Supportive interventions for carers of men with prostate cancer: systematic review and narrative synthesis

Natalie Winter, Hannah Jongebloed, Anna Green, Anna Ugalde, Patricia M Livingston

ABSTRACT
Purpose The objective of this study was to summarise the literature on current interventions available for carers of men with prostate cancer and analyse the outcomes of these interventions in supporting carers’ needs.

Methods A systematic review was conducted, searching databases MEDLINE, PsycINFO, CINAHL, Scopus and Cochrane, using terms related to prostate cancer, carers and interventions. Randomised controlled trials and non-randomised controlled trials of interventions for informal carers with or without patients were included. Data were analysed using descriptive and frequency statistics; interventions and their impact on carers’ outcomes were reported on narratively. The SwiM guidelines were applied to guide data synthesis.

Results Overall, 24 articles were included in the review. On average, participants were spouses (92%) and women (97%). Interventions largely were delivered face-to-face (42%) or used a combination of face to face and online modalities (38%). Two-thirds (63%) showed a significant improvement in carer’s outcomes including psychological, sexual, physical and relationship/marital. The majority of studies (79%) tailored contents to carers’ circumstances, most within a couples counselling format. Over one-third (42%) of studies focused on a range of supportive care needs, most commonly were psychological (58%), sexual (42%) and informational (25%).

Conclusions Interventions for carers of men with prostate cancer were largely face to face, patient–spouse focused and two-thirds had some measurable impact on carer’s outcomes. Research continues to underserve other patient-carer roles, including non-spousal carers. Interventions delivered solely for carers are required to meet gaps in care, and determine the impact on carer outcomes. Further research and more targeted interventions are needed.

WHAT IS ALREADY KNOWN ON THIS TOPIC
⇒ Interventions for carers looking after someone with cancer have variable impacts on carers’ outcomes.

WHAT THIS STUDY ADDS
⇒ Most interventions include some level of tailoring to carers’ supportive care needs; however, tailoring often occurs in dyad-based interventions such as couples counselling.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY
⇒ Findings inform the development of future interventions and current clinical practice where carers’ supportive care needs to be addressed outside of the marital relationship.

PROSPERO registration number CRD42021249870

BACKGROUND
In Australia, prostate cancer is the most common cancer type among men. Despite being the second leading cause of cancer mortality among men, 5-year survivorship from prostate cancer is close to 100% for those diagnosed with stages’ I–III. With early diagnosis and improved treatment options, prostate cancer is now considered a chronic condition.

Cancer is also considered a ‘family disease’, which has a significant impact on the daily lives and long-term health and well-being of close family members and friends. Approximately, 70% of people undergoing cancer treatment have a family member who provides ongoing care at home, these family members and other unpaid carers such as friends are...
known as informal carers (hereafter, carers). Understanding the role and influence of carers is a necessary component in developing resources to assist individuals providing care.

Most carers will report experiencing at least one unmet need throughout and beyond the illness trajectory and carers often require assistance to address needs as they arise. The type of support required by carers can vary across cancer stages and treatment types, as different side effects are experienced within each treatment regime. Carers can receive support in a myriad of ways, including informal social networks, formal support through government and hospital services, and through technology; linking with cancer organisations and online support groups. There is a range of information, resources and support available to carers across different modalities including face to face and through technology, and in the community and outpatient setting; however, resources are commonly provided based on patients’ needs. Caregivers’ knowledge of available support is dependent on their availability to attend outpatient appointments. Carers can initiate seeking support; however, accessing information and support is a time-consuming task and carers require adequate health literacy, knowledge and access, to properly navigate and understand health information. In particular during crises, a lack of information and support can result in uncertainty and at times delays in seeking medical assistance. Spouses and partners are family members who most commonly provide care to men with prostate cancer, and the patient–partner dyad can experience more specific unmet needs related to sexual function and marital relationships during and after treatment. Early educational programmes can be used to promote couples’ marital and sexual well-being prior to surgery. Carers require additional support to confidently manage patients’ side effects and symptoms and assistance to maintain their own health and well-being.

There is a pressing need to explore how interventions meet the supportive care needs experienced by carers. Within the wider cancer context, there is evidence that interventions are largely dyad based with intervention content focused on patient care. Similarly, within the prostate cancer field, the best way to support carers looking after men with prostate cancer is still unclear; dyadic interventions have limited positive outcomes in female partners. Technology-based interventions may play a role in improving carers’ outcomes; however, the full impact of these interventions requires further investigation. This review provides much needed information on how to support carers looking after men with prostate cancer.

Aims
The aim of this review was to summarise the current literature on supportive care interventions for informal carers of men living with prostate cancer and answer the following questions:
1. What supportive interventions have been evaluated to meet carers’ needs?
2. What are the outcomes of these supportive care interventions?

METHODS
This systematic review was registered on PROSPERO, registration number: CRD42021249870.

Search process
A systematic search was conducted in December 2020 and updated in January 2022 using the following databases: MEDLINE, PsycINFO, CINAHL, Embase, Scopus and Cochrane Database of Systematic reviews. References lists of articles included in the review were screened for additional articles meeting the inclusion criteria. Articles found through hand searching were included in the review. To gain a full understanding of the scope of research available, no date limits were applied. References were uploaded and organised in Covidence. Duplicates were removed and remaining resources were double screened by title, abstract (by NW, HJ and AU) and full text (by NW, HJ and AG; figure 1).

Search strategy
Search terms were developed by the whole research team and were reviewed by the research librarian. Search terms were developed for three main topics with subject heading applied to each database. An example of the strategy on the Medline database in outline in table 1. Search terms for each topic were as follows:
3. Supportive care interventions—program, intervention, counselling, therapy, community service*, social network, cognitive behavioural therapy, CBT, support group, telephone, internet, web, smartphone application, mobile application, app, pilot, randomized control trial, non-randomized controlled trial.

Inclusion criteria
Criteria are presented according to the Population, Intervention, Control, Outcomes (PICO) framework. Studies were included in this review if they met the following criteria:
- Population—interventions for partners and informal carers, identified as family members or non-family members who were providing care to men with prostate cancer.
- Intervention—interventions available to informal carers of men with prostate cancer including: face to face, online, telephone and studies using a combination of modalities to deliver intervention content.
Systematic review

Figure 1. Prisma flowchart.

Table 1  Search strategy on Medline Complete database

<table>
<thead>
<tr>
<th>Database (including platform for clarity of source, eg, Medline Complete (Via Ebsco))</th>
<th>Search strategy (Paste in the search strategy from the database, so others can replicate your search exactly.)</th>
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| Medline Complete (Via Ebsco) | S1 (MH *prostatic neoplasm* OR MH "urologic neoplasm") OR (TI "prostate neoplasm") OR (TI "prostatic carcinoma") OR (TI "urologic carcinoma") OR (TI "urologic neoplasm") OR (TI "urologic cancer") OR (TI "prostate cancer") OR (AB *prostate neoplasm*) OR (AB prostate) OR (AB "prostatic carcinoma") OR (AB "urologic carcinoma") OR (AB "urologic neoplasm") OR (AB "urologic cancer") OR (AB "prostate cancer")
| S2 (MH Caregiver*) OR (MH spous*) OR (MH family) OR (TI Carer*) OR (TI caregiver*) OR (TI spous*) OR (TI famil*) OR (TI partner*) OR (AB Caregiver*) OR (AB caregiver*) OR (AB spous*) OR (AB famil*) OR (AB partner*)
| S3 (MH *self-help group* OR (MH "cell phone") OR (MH "mobile application") OR (MH "clinical trial") OR (MH "qualitative research") OR (MH *pilot") OR (MH "randomized controlled trial") OR (TI therapy) OR (TI "community service") OR (TI "social network") OR (TI "cognitive behavioural therapy") OR (TI "support group") OR (TI telephone) OR (TI internet) OR (TI web) OR (TI "smartphone application") OR (TI "mobile application") OR (TI *app") OR (TI *pilot") OR (TI "randomi?ed control* trial") OR (TI "non-randomi?ed control* trial") OR (TI "clinical trial") OR (AB program) OR (AB intervention) OR (AB counseling) OR (AB therapy) OR (AB "community service") OR (AB "social network") OR (AB "cognitive behavioural therapy") OR (AB "support group") OR (AB telephone) OR (AB internet) OR (AB web) OR (AB "smartphone application") OR (AB "mobile application") OR (AB *app") OR (AB *pilot") OR (AB "randomi?ed control* trial") OR (AB "non-randomi?ed control* trial") OR (AB "clinical trial") |
| S1 AND S2 AND S3 | Limiters - Scholarly (Peer Reviewed) Journals
| Narrow by Language: - english
| Search modes - Boolean/Phrase |
Comparators—all usual care and alternative intervention groups were included in the review.

Outcomes—there were no restrictions on outcomes, studies could report on any supportive care outcomes including supportive care needs, psychosocial well-being and physical health.

Studies included randomised controlled trials and pilot studies of interventions to address partner and carers needs.

Publications including carer/patient dyads were included if results relating to carers’ support needs were reported separately.

Exclusion criteria
Studies were excluded in this review if they met the following criteria:

- Published in a language other than English.
- Focus on preventative screening of prostate cancer.
- Includes several types of cancer in their analysis where the specific needs of carers of men with prostate cancer cannot be distinguished.

Data extraction
For each included study, descriptive data were collected including: mean sample age, gender, ethnicity, race, recruitment rate, attrition rates, intervention modality, focus area of intervention and key findings. A data collection tool was created to collect data via Qualtrics and used a range of closed and open-ended questions. For example, close-ended questions included the target sample of the study (carers/dyads/other), study design (randomised controlled trial/pilot randomised controlled trial), intervention modality (face to face, online, telephone, hardcopy, other and types of unmet needs addressed in the intervention (information, support, marital etc). Open-ended questions included age, sample size, recruitment rate, retention rate, description of the intervention and impact on outcomes. Data extraction was completed (NW, AG and HJ) with 20% cross-checked by NW. Ambiguities were discussed until a consensus was reached. Two studies reported on one set of data in a longitudinal approach; we combined the findings of both studies during our analysis.

Data analysis
Data were analysed using descriptive and frequency statistics. Interventions and their impact on carers’ needs were reported. A meta-analysis was not conducted due to the heterogeneity of the studies. The Synthesis Without Meta-analysis (SwiM) guidelines are recommended for use when a review is undertaken with no meta-analysis; we have applied these guidelines to our review.

Studies were analysed in different groups, first by study design, where studies were grouped by randomised controlled trials, pilot studies and non-randomised clinical trials and were reported on in these groups. Second, studies were grouped by intervention modality such as face to face, online or a combination of both modalities to describe differences in outcomes compared with intervention delivery.

Risk of bias
A risk-of-bias assessment was completed using the Cochrane risk-of-bias tool. Risk of bias was completed by two authors and a research assistant (NW, HJ and Sharina Riva), with 20% cross-checked by Sharina Riva. Eight studies received a low risk of bias, 13 suggested some concerns and 2 had a high risk of bias (figure 2). Risk of bias was not completed for one study as it was a pilot study where the waitlist data were collected from participants 2 months prior to the delivery of the intervention. The same participants were then treated as the intervention group.

RESULTS
Study characteristics
Of 6440 articles screened, 24 were included in the review (figure 1), totalling 2015 participants. The majority of studies were published in the USA (12/24, 50%) and two-thirds were randomised controlled trials (16/24, 67%). Nearly all studies focused on spousal carers as participants (22/24, 92%) and just under half were conducted in a face-to-face setting (11/24, 46%). On average, women accounted for 97% of participants (range 40%–100%, SD 14). Most interventions were delivered as a patient–carer dyad as opposed to solely focusing on carers (22/24, 92%). Recruitment rates were on average 35% across studies (range 26%–98%, SD 22). See online supplemental table 1 for full study demographics.

Intervention modality
Overall, 10 of 24 studies (42%) delivered their intervention solely face to face, of these 7 showed a significant impact on carer’s outcomes (see online supplemental table 2). Nine studies delivered interventions using a combination of modalities and six had a significant impact on carers’ outcomes. Two studies trialled telephone interventions, one of which had a significant impact on carers’ outcomes. Two studies used online interventions, one of which showed a significant impact on outcomes.

Intervention description
Interventions focused on a variety of topics, with some using multiple approaches. This included counselling therapies, skills training, information booklets or online modules, and exercise. The majority of interventions (19/24, 74%) were presented as weekly modules that were most frequently 6 (n=6/24, 25%) or 8 weeks in duration (n=5/24, 17%). Intervention content was tailored to family members.
supportive care needs in the majority of studies (19/24, 79%).30–33 36–43 45 48–52

Randomised controlled trials (16/24)

Two-thirds of the studies were randomised control trials (16/24, 67%). Of these, seven studies used a combination of modalities including face to face, telephone, online, hardcopy material and other multimedia formats, with intervention periods ranging from 2 to 24 weeks.27 39–41 43–46 Face-to-face interventions were trialled across five studies with intervention periods ranging from 5 to 26 weeks.31 33–35 37 Two studies used telephone interventions with intervention periods ranging from 6 to 8 weeks,48 49 and one used an online intervention with a 28-week period.51

Pilot studies (8/24)

Half of the pilot studies assessed face-to-face interventions (4/8, 50%); and only two studies measured duration ranging from 4 to 8 weeks.32 36 Two studies used a combination of approaches including face to face, hardcopy material and multimedia formats, of these one was a 6-week course42 and one provided material to participants at baseline which was then accessed on an ‘as needs’ basis by participants.47 One study assessed an online intervention which was accessed on an ‘as needs’ basis by participants50 and one study held group sessions over a 6-week period; however, the mode of delivery of the groups was not specified.52
Impact of interventions on carer outcomes

A total of 15 studies (63%) reported a significant impact on carer outcomes. Of these, 13 were RCTs,\(^{27, 30–33, 37–41, 43, 45, 48, 51}\) n=5 had a low risk of bias,\(^{27, 33, 40, 41, 48}\) and n=6 were scored as ‘some concerns’ due to lack of clear reporting during randomisation.\(^{34–45}\) Two were pilot studies that have significant impacts on carer’s outcomes, one raised concerns about interventions concealment,\(^{32}\) and one was not assessed for bias.\(^{36}\) Six studies had no impact on carer’s outcomes; one RCT\(^{44}\) and five pilot studies,\(^{38, 42, 47, 50, 52}\) of these only two had a low risk of bias,\(^{38, 44}\) See online supplemental table 2 for a full description.

Of the 15 studies that had an improvement in outcomes, 12 (80%) tailored their content to family members’ supportive needs.\(^{38}\) Six studies (25%) found that their intervention had no impact on family members’ outcomes.\(^{38, 42, 44, 47, 50, 52}\) Of these six, five (83%) presented intervention content tailored to family members’ supportive care needs.\(^{38, 42–44, 50, 52}\)

**Significant findings**

During at least one time point in each study, the RCTs showed significant improvements in a range of outcomes including depression,\(^{27, 34, 48, 49}\) anxiety,\(^{31}\) fatigue, social well-being, social support from family, spiritual well-being,\(^{48, 49}\) relationship satisfaction,\(^{27, 43}\) positive and negative affect,\(^{40}\) distress,\(^{39}\) cohesion, avoidance and conflict resolution,\(^{33}\) affectionate behaviours,\(^{34}\) sexual functioning,\(^{27, 51}\) higher sexual satisfaction, intimacy and fewer sexual unmet needs,\(^{27, 34–35, 37–41, 43, 45, 48, 51}\) dyadic adjustment, problem-solving,\(^{39}\) subsections of coping,\(^{35}\) subsections of post-traumatic growth,\(^{35, 43}\) higher quality of life communication, active communication and self-efficacy, and lower negative appraisal, uncertainty, symptom distress, problems with husband’s incontinence and hopelessness.\(^{45}\) Lean mass, upper and lower body strength and chair standing time\(^{37}\) and general physical function.\(^{41}\) Pilot studies showed significant improvements in female sexual functioning,\(^{27, 40, 42, 52}\) medical impact, sexual interest and problems.\(^{40}\)

Two RCTs measured effect sizes and found moderate effect sizes for depression, fatigue, vigour\(^{46}\) dyadic adjustment and intimacy in relationships.\(^{46}\) One pilot study found moderator effects for baseline cancer specific distress, relationship satisfaction and intimacy.\(^{36}\)

**Intervention focus categorised into common supportive care needs**

In 10 studies (42%), the primary area of focus of each study often spanned multiple supportive care needs,\(^{27, 36–38, 40, 43–46, 49}\) (see online supplemental table 2). The most common outcomes were psychological (14/24, 58%),\(^{31, 35–40, 41–43, 45–50, 52}\) sexual (10/24, 42%),\(^{27, 30, 32, 34, 38, 40–42, 46, 51}\) and informational (6/24, 25%).\(^{40, 44–47, 49}\) One quarter of studies included additional measures including symptom management, quality of life, health related quality of life and a broader unmet supportive care needs measurement.

Eight RCTs had a low risk of bias,\(^{27, 33, 40, 41, 44, 48, 49}\) and eight raised some concerns.\(^{31, 34, 35, 39, 43, 45, 46, 51}\) Of these, lack of clear reporting of the randomisation process raised some concerns in n=7,\(^{34–35, 39, 43, 45, 46, 51}\) and a high risk of bias occurred in one study n=1 as there was no record of an analysis plan and the appropriateness of results could not be assessed.\(^{31}\) Across pilot studies, n=1 had a low risk of bias\(^{48}\) and n=6 raised some concerns.\(^{32, 36, 42, 47, 50, 52}\) Of these, n=3 did not clearly report on randomisation procedure.\(^{36, 47, 50}\) In two studies, there was little information given about concealment of assigned intervention prior to randomisation, due to the nature of interventions, for example, counselling, there was potential for bias to occur in as a result of knowledge of the intervention.\(^{32, 52}\) One study had a high risk of bias across multiple domains.\(^{42}\)

**DISCUSSION**

In this review, we found that the majority of interventions available to carers of men with prostate cancer were provided in face-to-face format, delivered a counselling intervention and focused on spouses. Half of the included studies showed a significant impact on a variety of carers’ outcomes. Of these studies, three-quarters provided some elements of tailoring content to carers’ own circumstances. Studies largely focused on psychological, sexual and informational aspects of caregiving.

There is debate around the ideal delivery modality of interventions for carers of people with cancer. In this review, earlier studies used a combination of approaches including face to face, written material, CD-ROMs and early technology such as the telephone; later studies primarily using face-to-face approaches with few using online only interventions. However, our findings contrast the cultural shift in the delivery of interventions to digital health platforms.\(^{53}\) Our results indicate that a higher number of face-to-face interventions provided positive outcomes for carers. It is possible that face-to-face settings correspond with the type of supportive care needs identified in this review such as psychological and sexual needs. These types of needs may often be addressed through counselling interventions requiring needs assessment of individuals’ and couples traditionally conducted in a face-to-face setting. However, previous research has identified that technology-based interventions show promising results\(^{44}\) for education, cognitive therapies, communication and support. Further research is required into the use of innovative solutions such as video conferencing and telehealth in supporting counselling-based services for people affected by prostate cancer to support traditional face-to-face services. In addition to existing face-to-face interventions, greater understanding and use of innovative resources will allow for the delivery of interventions to carers.
where none existed before, for example, in rural and regional areas.

Despite our findings of the success of face-to-face interventions, it is important to recognise the context of the COVID-19 pandemic and lockdowns worldwide where family members have been unable to attend outpatient settings with patients. The long-term ramifications on carers’ support needs and well-being are yet known. The adaptation of resources, including face to face and digital options, may allow for carers in diverse circumstances to seek support. There is a need for flexibility in the delivery of services. Recruitment rates of the included studies were low (average 35%), indicating that carers are unlikely to volunteer or initiate participation in programmes, as well as highlighting challenges in recruiting patient–carer dyads into research projects. These findings are similar across other studies. Reasons for hesitancy to seek support include lack of time for themselves, not acknowledging their own needs or having limited time to participate in additional tasks. There is a need therefore to embed new services into existing healthcare structures with automatic referrals to ensure uptake of programmes. Support for and referral into interventions have the potential to promote health and well-being during the illness and caring period, and more can be done to intervene early prior to unmet needs developing. A hybrid model of care may be required following the pandemic period; however, what this looks like in the long term and how sustainable it is requires further investigation.

The impact of interventions addressing couples’ needs has been explored previously and found that couples’ based interventions are as successful as stand-alone patient and carer interventions. Despite positive impacts of couples based interventions, a more recent review has identified that couple-based interventions are inadequate in addressing and producing successful outcomes for both patients and partners simultaneously. There is a need to tailored content to address the needs of family members; however, in this review we found that nearly equal amounts of studies with tailored content to family members’ needs both had a significant improvement in outcomes (n=10) or had no improvement in outcomes (n=7). One reason for this may be the level of tailoring provided to carers. Interventions were largely dyad based and at times were tailored to couples’ needs rather than individuals’ needs. While many dyads affected by prostate cancer experience unmet needs as a couple, there may be individual supportive care needs that carers experience, such as, dealing with emotions related to cancer, and at times planning for life after death. There is a need to ensure that future interventions incorporate less common unmet needs experienced by cancer carers to meet the needs of the carer. Additionally, while it was not represented in this review, the male/female spouse dyad represents only one patient–carer relationship who experience prostate cancer. Previous research indicates that up to 19% of carers of people with prostate cancer may also be children, or other relatives or friends where sexual and marital unmet needs may not be relevant for the carer. Similarly in this study, we found that couples were predominately heterosexual with women, representing 97% of the sample. This limits the ability to assess whether success of interventions is related to carers’ gender. It is known that women both living with cancer and who are carers experience higher levels of distress compare to people who do not identify as woman. Given that dyad interventions comprise primarily heterosexual spouses, there is a pressing need to codevelop and evaluate interventions for same-sex couples, or those who have a different relationship with the person living with prostate cancer to ensure that interventions are inclusive and encompassing to the needs of the caring population. The use of tailoring across flexible technology-based platforms requires further exploration to assess whether one programme can address both dyadic and individual needs for carers from diverse situations.

Consideration should be taken when designing and implementing studies about the language used as many carers do not identify with the term ‘carer’. In day-to-day practice, conversations between clinicians and patients/carers should include defining whether the patient has a carer or support person, and the term they prefer to use when being addressed.

From this review, we identified that interventions were largely focused on psychological, sexual and informational outcomes. However, carers of people with prostate cancer also experience other gaps in care, including the need for peer support, and practical advice related to everyday care needs. This highlights gaps in prostate cancer research and the need for interventions for carers own needs during the disease trajectory. Interventions had an impact on a diverse range of outcomes including psychological, social, marital and physical well-being, suggesting that interventions have the potential to meet the complex needs that carers experience. However, more research is needed to explore whether the focus of interventions can be broadened to meet a variety of needs experienced by carers and whether any resulting impact on outcomes can be seen. The majority of studies (60%) demonstrated that interventions had a significant impact on carers’ outcomes; however, this was across a multitude of psychological, physical and interpersonal measurements. Greater understanding of how interventions can improve carers’ well-being in the short-term and long term is needed.

Limitations
One limitation of this work is the lack of information provided about the stage of men’s illness or the treatment they were undergoing, due to the heterogeneity of information reported this information was
unable to be extracted. Carers can experience different supportive care needs in relation to the stage of diagnosis and treatment type. Further work should clearly report on the patients stage of illness in order to ascertain the impact on the carer at that time.

Findings of this review are limited as the majority of studies (63%) had ‘some concerns’ or high risk of bias.

In the majority of cases, this was due to inadequate reporting of randomisation and concealment, this is similar across risk of bias findings in other similar systematic reviews. However, as only five of the studies included had a low risk of bias and significant impact on outcomes, findings should be interpreted with caution. Future research is needed to strengthen this.

CONCLUSIONS

Our review highlighted that interventions for carers of people with cancer were largely face to face, were counselling based and patient-spouse focused. Most interventions addressed psychological, sexual and informational unmet needs. Opportunities exist for flexible technology-based interventions to test tailored programmes addressing complex unmet needs meeting dyad and individual carer needs. Findings from these interventions may provide additional information about the success of interventions in improving outcomes of carers of people with prostate cancer.

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Contributors All authors contributed to the study concept and design. HJ performed the literature search. NW and HJ screened resources. Data was extracted by NW, AU and HJ and cross-checked by NW. Data synthesis was performed by NW. The first draft of the manuscript was written by NW and HJ. All authors critically revised and approved of the final manuscript. NW is the guarantor who accepts full responsibility for the finished work and/or the conduct of the study, had access to the data, and controlled the decision to publish.

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

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<table>
<thead>
<tr>
<th>Study Authors</th>
<th>Year</th>
<th>Country</th>
<th>Design Type</th>
<th>Condition</th>
<th>Sample Size</th>
<th>Race</th>
<th>Follow-up Period</th>
<th>Duration</th>
<th>Success Rate</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manne et al., [43]</td>
<td>2019</td>
<td>USA</td>
<td>RCT</td>
<td>Spousal partners</td>
<td>237</td>
<td>99</td>
<td>57</td>
<td>5 weeks</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3 months</td>
<td>6 months.</td>
<td>15</td>
<td>NR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>McCaughan et al., [44]</td>
<td>2018</td>
<td>UK</td>
<td>RCT</td>
<td>Spousal partners</td>
<td>17</td>
<td>100</td>
<td>IG 64, CG 60</td>
<td>Baseline (T1), Immediately post intervention (T2), 1 month follow-up post intervention (T3)</td>
<td>20</td>
<td>Post-intervention (T2): IG 92.3%, CG 87.5% 1 month (T3): IG 84.6%, CG 62.6%</td>
</tr>
<tr>
<td>Northouse et al., [45]</td>
<td>2007</td>
<td>USA</td>
<td>RCT</td>
<td>Spousal partners</td>
<td>263</td>
<td>Not reported</td>
<td>59</td>
<td>Caucasian (84%)</td>
<td>Baseline 4 month 8 months 12 months</td>
<td>69</td>
</tr>
<tr>
<td>Walker et al., [46]</td>
<td>2013</td>
<td>Canada</td>
<td>RCT</td>
<td>Spousal partners</td>
<td>27</td>
<td>100</td>
<td>NR</td>
<td>Baseline 6 months</td>
<td>30.3% at one site, no figures reported for the second site.</td>
<td>NR</td>
</tr>
<tr>
<td>Winters-Stone et al., [37]</td>
<td>2016</td>
<td>USA</td>
<td>RCT</td>
<td>Spousal partners</td>
<td>64</td>
<td>100</td>
<td>IG 67, CG 70</td>
<td>Baseline, 3mths (T2), 6mths (T3)</td>
<td>22</td>
<td>Baseline (T1) IG: 100%, CG:100% 3 months IG: 100%, CG: 91% 6 months</td>
</tr>
<tr>
<td>Study</td>
<td>Year</td>
<td>Location</td>
<td>Type</td>
<td>Partners</td>
<td>Sample Size</td>
<td>IG Control Group</td>
<td>Intervention Duration</td>
<td>Post-intervention</td>
<td>Post-treatment</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
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</tr>
<tr>
<td>Wittman et al., [51]</td>
<td>2022</td>
<td>USA</td>
<td>RCT</td>
<td>Spousal partners</td>
<td>142</td>
<td>IG 95, CG 96</td>
<td>3 and 6 months after treatment</td>
<td>44</td>
<td>3 months: 70%, 6 months: 71%</td>
<td></td>
</tr>
<tr>
<td>Canada et al., [32]</td>
<td>2005</td>
<td>USA</td>
<td>Pilot</td>
<td>Spousal partners</td>
<td>51</td>
<td>Man alone group: 61, Couple group: 62</td>
<td>3 months 6 months</td>
<td>NR</td>
<td>Post-treatment 82%, 3 months 75%, 6 months: 73%</td>
<td></td>
</tr>
<tr>
<td>Carlson et al., [52]</td>
<td>2017</td>
<td>Canada</td>
<td>Pilot</td>
<td>Spousal partners</td>
<td>77</td>
<td>62</td>
<td>Post-intervention 3 months post-intervention</td>
<td>11</td>
<td>Post-intervention IG: 84%, CG: 78%, 3 months IG: 71%, CG: 75%, 6 months IG: 80%, CG: 75%</td>
<td></td>
</tr>
<tr>
<td>Hampton et al., [30]</td>
<td>2013</td>
<td>Canada</td>
<td>Pilot</td>
<td>Spousal partners</td>
<td>38</td>
<td>IG 58, CG 60</td>
<td>2 months</td>
<td>Unknown</td>
<td>76%</td>
<td></td>
</tr>
<tr>
<td>Karlsen et al., [42]</td>
<td>2017</td>
<td>Denmark</td>
<td>Pilot</td>
<td>Spousal partners</td>
<td>7</td>
<td>not recorded</td>
<td>8 months 12 months</td>
<td>14</td>
<td>71%</td>
<td></td>
</tr>
<tr>
<td>Levesque et al., [47]</td>
<td>2015</td>
<td>Australia</td>
<td>RCT</td>
<td>Spousal partners</td>
<td>42</td>
<td>NR</td>
<td>2 months</td>
<td>23</td>
<td>95%</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Year</td>
<td>Country</td>
<td>Design</td>
<td>Group Type</td>
<td>Baseline</td>
<td>Intervention</td>
<td>Follow-Up</td>
<td>N Total</td>
<td>N Intervention</td>
<td>N Control</td>
</tr>
<tr>
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</tr>
<tr>
<td>Manne et al., [36]</td>
<td>2011</td>
<td>USA</td>
<td>RCT, Pilot</td>
<td>Spousal partners</td>
<td>Baseline 2 months</td>
<td>71</td>
<td>97</td>
<td>56</td>
<td>White (83%)</td>
<td>21</td>
</tr>
<tr>
<td>Robertson et al., [38]</td>
<td>2016</td>
<td>United Kingdom</td>
<td>RCT, Pilot</td>
<td>Spousal partners</td>
<td>Baseline 4 months after baseline (T1) 6 months after the end of intervention (T2)</td>
<td>42</td>
<td>98</td>
<td>64</td>
<td>White (100%)</td>
<td>38</td>
</tr>
<tr>
<td>Song et al., [50]</td>
<td>2021</td>
<td>USA</td>
<td>RCT, Pilot</td>
<td>Spousal partners</td>
<td>4-6 months Semi structured post exit interview after T2</td>
<td>62</td>
<td>100</td>
<td>IG 62 CG 62</td>
<td>White (71%) Black (24%)</td>
<td>42</td>
</tr>
</tbody>
</table>
### Supplementary Table 2. Impact of interventions on carers’ outcomes

<table>
<thead>
<tr>
<th>Authors</th>
<th>Primary Outcomes</th>
<th>Intervention description</th>
<th>Intervention modality</th>
<th>Intervention format</th>
<th>Impact of intervention on carers outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Badger et al., 2011 [48]</td>
<td>Depresssion</td>
<td>IG1: Telephone interpersonal counselling (TIP-C). Carers received four phone calls to address problem related to physical and emotional wellbeing. IG2: Health education attention condition (HEAC) participants received National Cancer Institute prostate information booklets. Carers received 4 calls to review information.</td>
<td>Telephone</td>
<td>8 week course</td>
<td>IGI group had improved depression symptoms over time (p&lt;0.05). IG2 had significantly improved depression (p&lt;0.05), fatigue (p&lt;0.01), social wellbeing (p&lt;0.01), social support from family (p&lt;0.05) and spiritual wellbeing (p&lt;0.01).</td>
</tr>
<tr>
<td>Borji et al., 2017 [31]</td>
<td>Depression Anxiety Stress</td>
<td>1.5 hour twice weekly sessions x8 (followed by two summary sessions) based on cognitive behaviour therapy for managing stress.</td>
<td>Face-to-face</td>
<td>5 (4 weeks of twice weekly sessions, then two further session of summary)</td>
<td>Significant decrease in depression and anxiety symptoms between groups at 4 and 8 weeks (both p=0.001)</td>
</tr>
<tr>
<td>Campbell et al., 2007 [49]</td>
<td>Self efficacy Quality of life Caregiver strain</td>
<td>1 hour sessions 6 Coping skills training - included information about prostate cancer and side effects, teaching problem solving skills and teaching cognitive coping skills</td>
<td>Telephone</td>
<td>6 week course</td>
<td>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.</td>
</tr>
<tr>
<td>Chambers et al., 2015; 2019 [27, 28]</td>
<td>Utilisation of erectile dysfunction treatments</td>
<td>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.</td>
<td>Telephone, Audio-visual DVD 6 weeks (post-surgery recruitment) or 8 weeks (pre-surgery recruitment)</td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>Chien et al., 2020 [40]</td>
<td>Disease appraisals</td>
<td>IG1: The intervention included a psychosocial information package (PIP&lt;sup&gt;6&lt;/sup&gt;) 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&lt;sup&gt;6&lt;/sup&gt;) via the mobile messaging application</td>
<td>Online Telephone Hardcopy Multimedia films 6 week course</td>
<td>At T1&lt;sup&gt;1&lt;/sup&gt; the PIP had high positive affect than control group (p=0.027). At T2&lt;sup&gt;2&lt;/sup&gt; 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&lt;sup&gt;3&lt;/sup&gt; at T2 than control group (p=0.023).</td>
<td></td>
</tr>
</tbody>
</table>
Couper et al., 2015 [33]  | Relationship function | Cognitive existential couples therapy (CECT³). 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
<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention</th>
<th>Setting</th>
<th>Duration</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karlsen et al., 2021</td>
<td>ProCan - six counselling sessions and three pelvic floor muscle training sessions with a home video training program.</td>
<td>Face-to-face, video</td>
<td>24 weeks</td>
<td>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)</td>
</tr>
<tr>
<td>Lyons et al., 2016</td>
<td>&quot;Exercising together&quot; 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.</td>
<td>Face-to-face</td>
<td>26 week course</td>
<td>Wives had significant increase in engagement in affectionate behaviours over time p&lt;0.001</td>
</tr>
<tr>
<td>Malcarne et al., 2018</td>
<td>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.</td>
<td>Face-to-face</td>
<td>6-8 sessions</td>
<td>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).</td>
</tr>
<tr>
<td>Manne et al., 2004</td>
<td>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</td>
<td>Face-to-face</td>
<td>6 week course</td>
<td>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</td>
</tr>
</tbody>
</table>
- Depression  
- Cancer-specific distress  
- Cancer-related concerns  
- Relationship satisfaction | Intimacy-enhancing therapy (IET) & General health and wellness intervention (GWH). Both consisted of five 90-min couples’ sessions and one 30–45 min booster call. IET 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. GWH 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 =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 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. |
<table>
<thead>
<tr>
<th>Northouse et al., 2007 [45]</th>
<th>Quality of life</th>
<th>Appraisal variables:</th>
<th>FOCUS: family based intervention focused on support and education. Has five core areas: Family involvement, Optimistic attitude, Coping effectiveness, Uncertainty reduction, and Symptom management</th>
<th>Face-to-face Telephone</th>
<th>8 week course</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Appraisals of illness/caregiving</td>
<td>Uncertainty</td>
<td>Hopelessness</td>
<td>Coping resource</td>
<td>Coping strategies</td>
</tr>
<tr>
<td></td>
<td>Spouses reported better physical QOL than controls at 8 months (p&lt;.05) and at 12 months (p&lt;.01), intervention spouses had better mental QOL scores (p&lt;.05) and overall QOL scores (p&lt;.01), Intervention spouses had significantly less negative appraisal of caregiving (p&lt;.01), significantly less uncertainty about the illness (p&lt;.01), and less hopelessness (p&lt;.05) than control spouses at 4 months higher self-efficacy about ways to manage the illness than control spouses at 4 months (p&lt;.05) and 12 months (p&lt;.05), better communication with patients than control spouses at 4 months (p&lt;.01), 8 months (p&lt;.05), and 12 months (p&lt;.01), used more active coping at 12 months than control spouses (p&lt;.05), significantly less general symptom distress of their own than control spouses (p&lt;.01) and had fewer problems related to their husbands’ urinary incontinence at 4 months (p&lt;.05) and at 8 months (p&lt;.01).</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 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: effect size for partners’ change scores was observed at 0.04, treatment group scoring lower ($M=−9.21$, $SD=24.80$) 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 demographic s  
- 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 |
<table>
<thead>
<tr>
<th>Function (female)</th>
<th>Intervention Description</th>
<th>Delivery Method</th>
<th>Course Duration</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>Face-to-face</td>
<td>4 week course</td>
<td>Females sexual functioning scores significantly improved overtime from baseline to 6 month follow up (p&lt;0.05). No impact on marital adjustment or distress.</td>
<td></td>
</tr>
<tr>
<td>Six weekly 1.5hr group Supportive Expressive Therapy (SET®) 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.</td>
<td>Group sessions (specific modality not identified)</td>
<td>6 week course</td>
<td>Regardless of group membership, partners reported improvements in total mood disturbance (p=.011), tension (p&lt;.001), anger (p=.041), confusion (p&lt;.001), state anxiety (p&lt;.001), and emotional support (p=.037)</td>
<td></td>
</tr>
<tr>
<td>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</td>
<td>Face-to-face</td>
<td>Single session</td>
<td>Partners had significant improvements in medical impact scores (p=0.008) sexual interest (p=0.008), problems (p&lt;0.01) and total sexual function (p=0.011) after the workshop</td>
<td></td>
</tr>
<tr>
<td>ProCan- so one-hour couples counselling sessions, one group and three individual PFMT® sessions, DVD of PFMT for home training plus standard care including preoperative information.</td>
<td>Face-to-face DVD</td>
<td>6 week course</td>
<td>On average female seal function increased from 15 to 21 from baseline to 12 month follow up.</td>
<td></td>
</tr>
</tbody>
</table>
| 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, 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) - 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.

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

<table>
<thead>
<tr>
<th>Authors</th>
<th>Intervention modality</th>
<th>Information</th>
<th>Support</th>
<th>Marital</th>
<th>Sexual</th>
<th>Psychological</th>
<th>Practical</th>
<th>Physical</th>
<th>Other</th>
<th>Number of supportive care needs</th>
<th>Tailored to carers</th>
<th>Only to carers</th>
<th>To dyads</th>
<th>Impact on outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Randomised Controlled Trials</strong></td>
<td></td>
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<tr>
<td>Borji et al., 2017 [31]</td>
<td>Face-to-face</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>1 Y&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>ü</td>
<td>ü</td>
<td>S&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Couper et al., 2015 [33]</td>
<td>Face-to-face</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>1 Y&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>ü</td>
<td>ü</td>
<td>S&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>Lyons et al., 2016 [34]</td>
<td>Face-to-face</td>
<td>ü</td>
<td>ü</td>
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<td>ü</td>
<td>ü</td>
<td>ü</td>
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<td>ü</td>
<td>ü</td>
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<tr>
<td>Manne et al. 2004 [35]</td>
<td>Face-to-face</td>
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<td>ü</td>
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<td>ü</td>
<td>ü</td>
<td>S&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Winters-Stone et al., 2016 [37]</td>
<td>Face-to-face</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>2 Y&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>ü</td>
<td>ü</td>
<td>S&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>Wittman et al., 2022 [51]</td>
<td>Online</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>1 Y&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>ü</td>
<td>ü</td>
<td>S&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>Badger et al., 2011 [48]</td>
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<td>1 Y&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>ü</td>
<td>ü</td>
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<td>ü</td>
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<td>ü</td>
<td>2 Y&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>ü</td>
<td>ü</td>
<td>E&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td>Chambers et al., 2015; 2019 [27, 28]</td>
<td>Combination</td>
<td>ü</td>
<td>ü</td>
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<td>ü</td>
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<tr>
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<td>ü</td>
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<td>ü</td>
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<td>ü</td>
<td>S&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>Karlsen et al., 2021</td>
<td>Combination</td>
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<td>ü</td>
<td>ü</td>
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<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>1 Y&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>S&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>[41] Malcarne et al., 2018 [39]</td>
<td>Combination</td>
<td>ü</td>
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<td></td>
<td>1</td>
<td>Y</td>
<td>ü</td>
<td>S</td>
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<tr>
<td>[44] McCaughan et al., 2018 [44]</td>
<td>Combination</td>
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<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>3</td>
<td>Y</td>
<td>ü</td>
<td>NS³</td>
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<td>[45] Northouse et al., 2007 [45]</td>
<td>Combination</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>ü</td>
<td>3</td>
<td>Y</td>
<td>ü</td>
<td>S</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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 | M⁶ |
| 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 |
| Y = yes, | N = no, | U = unsure, | S = significant impact on carers’ outcomes, | NS = no significant impact on carers’ outcomes, | E = effect sizes indicate positive change in carers’ outcomes, | M = moderator effect in carers’ outcomes. |