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## REVIEW PAPER

# Methodological exemplar of integrating quantitative and qualitative evidence – supportive care for men with prostate cancer: what are the most important components?

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HUNTLEY A.L., KING A.J.L., MOORE T.H.M., PATERSON C., PERSAD R., SHARP D. & EVANS M. (2017) Methodological exemplar of integrating quantitative and qualitative evidence – supportive care for men with prostate cancer: what are the most important components?. *Journal of Advanced Nursing* 73(1), 5–20. doi: 10.1111/jan.13082

## Abstract

**Aims.** To present a methodological exemplar of integrating findings from a quantitative and qualitative review on the same topic to provide insight into components of care that contribute to supportive care that is acceptable to men with prostate cancer.

**Background.** Men with prostate cancer are likely to live a long time with the disease, experience side effects from treatment and therefore have ongoing supportive care needs. Quantitative and qualitative reviews have been published but the findings have yet to be integrated.

**Design.** Integration of quantitative and qualitative synthesized evidence.

**Data source.** Two previously published systematic reviews.

**Review methods.** Synthesized evidence on supportive care for men with prostate cancer was integrated from two previously published systematic reviews: a narrative quantitative review and a qualitative review with thematic synthesis. These two streams of synthesized evidence were synthesized using concurrent narrative summary. Data from both reviews were used to develop a set of propositions from which a summary of components of care that likely to contribute to supportive care acceptable to men with prostate cancer were identified.

**Results.** Nine propositions were developed which covered men's supportive care focusing on the role of health professionals. These propositions were used to compose nine components of care likely to lead to supportive care that is acceptable to men with prostate cancer. Some of these components are no/low cost such as developing a more empathic personalized approach, but more specific approaches need further investigation in randomized controlled trials, for example, online support.

*continued on page 6*

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**Conclusion.** This methodological exemplar demonstrates the integration of quantitative and qualitative synthesized data to determine components of care likely to lead to provision of supportive care acceptable to men with prostate cancer.

**Keywords:** health professional, methodology, mixed-method, nursing, prostate cancer, supportive care, systematic review

#### Why is the methodological exemplar needed?

- Guidance on mixed-method synthesis of data is in its infancy; this exemplar helps advance the field.
- This exemplar illustrates the bringing together and presentation of quantitative and qualitative data with robust, reproducible methods.
- Mixed-method synthesis of data is important as it helps to present evidence from different sources in a way to influence clinical practice and policy.

#### What are the key findings?

- Feasibility of synthesizing qualitative and quantitative data with robust methodology.
- Urinary incontinence and erectile dysfunction as two of the most important issues for men.
- Timely education, information delivered in an emphatic manner is essential.
- Carer burden and involvement should be considered.
- Peer support is highly valued by men with prostate cancer.
- Appreciation of the home life and cultural background of men need to be considered.

#### How should the findings be used to influence policy/practice/research/education?

- Mixed-method synthesis is an ideal tool for presenting both quantitative and qualitative evidence in relevant way for influencing policy, practice, research and education.
- Patient-directed access to care especially specialist nurse care should be facilitated.
- High quality research into specific supportive care interventions is warranted, for example, online support.
- Health professionals need to adopt a more personalized approach.

## Background

Prostate cancer (PC) is the second most common cancer worldwide for men, with an estimated 900,000 new cases diagnosed annually (Ferlay *et al.* 2010). A large increase in incidence has been reported in recent years with much of this increase being attributed to increased prostate-specific antigen (PSA) testing (Hsing *et al.* 2000, Bray *et al.* 2010).

Men with PC are likely to have a long illness pathway with the greater part being supported by family, friends and family doctors. The National Cancer Institute defines the goal of supportive care for cancer patients as 'to prevent or treat as early as possible the symptoms of a disease, side effects caused by treatment of a disease and psychological, social and spiritual problems related to a disease or its treatment' (National Cancer Institute).

In a recent survey covering seven European countries and involving over 1000 men, 81% of the respondents had some unmet supportive care needs including psychological, sexual and health system and information needs (Cockle-Hearne *et al.* 2013).

We have recently completed a systematic review investigating the effectiveness of supportive care interventions for men with PC and a qualitative systematic review and thematic synthesis of men's experiences of and needs for supportive care (King *et al.* 2015, Moore *et al.* 2015). In using these qualitative data in combination with the quantitative data, this paper reports the first mixed-method synthesis of supportive care evidence for men with PC.

## The review

### Aim

To present a methodological exemplar of integrating findings from a quantitative and qualitative review on the same

topic to provide insight into components of care that contribute to supportive care that is acceptable to men with prostate cancer by combining data.

### Design

Two previous systematic reviews on supportive care for men with PC, one quantitative and one qualitative has enabled us to address the following objectives previously:

- To review the evidence for the effectiveness and cost effectiveness of supportive care interventions for men with PC.
- To review men's experiences of supportive care for PC.

In this current paper, these two streams of evidence have been synthesized to answer objective c) (Figure 1):

- To identify the components of care likely to lead to supportive care acceptable to men with PC.

### Source systematic review methodology

The two individual published systematic reviews describe the details of the methodology outlined below (King *et al.* 2015, Moore *et al.* 2015).

### Eligibility criteria

These criteria are presented in supplementary Appendix S1.

### Information sources and searches

Custom-designed parent search strategies which combined terms of PC, supportive care and study type were developed individually for the quantitative and qualitative review. All searches were from the inception of the database – July 2013. Details and dates of searches are in supplementary Appendix S2.

### Study selection

All titles and abstracts from the searches were screened using the eligibility criteria and any studies selected were obtained in full. The reference lists of all the included studies were screened for additional relevant papers and key authors were contacted about any unpublished studies.

### Data extraction

Data from quantitative studies were extracted on study details, participant characteristics, outcome measures and

results. Data extracted from qualitative studies were study details, participant characteristics and primary (participants) and secondary (authors) order quotes (constructs).

### Quality appraisal of included studies

Risk of bias of the quantitative studies was conducted using the Cochrane Collaboration's risk of bias tool (Higgins *et al.* 2011). Qualitative papers were appraised using the CASP qualitative checklist which comprises 10 questions relating to rigour, credibility and relevance of qualitative studies (Critical Appraisal Skills Programme (CASP) 2014). All the screening, data extraction and quality assessment of both reviews were conducted independently by two reviewers, disagreements were resolved by consensus and where necessary recourse to a third reviewer.

### Synthesis of results

#### *Quantitative studies*

While the plan was to perform a formal analysis, the clinical heterogeneity of the studies was too great for meta-analysis to be considered so a narrative synthesis was prepared.

#### *Qualitative studies*

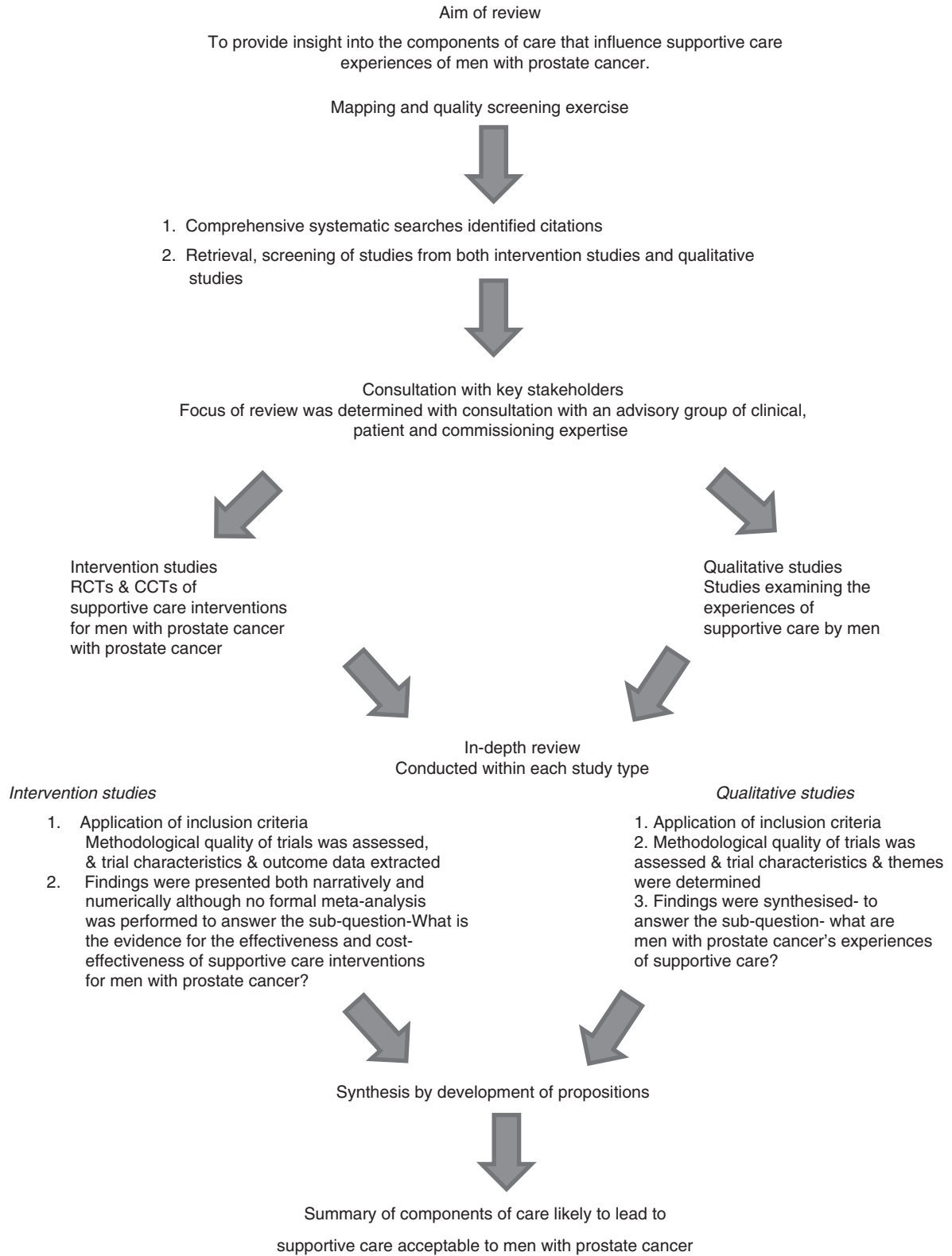
A thematic synthesis of the evidence was conducted, taking an interpretive approach, which combines and adapts approaches from both meta-ethnography and grounded theory. A thematic synthesis was conducted using primary and secondary constructs (Thomas *et al.* 2004) where 'descriptive themes' were drawn out of the data followed by the development of 'analytic themes'. A team of four researchers worked to identify and agree consensus on the naming of fourteen themes across the 20 papers. This process constituted the reciprocal translation of concepts across papers (Melendez-Torres *et al.* 2015). Following the identification of these 'descriptive themes', 'analytic themes' (overarching themes) were developed across papers.

### Reporting tools

The conduct of the quantitative review followed PRISMA guidelines and the qualitative review followed ENTREQ guidelines (Moher *et al.* 2009, Tong *et al.* 2012).

### Integration of quantitative and qualitative data

The robustness of the mixed-data systematic review methodology is still being examined and refined (Petticrew *et al.* 2013). However, there is agreement that complex



**Figure 1** Main steps in the mixed method review.

health questions addressed in systematic reviews need to be examined in a more complex way to ensure the outcomes are meaningful (Noyes *et al.* 2013). This review uses methodology described by Dixon-Woods *et al.* (2005). We have used the approach of narrative summary. In addition, we have informed our methods from previously published mixed-method reviews (Thomas *et al.* 2004, Lewis *et al.* 2010, Glenton *et al.* 2013, Puts *et al.* 2015).

Narrative summary is the selection, chronicling and ordering of evidence to produce an account of the evidence and can integrate quantitative and qualitative evidence through narrative juxtaposition (Dixon-Woods *et al.* 2005). We followed the example of the methods of Lewis (Lewis *et al.* 2010). Using the analysed data from both reviews, we developed a set of propositions to explore supportive care for men with PC. The propositions were ideas or statements derived from the initial data which have not necessarily been subjected to empirical research but are amenable to testing, for example, in a RCT. To ensure there was transparency as to which papers contributed to each of the propositions, a table was composed cross-referencing the propositions and the relevant original papers in a similar manner used by a previous mixed-method review (Puts *et al.* 2015).

In practice, the above methodology was applied by individual- and group-work. Initially, the four core systematic review authors (AH, AK, TM, MS) comprising of two quantitative and two qualitative researchers used the data from the two published systematic reviews to draft propositions individually, using both data sets. These mixed-data propositions were discussed as a group to reduce redundancy and to produce one set of propositions which were drafted by AH and recirculated. After individual consideration, the group met again to further refine the propositions. These were then circulated to all the co-authors of the paper.

The propositions and their supporting content were discussed and redrafted until all authors were in agreement. The propositions were then summarized by two authors (AK, AH) into a user-friendly format which describe the components of care likely to lead to supportive care provision acceptable to men with PC (Lewis *et al.* 2010). This summary was also circulated to co-authors until a consensus on the content was agreed. In the absence of a mixed-method reporting tool, the Mixed Methods Appraisal Tool (MMAT) while not applied formally was used to help the authors to ensure clarity and accurate reporting (Pluye *et al.* 2011).

## Results

In the quantitative review, 34 papers were identified that described 25 randomized controlled trials and one

controlled trial and included 2740 participants (Supplementary Appendix S3) (Johnson *et al.* 1988, 1989, Johnson 1996, Lepore & Helgeson 1999, Kim *et al.* 2002, Mishel *et al.* 2002, 2003, Yung *et al.* 2002, Berglund *et al.* 2003, 2007, Lepore *et al.* 2003, Bailey *et al.* 2004, Carmack Taylor *et al.* 2004, 2006, 2007, Penedo *et al.* 2004, 2006, Scura *et al.* 2004, Templeton & Coates 2004, Weber *et al.* 2004, 2007, Giesler *et al.* 2005, Helgeson *et al.* 2006, Campbell *et al.* 2007, Northouse *et al.* 2007, Molton *et al.* 2008, Parker *et al.* 2009, Loisele *et al.* 2010, Beard *et al.* 2011, Cohen *et al.* 2011, Manne *et al.* 2011, Gilts *et al.* 2013, Traeger *et al.* 2013, Walker *et al.* 2013).

In the qualitative review, 20 papers describing 20 unique studies were included in the synthesis (Supplementary Appendix S3) (Matsunaga & Gotay Cook 2004, Boehmer & Babayan 2005, Broom 2005, Wallace & Storms 2007, Milne *et al.* 2008, Tarrant *et al.* 2008, Nanton *et al.* 2009, Oliffe *et al.* 2009, Ream *et al.* 2009, Ervik *et al.* 2010, O'Brien *et al.* 2010, 2011, Walsh & Hegarty 2010, Carter *et al.* 2011, Nanton & Dale 2011, Chambers *et al.* 2012, Galbraith *et al.* 2012, Rivers *et al.* 2012, O'Shaughnessy *et al.* 2013 Thomas 2013). No mixed-method studies were found (Appendix S3).

### Systematic review of quantitative (intervention studies) (Supplementary Appendix S4)

Overall there was a lack of evidence of effectiveness or cost effectiveness from the quantitative studies. The majority of trials measuring quality of life (15/22 trials) and depression (11/14 trials) found no effect. Relatively few trials measured anxiety, coping skills and self-efficacy and most of them found no effect (0/3, 2/4, 3/4 trials respectively). No cost data were available. Overall trials were rated unclear for risk of bias. Interventions were delivered before and during primary treatment, short term after primary treatment (within 6 months) and in the longer term post primary treatment. Intervention components included information, education, health professional discussion, homework, peer discussion, formal buddy support, cognitive behavioural therapy, cognitive restructuring, psychoeducation, reiki and relaxation. Most interventions were given for 5–10 weeks.

### Synthesis of qualitative studies (Supplementary Appendix S5)

Most qualitative studies were predominantly about men's experiences of (supportive) care but we also included studies which were more generally about men's experiences but only used the proportion of the study focusing on

(supportive) care. All qualitative studies were of high quality as assessed by CASP checklist (CASP 2014). The thematic synthesis drew out eight descriptive themes from the data: peer support, support from partner, online support, cancer specialist nurse support, self-care, communication with health professionals, unmet needs (emotional support, information needs, support for treatment induced side effects of incontinence and erectile dysfunction) and men's suggestions for improved delivery of supportive care.

### Synthesis of mixed data from both quantitative and qualitative studies (Table 1)

Nine propositions (P1–9) were developed across the studies. Seven were formed from both the quantitative and qualitative data and two from the qualitative data only (P5 and 8). Most of the propositions (P1–7) were based both on current evidence and the acknowledgement that further research is needed, P8 was based on current evidence and P9 acknowledged that further research is needed:

P1: The 'care burden' on partners or trusted others in providing emotional support and help with information seeking, provision and interpretation should be acknowledged by health professionals when talking to patients and incorporated into care planning.

This proposition was based on data by the qualitative review as the studies are the principal vehicle for integration. Nine qualitative studies described wives, partners, friends and families as significant sources of support and some of these also highlighted the additional need for spouses to receive support (Matsunaga & Gotay Cook 2004, Boehmer & Babayan 2005, Milne *et al.* 2008, Ervik *et al.* 2010, Nanton & Dale 2011, O'Brien *et al.* 2011, Rivers *et al.* 2012, O'Shaughnessy *et al.* 2013, Thomas 2013). In light of this, it is disappointing that just seven of the 26 intervention studies were delivered to couples with only two of these reporting outcomes specific to partners or spouses (Lepore & Helgeson 1999, Lepore *et al.* 2003, Giesler *et al.* 2005, Campbell *et al.* 2007, Northouse *et al.* 2007, Manne *et al.* 2011 Walker *et al.* 2013).

In the Northouse trial of supportive educative intervention, spouses reported higher quality of life, more self-efficacy, better communication and less negative appraisal of caregiving, uncertainty, hopelessness and symptom distress at 4 months compared with controls and some effects were sustained to 8 months and 12 months (Northouse *et al.* 2007). In the intimacy-enhancing psychological intervention trial by Manne, partners beginning the intervention with higher cancer specific distress, lower marital satisfaction,

lower intimacy and poorer communication, the intervention improved these outcomes (Manne *et al.* 2011):

P2: Men strongly express the need for information following diagnosis and prior to any treatment but may have difficulty in absorbing facts at this time and so there is a need for reinforcement. Information, educational and stress-management interventions will benefit men with PC around this time and in the short-term preceding primary treatment.

This proposition was based on data from both the quantitative and qualitative review.

In many of the qualitative papers, men reported receiving information about PC and its treatment from a variety of sources including oncologists, urologists, nurses, GPs, cancer charities, the Internet, friends and family members (Boehmer & Babayan 2005, Wallace & Storms 2007, Milne *et al.* 2008, Nanton *et al.* 2009, Ervik *et al.* 2010, Walsh & Hegarty 2010, Carter *et al.* 2011 Nanton & Dale 2011, Rivers *et al.* 2012).

Some data describe patients' difficulties in talking to health professionals about important issues early on postdiagnosis (Wallace & Storms 2007, Nanton *et al.* 2009, Walsh & Hegarty 2010). Men said that doctors did not give them enough information about treatment options and assumed they understood more than they really did. Many of the interventions described in the trials that were delivered around the time of treatment and in the preceding 6 months involved education and information components (Johnson *et al.* 1988, Johnson 1996, Lepore & Helgeson 1999, Kim *et al.* 2002, Mishel *et al.* 2002, Yung *et al.* 2002, Berglund *et al.* 2003, Lepore *et al.* 2003, Bailey *et al.* 2004, Penedo *et al.* 2004, 2006, Scura *et al.* 2004, Templeton & Coates 2004, Weber *et al.* 2004, 2007, Giesler *et al.* 2005, Carmack Taylor *et al.* 2006, Campbell *et al.* 2007, Northouse *et al.* 2007, Molton *et al.* 2008, Parker *et al.* 2009, Loiselle *et al.* 2010, Beard *et al.* 2011, Manne *et al.* 2011, Traeger *et al.* 2013, Walker *et al.* 2013).

In addition, interventions delivered around the time of primary treatment included approaches such as relaxation and acute coping skills components. Twenty-two of the 26 trials measured QoL with only eight reporting an improvement in QoL in the intervention group compared with the control group (Lepore & Helgeson 1999, Lepore *et al.* 2003, Bailey *et al.* 2004, Weber *et al.* 2004, 2007, Giesler *et al.* 2005, Parker *et al.* 2009).

Fourteen of the 26 trials used depressive symptoms as an outcome and three trials measured anxiety. In the 14 trials, only three showed an improvement in the intervention group compared with the control group (Weber *et al.* 2004, 2007, Parker *et al.* 2009). There were no trials that showed

**Table 1** Propositions derived from both the quantitative and qualitative data correlated with the individual papers.

Proposition	Qualitative (20 studies)	Quantitative studies (26 studies)
P1: The 'care burden' on partners or trusted others in providing emotional support and help with information seeking, provision and interpretation should be acknowledged by health professionals when talking to patients and incorporated into care planning.	Trusted other/partner support Matsunaga and Gotay Cook (2004) Boehmer and Babayan (2005) Milne <i>et al.</i> (2008) Ervik <i>et al.</i> (2010) Nanton and Dale (2011) O'Brien <i>et al.</i> (2011) O'Shaughnessy <i>et al.</i> (2013) Rivers <i>et al.</i> (2012) Thomas (2013)	Interventions delivered to couples Walker <i>et al.</i> (2013) Giesler <i>et al.</i> (2005) Lepore & Helgeson 1999) Lepore <i>et al.</i> (2003) Manne <i>et al.</i> (2011) Campbell <i>et al.</i> (2007) Northouse <i>et al.</i> (2007)
P2: Men strongly express the need for information following diagnosis and prior to any treatment but may have difficulty in absorbing facts at this time and so there is a need for reinforcement. Information, educational and stress-management interventions will benefit men with prostate cancer around this time and in the short-term preceding primary treatment.	Men's experience of information Boehmer and Babayan (2005) Wallace and Storms (2007) Milne <i>et al.</i> (2008) Nanton <i>et al.</i> (2009) Ervik <i>et al.</i> (2010) Walsh and Hegarty (2010) Carter <i>et al.</i> (2011) Nanton and Dale (2011) Rivers <i>et al.</i> (2012)	Trials involving information and or education Beard <i>et al.</i> (2011) Carmack Taylor <i>et al.</i> (2006) Johnson <i>et al.</i> (1988) Johnson (1996) Kim <i>et al.</i> (2002) Loiselle <i>et al.</i> (2010) Mishel <i>et al.</i> (2002) Parker <i>et al.</i> (2009) Templeton and Coates (2004) Scura <i>et al.</i> (2004) Walker <i>et al.</i> (2013) Bailey <i>et al.</i> (2004) Berglund <i>et al.</i> (2003) Giesler <i>et al.</i> (2005) Lepore and Helgeson (1999) Lepore <i>et al.</i> (2003) Manne <i>et al.</i> (2011) Campbell <i>et al.</i> (2007) Molton <i>et al.</i> (2008) Penedo <i>et al.</i> (2004) Penedo <i>et al.</i> (2006) Traeger <i>et al.</i> (2013) Northouse <i>et al.</i> (2007) Specific therapeutic approaches to support around time of treatment. Beard <i>et al.</i> (2011) Carmack Taylor <i>et al.</i> (2006) Mishel <i>et al.</i> (2002) Parker <i>et al.</i> (2009) Scura <i>et al.</i> (2004) Yung <i>et al.</i> (2002)
P3: Healthcare providers need to be aware that men with prostate cancer may have different preferences regarding delivery of support, for example, face-to-face contact, by Internet, by telephone.	Internet support Broom (2005)	Interventions delivered exclusively by telephone Mishel <i>et al.</i> (2002) Parker <i>et al.</i> (2009) Bailey <i>et al.</i> (2004) Campbell <i>et al.</i> (2007) Provision of CD-ROM & list of reputable prostate cancer information websites Loiselle <i>et al.</i> (2010)



**Table 1** (Continued).

Proposition	Qualitative (20 studies)	Quantitative studies (26 studies)
P4: There is need for realistic appraisal and discussion of potential side effects with patients as part of the health professional-patient communication prior to treatment, especially concerning erectile dysfunction and urinary incontinence.	Lack of communication about side effects Broom (2005) Ream <i>et al.</i> (2009) Ervik <i>et al.</i> (2010) Galbraith <i>et al.</i> (2012) Thomas (2013) Need for information and practical support on side effects Walsh and Hegarty (2010) Milne <i>et al.</i> (2008) Carter <i>et al.</i> (2011) Nanton and Dale (2011) O'Brien <i>et al.</i> (2011) Thomas (2013)	Trials measuring prostate cancer QoL Parker <i>et al.</i> (2009) Templeton and Coates (2004) Giesler <i>et al.</i> (2005) Manne <i>et al.</i> (2011) Weber <i>et al.</i> (2004) Weber <i>et al.</i> (2007) Molton <i>et al.</i> (2008) Northouse <i>et al.</i> (2007)
P5: Some men need referral to psychological support which may also include specialist psychosexual support.	Men's experience of psychological needs & support Wallace and Storms (2007) Ervik <i>et al.</i> (2010) Carter <i>et al.</i> (2011)	Psychological components (majority of studies) Trials focusing on psychosexual support Walker <i>et al.</i> (2013) Molton <i>et al.</i> (2008)
P6: Men need individual and flexible access to a specialist nurse. If supportive care is of an appropriate duration and intensity that matches men's needs it will maximize its potential effectiveness.	Men's relationship with specialist nurses Tarrant <i>et al.</i> (2008) Ream <i>et al.</i> (2009)	Interventions delivered by nurses Beard <i>et al.</i> (2011) Mishel <i>et al.</i> (2002) Templeton and Coates (2004) Bailey <i>et al.</i> (2004) Berglund <i>et al.</i> (2003) Giesler <i>et al.</i> (2005) Northouse <i>et al.</i> (2007)
P7: Men value the opportunity to talk to other men about their experiences of living with prostate cancer and may need signposting to peer support.	Men's experiences of peer support Matsunaga and Gotay Cook (2004) Walsh and Hegarty (2010) Broom (2005) Wallace and Storms (2007) Milne <i>et al.</i> (2008) Ream <i>et al.</i> (2009) Nanton <i>et al.</i> (2009) Ervik <i>et al.</i> (2010) O'Brien <i>et al.</i> (2010) Carter <i>et al.</i> (2011) Nanton and Dale (2011) Chambers <i>et al.</i> (2012) Galbraith <i>et al.</i> (2012)	Trials with components of peer support. Parker <i>et al.</i> (2009) Lepore and Helgeson (1999) Lepore <i>et al.</i> (2003) Weber <i>et al.</i> (2004) Weber <i>et al.</i> (2007) Molton <i>et al.</i> (2008) Penedo <i>et al.</i> (2004) Penedo <i>et al.</i> (2006) Traeger <i>et al.</i> (2013)
P8: Men experience some health professionals particularly consultants as showing a lack of understanding of the emotional impact of prostate cancer. There is a need for a more empathetic, personalized approach.	Lack of understanding & empathy by health professionals Matsunaga and Gotay Cook (2004) Boehmer and Babayan (2005) Olliffe <i>et al.</i> (2009) O'Brien <i>et al.</i> (2010) Thomas (2013) Differences between different health professionals Galbraith <i>et al.</i> (2012) Thomas (2013)	No relevant studies

Table 1 (Continued).

Proposition	Qualitative (20 studies)	Quantitative studies (26 studies)
P9: Health professionals need to more fully understand the potential different needs of men without partners or trusted others, men in same sex relationships and men from different ethnic backgrounds.	Partnered men /not stated (majority of studies) Ethnic minority men Boehmer and Babayan (2005) Matsunaga and Gotay Cook (2004) Nanton and Dale (2011) Thomas (2013) Rivers <i>et al.</i> (2012) Ream <i>et al.</i> (2009) Wallace and Storms (2007) Gay/bisexual men Thomas (2013)	Partnered men /not stated (majority of studies) Ethnic minority men Mishel <i>et al.</i> (2002) Scura <i>et al.</i> (2004) Campbell <i>et al.</i> (2007) Molton <i>et al.</i> (2008) Penedo <i>et al.</i> (2004) Penedo <i>et al.</i> (2006) Traeger <i>et al.</i> (2013) Northouse <i>et al.</i> (2007)

a positive intervention effect on anxiety. A forest plot of standardized mean differences indicated that although many of the studies found no effect on depressive symptoms, mood or anxiety and the confidence intervals were generally wide they are tending towards a positive effect:

P3: Healthcare providers need to be aware that men with PC may have different preferences regarding delivery of support, for example, face-to-face contact, by Internet, by telephone.

This proposition was based on data from both the quantitative and qualitative review.

The studies predominantly described face-to-face interaction with both health professionals and peers. However, several of the qualitative studies reported that the Internet was a source of information, with some men citing that online contact reduced their inhibition to talk about PC (Broom 2005, Carter *et al.* 2011). There were no Internet-based interventions in the quantitative review although one intervention which reduced anxiety for men during the study period comprised of an informational CD-ROM and a list of reputable PC support websites (Loiselle *et al.* 2010). Numerous intervention studies used the telephone as a mode of providing ongoing support, with four interventions being exclusively delivered by telephone (Mishel *et al.* 2002, Campbell *et al.* 2007, Parker *et al.* 2009). Of these four interventions, only one study aimed at reducing uncertainty showed an improvement in quality of life for men (Bailey *et al.* 2004):

P4: There is a need for realistic appraisal and discussion of potential side effects with patients as part of the health professional-patient communication prior to treatment, especially concerning erectile dysfunction and urinary incontinence.

This proposition was based on data from both the quantitative and qualitative review.

In the qualitative studies, men reported poor communication about side effects of their treatment, their severity and duration, so that they felt unclear about what to expect (Broom 2005, Ream *et al.* 2009, Ervik *et al.* 2010, Galbraith *et al.* 2012, Thomas 2013). Men in several studies expressed a need for information on side effects, as well as practical support (Milne *et al.* 2008, Walsh & Hegarty 2010, Carter *et al.* 2011, Nanton & Dale 2011, O'Brien *et al.* 2011, Thomas 2013).

PC-specific QoL measures capture the important impact of urinary and sexual dysfunction which many men with PC experience. Many of the intervention trials used a general or cancer quality-of-life instrument to measure the quality of life of men with the majority using measure, but fewer used a PC-specific scale (Manne *et al.* 2011, Templeton & Coates 2004, Weber *et al.* 2004, 2007, Giesler *et al.* 2005, Northouse *et al.* 2007, Molton *et al.* 2008, Parker *et al.* 2009).

There was some evidence from individual trials to suggest a positive effect of supportive care on men's urinary and sexual functioning:

P5: Some men need referral to psychological support which may also include specialist psychosexual support.

This proposition was based on data from the qualitative review as the studies are the principal vehicle for integration.

Several of the qualitative papers highlighted the need for emotional and psychological support for treatment side effects (Wallace & Storms 2007, Ervik *et al.* 2010, Carter *et al.* 2011). These papers proposed that assessment of psychosexual needs should take place throughout the follow-up period, not only at the time of initial treatment. Many of the interventions in the trials included components of

psychological support and psycho-education but only two trials specifically addressed physical relationships between men and their partners (Molton *et al.* 2008 Walker *et al.* 2013). These two trials did not yield any positive outcomes for the couples:

P6: Men need individual and flexible access to a specialist nurse according to their needs. If supportive care is of an appropriate duration and intensity that matches men's needs it will maximize its potential effectiveness.

This proposition was based on data from both the quantitative and qualitative review.

Men's experiences of care from a cancer specialist nurse were described almost entirely as a positive experience (Tarrant *et al.* 2008, Ream *et al.* 2009). This relationship enabled them to discuss the non-medical aspects of their illness. The role of the specialist nurse in ongoing and long-term care was valued as was the fact that contact could be initiated by men. The interventions investigated in the trials were all delivered within 2 years of primary treatment. The majority of interventions were delivered or facilitated by health professionals with seven of the interventions being exclusively delivered by nurses although not all were specified as urology/specialist nurses (Mishel *et al.* 2002, Berglund *et al.* 2003, Bailey *et al.* 2004, Templeton & Coates 2004, Giesler *et al.* 2005, Northouse *et al.* 2007, Beard *et al.* 2011).

Most of the interventions were short in duration and intensity lasting between 5 and 10 weeks with weekly meetings of 1–2 hours. Men's supportive care needs continue throughout their lives and therefore we need more studies conducted that focus on the longer term care of men to determine which approaches are likely to be most effective:

P7: Men value the opportunity to talk to other men about their experiences of living with PC and may need signposting to peer support.

This proposition was based on data from both the quantitative and qualitative review.

The qualitative studies highlighted the importance of peer support. Peer support took different forms: support groups led by peers or by health professionals and one-to-one peer support. Some men in the qualitative review described being proactive in accessing this support in patients' friendship networks, families, work colleagues, church group or leisure clubs although some studies described referral or signposting by health professionals (Matsunaga & Gotay Cook 2004, Broom 2005, Wallace & Storms 2007, Milne *et al.* 2008, Nanton *et al.* 2009, Ream *et al.* 2009, Ervik *et al.* 2010, O'Brien *et al.* 2010, Walsh & Hegarty 2010, Carter *et al.* 2011, Nanton & Dale 2011, Chambers *et al.* 2012, Galbraith *et al.* 2012).

Some of the interventions delivered following primary treatment in randomized controlled trials often comprised peer support components (Lepore & Helgeson 1999, Lepore *et al.* 2003, Penedo *et al.* 2004, 2006, Weber *et al.* 2004, 2007, Molton *et al.* 2008, Parker *et al.* 2009 Traeger *et al.* 2013).

Most peer support interventions were delivered in discussion groups for which there was limited data. Lepore 1999 reported that a psycho-educational support group with peer discussion had improved mental health scores compared with controls two weeks post intervention. Two RCTs by Weber (pilot and main trial) investigated one-to-one support (Weber *et al.* 2004, 2007). The pilot trial showed significant improvement in depressive symptoms at four weeks with the intervention compared with controls (Weber *et al.* 2004). In the full trial, the intervention group had significantly lower depressive symptoms at eight weeks compared with controls:

P8: Men experience some health professionals particularly consultants as showing a lack of understanding of the emotional impact of PC. There is a need for a more empathetic, personalized approach.

This proposition was based on data from the qualitative review as the studies are the principal vehicle for integration. The qualitative studies described men feeling that there was a lack of understanding by health professionals in both primary and secondary care of the emotional impact of PC particularly in the longer term (Matsunaga & Gotay Cook 2004, Boehmer & Babayan 2005, Oliffe *et al.* 2009, O'Brien *et al.* 2010, Thomas 2013). Men said that there was a lack of empathy shown by health professionals, leaving them feeling depersonalized. Some of the qualitative studies suggest that participants perceived specialist nurses and GPs to be more empathetic than urologists (Galbraith *et al.* 2012, Thomas 2013):

P9: Health professionals need to more fully understand the potential different needs of men without partners or trusted others, men in same sex relationships and men from different ethnic backgrounds.

This proposition was based on data from both quantitative and qualitative review. The majority of the studies were limited in their patient groups with few studies recruiting ethnic minorities, younger, un-partnered men or men in same sex relationships. Only a third of the studies in the mixed-method review included men from ethnic minorities and one qualitative study addressed the supportive care needs of men in same sex relationships (Thomas 2013). Men with different ethnic and or socio-demographic backgrounds are likely to have different supportive care

needs. Appropriate tailoring of interventions is not possible without evidence from studies including or focusing on these groups of men.

### Summary of components of care are likely to contribute to supportive care acceptable to men with PC (Table 2)

The above propositions based on patient experiences and trial data were used to produce a list of nine care components probably to lead to supportive care acceptable to men with PC with health professionals in mind. These criteria cover components of supportive care for men with PC which can be influenced by health professionals either by providing the care or signposting to alternative care or support services.

## Discussion

To the best of our knowledge, this is the first mixed-data synthesis investigating supportive care for men with PC. Propositions were developed by applying the emerging methodology for integration of quantitative and qualitative data. From these propositions, care components were identified that are likely to contribute to acceptable supportive care for men with PC either provided or signposted to by health professionals.

While there was evidence about carer involvement in this synthesis, there appeared to be little appreciation of carer burden. A recent study of spouses of PC survivors showed that they continued to experience negative appraisal of

caregiving, which affected their quality of life at 36 months after their husband's initial treatment (Harden *et al.* 2013). Our current synthesis supports the need for focus on caregiver burden in the future.

While it was not possible to determine the unique contribution of education in the multi-component interventions, the qualitative studies made it clear that sufficient and timely information and education was needed by men. Most of the studies described face-to-face interaction with health professionals; however, evidence from survey data supports our data that some men prefer to access information and be educated via online sources (Børø-sund *et al.* 2013). Different demographic factors such as age, education, income, time after treatment, degrees of distress and social support are likely to influence this preference (Børø-sund *et al.* 2013, Jansen *et al.* 2014). Our data suggested that telephone-only support was not helpful to men with PC and a more recent telephone-based study targeted at couples also failed to improve sexual relationship outcomes (Chambers *et al.* 2014).

Targeted information provision to cancer patients suggests that information priorities were related to prognosis, diagnosis and treatment options and that being able to prioritize the most-needed information can make patient encounters more meaningful and useful (Tariman *et al.* 2014). Our current synthesis supports this, with evidence from men that the most important side effects of erectile dysfunction and urinary incontinence were not discussed sufficiently prior to treatment. The qualitative studies suggest that there are few referrals to psychological and psychosexual services for men with PC and few of the intervention studies addressed these needs. This provision is, however, likely to be influenced by local availability of such services.

The criticism of health professionals was a lack of empathy and the need for them to take the initiative in opening up to a realistic discussion of potential side effects particularly in relation to erectile dysfunction and urinary incontinence. The qualitative data also suggest that continuity of care plays a role in this (Carter *et al.* 2011). The benefit of shared care between secondary and primary care to maintain continuity of care of cancer patients is realized (Cooper *et al.* 2010 Lund *et al.* 2013).

Formal psychosocial support was mostly provided by nurses and studies suggest this is appreciated. However, most men appear not to receive this care in the longer term. In a 2014 evaluation study of a follow-up assessment after radical treatment for PC, the majority of patients said that it was important to have easy face-to-face access with specialist nurses and doctors and that this should happen every 6 months (Cockle-Hearne *et al.* 2013).

**Table 2** Components of care likely to contribute to effective supportive care for men with prostate cancer.

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Health professionals need to provide empathic, personalized care
Continuity of care is likely to enhance men's care by building rapport
Health professionals need to appreciate men background and relationship status
Health professionals need to acknowledge the 'care burden' on partners/significant others and provide access to support
Patients need timely and accurate information to help manage daily living impacted by treatment side effects. This information might need to be repeated more than once
Patients need access to timely and appropriate supportive care to help manage daily living impacted by treatment side effects
Patients need to be able to access to cancer specialist nurses throughout the care pathway: on diagnosis, during treatment decision-making and post-treatment to support patients' treatment side effects
Patients may need referral to local peer support groups
Patients may need access to psychological and psycho-sexual support

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This synthesis suggests that the most important element of informal support is peer support. While the intervention studies might suggest this can be facilitated by health professionals, the qualitative studies suggest a more informal, organic process of peer support is optimum. However, it is possible that men prefer speaking to their peers as such support is not forthcoming from health professionals.

This synthesis highlights that supportive care is unlikely to have been tailored to men's domestic, cultural and socioeconomic background. There is some evidence in the literature suggesting that there are moves to reach out to different ethnic groups and patients with lower literacy skills (Odedina *et al.* 2014, Wang *et al.* 2015). While there is the acknowledgement that care and advice for gay men needs to be appropriate, this support is still lacking (Hart *et al.* 2014). A recent study suggests that unmarried status is an independent predictor of PC-specific mortality and overall mortality in men with PC (Tyson *et al.* 2013). It is therefore important that healthcare professionals are aware of the partnership status of their patients and are aware that un-partnered men may need extra support.

### Strengths

The strengths of this paper are that the individual systematic reviews were conducted to rigorous standards. By integrating quantitative and qualitative data on supportive care for men with PC it presents a comprehensive and robust view of the topic and provides practical and research recommendations. The resultant synthesis draws on recent examples of approaches to mixed-method synthesis and thus reinforces the potential utility of this emerging methodology. In the absence of a reporting tool for mixed-method papers we used the MMAT tool of appraisal but acknowledge that this is not adequate, but uses the best methods available to date. We have provided the details of both the synthesis methods and the actual process we took as a research team as we have felt this has been lacking in previous mixed-method papers.

### Limitations

While we have been meticulous in the description of our integration of mixed data, the narrative summary approach we have used is an informal process and it is possible the data could be interpreted in a different way by different authors (Dixon-Woods *et al.* 2005). The use of propositions in this type of review is relatively novel. To ensure transparency as to which papers were contributing to the propositions, we composed a table with this detail; however, this

was not a formal content analysis. Content analysis is a more robust approach with established use and would apply frequencies and thus weighting as to the contribution of individual studies. This, we believe, could be a useful tool in mixed-method synthesis, although it can be criticized for its reductive nature and its tendency to diminish complexity and context (Dixon-Woods *et al.* 2005). However, both the supporting text for the propositions and the individually published quantitative and qualitative systematic reviews counteract this effect to a greater extent.

### Summary and recommendations

Men with PC are likely to live for a long time with the disease, experience side effects from treatment and therefore have ongoing supportive care needs. The results of this mixed-method synthesis has produced components of care likely to lead to supportive care acceptable for men with PC specially aimed at health professional provision. Some of these factors are cost free (empathic approach) and low cost (ensuring information is understood) but more specific approaches which may have costs associated with them still need further investigation in randomized controlled trials.

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### Conflict of interest

No conflict of interest has been declared by the author(s).

### Author contributions

All authors have agreed on the final version and meet at least one of the following criteria [recommended by the ICMJE (<http://www.icmje.org/recommendations/>)]:

- substantial contributions to conception and design, acquisition of data or analysis and interpretation of data;
- drafting the article or revising it critically for important intellectual content.

## Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site.

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