotional expression, discussing uncertainty in a supportive environment, fostering communication, and finding meaning. Sessions were facilitated by two experienced doctoral-level psychologists.	Group sessions (specific modality not identified)	6 week course	Regardless of group membership, partners reported improvements in total mood disturbance (p=.011), tension (p<.001), anger (p=.041), confusion (p<.001), state anxiety (p<.001), and emotional support (p=.037)
Hampton et al., 2013 [30]	• Sexual functioning • Feasibility • Acceptability	One 3.5 hour workshop on sexuality including changes in functionality, understanding values and expectations, maintaining intimacy, committing as a couple to the sexual relationship	Face-to-face	Single session	Partners had significant improvements in medical impact scores (p=0.008) sexual interest (p=0.008), problems (p<0.01) and total sexual function (p=0.011) after the workshop
Karlsen et al., 2017 [42]	• Erectile functioning (males)	ProCan- so one-hour couples counselling sessions, one group and three individual PFMT[o] sessions, DVD[p] of PFMT for home training plus standard care including preoperative information.	Face-to-face DVD	6 week course	On average female seal function increased from 15 to 21 from baseline to 12 month follow up.

Levesque et al., 2015 [47]	• Bipsychosocial concerns • Perceptions of information received.	Coping Together - 4 booklets providing information on symptom management, communication with healthcare professionals, support for partners and dealing with emotions. A relation CD[q], DVD and newsletter were provided as additional supplements.	Hardcopy CD Newsletter	Resource provided post randomisation and accessed as needed.	Top unmet needs were in relation to worries, concerns and emotions. Partners reported receiving less information on self-management and support services than patients and were overall less satisfied with the intervention (P<0.007)
Manne et al., 2011 [36]	• Distress, • Wellbeing • Cancer-Specific Distress • Cancer Concerns • Relationship satisfaction • Relationship intimacy	IET: intervention consisting of five 90 minute couples' sessions. Focus is on improving couples' ability to comfortably share their thoughts and feelings regarding cancer, promote mutual understanding and support regarding their own and one another's cancer experience, facilitate constructive discussion of cancer concerns, and to enhance and maintain emotional intimacy	Face-to-face	8 weeks (5x90 minute sessions)	No significant treatment differences. Moderator effect was found for baseline cancer specific distress (p=0.005), second moderator effect was found for baseline relationship satisfaction (p<0.0001), third moderator effect was found for baseline relationship intimacy (p<0.0001))
Robertson et al., 2016 [38]	• Sexual bother subdomain of the Expanded Prostate Cancer Index Composite	Relational Psychosexual Treatment for Couples With Prostate Cancer: psychosexual intervention comprised of assistance with emotional disclosure, psychoeducation, relational and sexual needs, and dyadic adjustment and coping	Face-to-face	6 X 50 minute sessions - time frame varied per couple	Statistically significant effect on sexual bother immediately following the intervention (p=.04)(patient only). Small decreases in anxiety and depression for the intervention couples - not statistically significant
Song et al., 2021 [50]	• Quality of Life	Prostate Cancer Education and Resources for Couples (PERC[r]) - web-based mHealth program accessible via any device. Includes modules on working effectively as a team,	Online	Accessed as needed	No significant results for carers outcomes.

		assessing and managing prostate cancer treatment–related side effects and symptoms (including urinary and bowel problems, sexual dysfunction, hormonal symptoms, pain, fatigue, sleep disturbance, and stress), and improve healthy behaviours.			

[a]IG1= Intervention group one, [b]IG2=intervention group 2, [c]T1= follow up time one, [d]T2 = follow up time 2, [e]TIP-C= Telephone interpersonal counselling, [f]HEAC= health education attention condition, [g]PIP=psychosocial information package, [h]MPI=multimedia psychosocial intervention, [i]MMA= mobile messaging application, [j]CECT= Cognitive existential couples therapy, [k]IET=Intimacy enhancing therapy, [l]GHW= General health and wellness, [m]FOCUS= Family involvement, optimistic attitude, coping effectives, uncertainty reduction, and symptom management, [n]SET= supportive expressive therapy, [o]PFMT=pelvic floor muscle training, [p]DVD=digital video disc, [q]CD= computerised disc, [r]PERC=prostate cancer education and resources for couples , [s]QOL=quality of life, [u]SD= standard deviation, [v]M=mean.

Supplementary Table 3. The types of unmet needs addressed in each study, tailoring of content to carers and impact on outcomes

		Types of unmet needs that may have been addressed in interventions										Intervention delivery		
Authors	Intervention modality	Information	Support	Marital	Sexual	Psychological	Practical	Physical	Other	Number of supportive care needs	Tailored to carers	Only to carers	To dyads	Impact on outcomes
Randomised Controlled Trials														
Borji et al., 2017 [31]	Face-to-face					ü				1	Y[a]	ü		S[d]
Couper et al., 2015 [33]	Face-to-face			ü						1	Y		ü	S
Lyons et al., 2016 [34]	Face-to-face				ü					1	N[b]		ü	S
Manne et al. 2004 [35]	Face-to-face					ü				1	U[c]	ü		S
Winters-Stone et al., 2016 [37]	Face-to-face					ü		ü		2	Y		ü	S
Wittman et al., 2022 [51]	Online				ü					1	Y		ü	S
Badger et al., 2011 [48]	Telephone					ü				1	Y		ü	S
Campbell et al., 2007 [49]	Telephone	ü				ü				2	Y		ü	E[f]
Chambers et al., 2015; 2019 [27, 28]	Combination			ü	ü				ü	2	N		ü	S
Chien et al., 2020 [40]	Combination	ü			ü	ü			ü	4	Y		ü	S
Karlsen et al., 2021	Combination				ü					1	Y		ü	S

[41]														
Malcarne et al., 2018 [39]	Combination					ü				1	Y	ü		S
Manne et al. 2019 [43]	Combination			ü		ü			ü	2	Y		ü	S
McCaughan et al., 2018 [44]	Combination	ü	ü			ü			ü	3	Y		ü	NS[e]
Northouse et al., 2007 [45]	Combination	ü	ü			ü			ü	3	Y		ü	S
Walker et al., 2013 [46]	Combination	ü		ü	ü					3	U		ü	E
Pilot studies														
Canada et al., 2005 [32]	Face-to-face				ü					1	Y		ü	S
Hampton et al., 2013 [30]	Face-to-face				ü					1	Y		ü	S
Robertson et al., 2016 [38]	Face-to-face				ü	ü				2	Y		ü	NS
Manne et al., 2011 [36]	Face-to-face			ü		ü			ü	3	Y		ü	M[g]
Song et al., 2021 [50]	Online					ü				1	Y		ü	NS
Karlsen et al., 2017 [42]	Combination				ü					1	Y		ü	NS
Levesque et al., 2015 [47]	Combination	ü								1	N		ü	NS
Carlson et al., 2017 [52]	NS					ü				1	Y		ü	NS

[a]Y= yes, [b]N=no, [c]U=unsure, [d]S=significant impact on carers' outcomes, [e]NS= no significant impact on carers' outcomes, [f]E=effect sizes indicate positive change in carers' outcomes, [g]M=moderator effect in carers' outcomes.