

REVIEW

A systematic review of the effectiveness of problem-solving approaches towards symptom management in cancer care

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Aims. To investigate the evidence of problem-solving approach interventions on symptom management in cancer care.

Background. Symptom-related problems are a common challenge in cancer care. The problem-solving approach is one strategy of cognitive behavioural therapy used to help patients with cancer self-manage their symptoms. However, no systematic review has investigated the effectiveness of this approach.

Design. Systematic review.

Method. A systematic search for intervention studies using randomised controlled designs, controlled clinical trial and quasi-experimental studies designs was conducted using the following electronic databases: EBSCO host, CINAHL (1991–2008), Medline (1975–2009), Electronic Periodical Services (Chinese) and Electronic Theses and Dissertations System (Taiwan).

Results. Seven studies published in English between 1975–2009 were included in this systematic review. All studies were randomly assigned and almost all studies demonstrated the positive effects of a problem-solving approach in reducing symptomatic problems in the target participants. Varying protocols and qualities of methodological design (14% good, 43% fair and 43% poor) were found in this review.

Conclusions. This systematic review highlighted the potential of a problem-solving approach in the management of symptom problems in patients with cancer. However, more rigorous studies are needed and a better evaluation of the most effective problem-solving approach protocols is required.

Relevance to clinical practice. Cancer care nurses should explore the use of problem-solving approach interventions in their practice as the evidence base suggests the value of this approach – but caution is needed in regard to the precise structure of the problem-solving approach protocol.

Key words: cancer, nurses, nursing, problem-solving approach, symptom management, systematic review

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Introduction

Cancer is one of the most life-threatening diseases in the world (World Health Organization 2009) and also a disease process that presents patients and health professionals with

significant symptom management challenges (Cooley *et al.* 2003, Burkett & Cleeland 2007, Given *et al.* 2007, Leak *et al.* 2008). Symptomatic problems in cancer vary extensively but often include pain, fatigue, insomnia, constipation or nausea (Breen *et al.* 2009) all of which can have a

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significant impact on a cancer patient's quality of life (Watson *et al.* 1987, Yan & Sellick 2004, Leak *et al.* 2008, Bird & Hayter 2009). Therefore, approaches to help patients effectively manage cancer symptoms form an important element of cancer care.

The problem-solving approach (PSA) is a combined learning process, coping strategy and self-management method for defining and solving problematic phenomena successfully (D'Zurilla & Nezu 1999). It is an approach that has been studied in relation to various disease processes, for example, in stroke (Grant *et al.* 2001), traumatic brain injury (Rivera *et al.* 2008) and depression (Akechi *et al.* 2008, Gellis & Kenaley 2008). In cancer care, there have been several studies that have explored the use of a PSA in relation to symptom management (Toseland *et al.* 1995, Bucher *et al.* 2001, Allen *et al.* 2002, Cameron *et al.* 2004). However, there has been no systematic appraisal of this body of literature to allow practitioners to evaluate the evidence base of this aspect of cancer care. Consequently, this systematic review aims to evaluate the evidence for the effectiveness of PSA-based interventions on symptom management in cancer care.

Background

The goal of symptom management is to prevent or treat the symptoms of a disease, address the side effects caused by the treatment of a disease and reduce any psychological, social and spiritual problems related to the disease as early as possible (National Cancer Institute 2009). According to Rhodes *et al.* (1998), the 'symptom experience' includes the frequency, intensity (severity) and persistence of symptoms. Symptom distress is defined as 'the degree or amount of physical or mental upset, anguish or suffering experienced from a specific symptom' (Rhodes *et al.* 1998). There are many studies that describe symptomatic problems in cancer, either from the perspective of symptom intensity or severity (Sherwood *et al.* 2005, McMillan & Small 2007), symptom distress (McMillan & Small 2007) and the impact of symptomatic problems on patients' daily function (Doorenbos *et al.* 2005, 2006).

Problem-solving approach

The PSA is based on a cognitive behavioural approach by which individuals attempt to identify stressful issues or events and develop positive behavioural changes through enhanced self-efficacy (D'Zurilla & Nezu 1999). The problem-solving model consists of two major processes: problem orientation and problem-solving style. In problem orientation the first step is to re-orientate a person thoughts and

feelings towards a problem (for example a symptom) and develop a sense of positivism by framing the problem as a 'challenge'. This re-framing challenges negative problem orientation that may exacerbate any symptoms by increasing worry, frustration and uncertainty (McCann 1983, D'Zurilla & Nezu 1999).

Once this has been achieved, the second process in the PSA involves the application of four problem-solving skills (problem definition and formulation, generation of alternative solutions, decision-making and solution implementation and verification) the purpose being is to help the patient find out the best or the most effective solution for a particular problem. The health professional's role in this is to help patients identify and appraise their problems, then, work in partnership to construct problem-solving strategies to enhance the patient's ability to cope with, or decrease the negative impact of, any particular problem (McCann 1983, D'Zurilla & Nezu 1999). Practitioners, therefore, work through the four problem-solving stages and help the patient to develop skills to first identify symptomatic problems, develop a positive sense of their management, agree courses of action and set goals, finally evaluating the effectiveness of the process.

Aim of the review

The specific aims of this review are to explore:

- 1 Can a PSA improve symptom management in cancer patients?
- 2 What is methodological quality of the studies evaluating the effectiveness of the PSA in cancer care?

Summary of the search and selection strategy

Inclusion criteria

Inclusion criteria were determined on the basis of the four categories of inclusion suggested by the Joanna Briggs Institute (2008).

Types of participants

The study participants were limited to adults (≥ 18 years) who were diagnosed with cancer – irrespective of features such as gender, race, nationality, religion, education level, occupation and location.

Types of interventions

A PSA was the principle intervention. For this element of the review PSA interventions entitled 'problem-solving therapy', 'problem-solving treatment', 'problem-solving

intervention', 'social problem solving' and 'problem solving' training were included.

Types of outcome measures

Symptom occurrence (frequency or number, intensity/severity and duration or persistence of the symptom), symptom distress and symptom limitation were selected as outcome measures in this review.

Type of studies

To determine the effectiveness of the PSA, randomised controlled trials (RCTs) were seen as the 'gold standard' of evidence. However, in the absence of RCT's, controlled clinical trials and quasi-experimental studies design were also included. Case studies were excluded.

Search strategy and outcome

Initial search terms were as follows: (1) problem solving or PST; (2) Cancer; (3) adult (18 years); (4) human and were conducted on the following electronic databases: EBSCO host, CINAHL (1991–2008), Medline (1975–2009), Electronic Periodical Services (Chinese) and Electronic Theses and Dissertations System (Taiwan). Initially, 158 abstracts were found, but following a review of either title, abstract or contents, the count reduced to a final total of seven studies that met the inclusion criteria as shown in Fig. 1. The characteristics of reviewed studies are summarised in Table 1.

Methodological quality

The methodological quality of the studies was based on Newell's 10 internal validity indicators which were developed to assess the methodological rigour of psychological inter-

ventions for patients with cancer. Total scores greater than 20 points indicate the quality is good, scores between 11–20 points indicate the quality is fair and scores below 11 points indicate the quality is poor (Newell *et al.* 2002). Two members of the research team independently scored papers and then compared scores, discussed any discrepancy and agreed a final score. Overall, there was a good level of agreement between reviewers with no major discrepancies. Table 2 describes the methodological quality of the reviewed studies.

Results

Characteristics of reviewed studies

All of the reviewed studies were conducted in the USA and all of the authors' professional areas were nursing. Three of seven studies (Given *et al.* 2002, Doorenbos *et al.* 2005, 2006) were conducted among newly diagnosed cancer patients, another two studies (McMillan *et al.* 2006, McMillan & Small 2007) were conducted among hospice cancer patients, one study (Sherwood *et al.* 2005) was conducted among advanced cancer patients and one study (Mishel *et al.* 2002) was conducted with patients with prostate cancer. Four studies (Doorenbos *et al.* 2005, 2006, McMillan *et al.* 2006, McMillan & Small 2007) required family caregivers to participate in the intervention. The ages of patients in the studies ranged from 31–91. Four studies (Given *et al.* 2002, Doorenbos *et al.* 2005, 2006, Sherwood *et al.* 2005) had a larger percentage of female to male participants (58–73%).

Study design

All of the reviewed studies were randomly assigned and examined the baseline homogeneity of participants. Six studies (Given *et al.* 2002, Doorenbos *et al.* 2005, 2006, Sherwood *et al.* 2005, McMillan *et al.* 2006, McMillan & Small 2007) showed no significant differences between the experimental and control group but one study (Mishel *et al.* 2002) showed significant differences relating to marital status, tumour stage and the number of health problems. In this study, the authors discussed the impact of marital status and tumour stage and used health problems as a covariate in their analysis.

Five studies (Given *et al.* 2002, Mishel *et al.* 2002, Doorenbos *et al.* 2005, 2006, Sherwood *et al.* 2005) involved a PSA with the experimental group and two studies (1, 3) used the COPE model developed by Houts *et al.* (1996) which is heavily based on problem-solving therapy. Most ($n = 4$) studies (Given *et al.* 2002, Doorenbos *et al.* 2005,

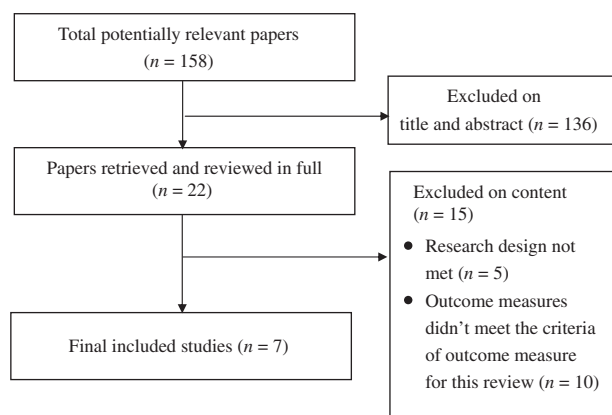


Figure 1 Flowchart of review studies' selection process.

Table 1 Overview of selected papers

Reference number	Author, Year, Country, professional area	Participants	Study design	Intervention	Outcome measures	Results
1	McMillan and Small (2007), USA, nursing	329 cancer patient-caregiver dyads (hospice homecare patients) Patient age: approximately 70 years Gender: Female Supportive visits group: 39% COPE* intervention Group: 37% Standard care: 44% Stage: NA	Random allocation Power (%): NA Sample size: estimate 160/each group	<i>Experimental group</i> Sessions: three contacts Baseline: within 24–48 hours after hospice admission Intervals: no list Dosage: 1st = 45 minutes 2nd = 30 minutes 3rd = 30 minutes Duration: nine days Supportive visits group Standard care and support (<i>n</i> = 109) COPE* Intervention Group Standard care and COPE intervention (<i>n</i> = 111) + handbook (Home Care Guide for Advanced Cancer) Detail protocol description <i>Control group</i> Standard care (<i>n</i> = 109): Describing the hospice routinely provided some caregiver education and support about symptom management and what to expect as the disease progresses	<i>Symptom intensity</i> Pain intensity (NRS) Dyspnea intensity scale (0–10) Constipation assessment scale <i>Symptom distress</i> (Memorial Symptom Assessment Scale, MSAS) QOL (Hospice Quality-of-life Index, HQOL)	Follow-up: day 16 of hospice admission and day 30 Finding: the results see the longitudinal changes over time Symptom intensity and QOL were not significantly different in three group Symptom distress was significantly improved in COPE group

Table 1 (Continued)

Reference number	Author, Year, Country, professional area	Participants	Study design	Intervention	Outcome measures	Results
2	Doorenbos <i>et al.</i> (2006), USA, nursing	237 cancer patient-caregiver dyads (newly diagnosed cancer patients) Patient age: 31–87 years (mean: 60) Gender: 73% female Stage: Stage III and IV (67%) Breast (39%) Lung (35%) Other (26%)	Primary random allocation for secondary analysis in cancer patient Power (%): NA Sample size: NA	<i>Experimental group</i> Problem-solving approach (PSA) (<i>n</i> = 118) Sessions: 10 contacts (week 1, 5, 9, 13, 17: face to face; week 3, 7, 11, 15, 19: telephone) Dosage: 45–60 minutes Duration: 18 weeks <i>Control group</i> Conventional care (<i>n</i> = 119): was not detail information	Physical functioning (SF-36 physical functioning subscale) <i>Symptom limitations</i> (symptom experience tool) Depression (CES-D)	Follow-up: after the first interview 10, 20, 32 weeks Finding: Women with breast cancer had significantly better physical functioning than women with lung cancer Symptom limitation and depression were found to moderate the effect of intervention on physical function Symptom limitation was not found to mediate the effect of intervention on physical function Symptom limitation could explain about 30% variance in physical functioning (adjustment the time)

Table 1 (Continued)

Reference number	Author, Year, Country, professional area	Participants	Study design	Intervention	Outcome measures	Results
3	McMillan <i>et al.</i> 2006, USA, nursing	329 cancer patient-caregiver dyads (hospices patients) Patient age: approximately 70 years Caregiver age: approximately 60 years Gender: Female Supportive visits group: 39% COPE* Intervention Group: 37% Standard care: 44% Stage: NA	Random allocation Power (%): NA Sample size: NA	<i>Experimental group</i> Sessions: three contacts Baseline: within 24–48 hours after hospice admission Intervals: no list Dosage: 1st = 45 minutes 2nd = 30 minutes 3rd = 30 minutes Duration: nine days Supportive visits group Standard care and support ($n = 109$) COPE* Intervention Group Standard care and COPE intervention ($n = 111$) + handbook (Home Care Guide for Advanced Cancer) Detail protocol description <i>Control group</i> Standard care ($n = 109$): Describing the hospice routinely provided some caregiver education and support about symptom management and what to expect as the disease progresses	Primary outcome measures Caregiver quality of life (Caregiver Quality of Life Index-Cancer, CQOL-C) <i>Burden of cancer symptoms</i> Assessment 24 patient symptoms distress from caregivers' perspective (Memorial Symptom Assessment Scale, MSAS) General caregiver mastery: assessment the feelings of control and confidence in caregiving Burden and mastery specific to caregiving tasks (Caregiver Demands Scale, CDS) Secondary outcome measures Impact of these interventions on coping responses (The Brief COPE Scale)	Follow-up: day 16 of hospice admission and day 30 Findings: Effectiveness in improving caregivers' overall QOL and in decreasing patients symptoms distress and caregiving tasks in COPE group at the 30-day follow-up

Table 1 (Continued)

Reference number	Author, Year, Country, professional area	Participants	Study design	Intervention	Outcome measures	Results
4	Doorenbos <i>et al.</i> (2005), USA, nursing	237 cancer patient-caregiver dyads (newly diagnosis cancer patients) Patient age: 31–87 years (mean: 60) Gender: 73% female Stage: Stage III and IV (67%) Breast (39%) Lung (35%) Other (26%)	Random allocation Power (%): NA Sample size: NA	<i>Experimental group</i> PSA ($n = 118$): providing self-care management, information, decision-making skills and counselling and support Sessions: 10 contacts (week 1, 5, 9, 13, 17; face to face; week 3, 7, 11, 15, 19: telephone) Dosage: 45–60 minutes Duration: 18 weeks Control group Conventional care ($n = 119$): focus on direct treatment of the cancer and did not emphasis on providing support for self-managed behavioural, cognitive, or emotional response to symptoms	<i>Symptom limitations</i> (Symptom Experience Tool) Chronic health conditions (modified version of the Comorbidity Questionnaire) Depression (CES-D)	Follow-up: after the first interview 10, 20, 32 weeks Finding: Experimental group had lower scores of symptom limitation than control group at each measurement point (10, 20, 32 weeks) Intervention particularly useful in younger patients for managing symptom limitation
5	Sherwood <i>et al.</i> (2005), USA, nursing	124 advanced cancer patients Patient age: 36–91 years (mean: 62) Gender: 58% female Stage: Stage III (25%) Stage IV (28%) Recurrent (47%)	Random allocation Power (%): 85 Sample size: estimate 113	<i>Experimental group</i> : PSA ($n = 62$) Sessions: five contacts Baseline + two-week intervals (1st, 5th: face to face; 2nd, 3rd, 4th: telephone) Dosage: no list Duration: eight weeks <i>Control group</i> Conventional care: was not detail information	<i>Symptom severity</i> Including pain, fatigue, nausea, vomiting, insomnia, dyspnea, weakness, anorexia, fever, dry mouth, constipation, and mouth sores (0–10) Depression (Center for Epidemiologic Studies-Depression, CES-D)	Follow-up: after the first interview 10 and 20 weeks Finding: 10 and 20 weeks Symptom severity ↓ 20 weeks Depression could predict symptom severity at 20 weeks. ≤60 years: symptom severity ↓ Attrition rate: 32% (death: 43%; advancing disease 33%)

Table 1 (Continued)

Reference number	Author, Year, Country, professional area	Participants	Study design	Intervention	Outcome measures	Results
6	Given <i>et al.</i> (2002), USA, nursing	113 cancer patient who have pain and fatigue at baseline (newly diagnosis patients) Patient age: 58 years (SD = 10.5) Gender: 72% female Stage: Stage III and IV (69%) Breast (35%) Lung (23%) Gynecologic (27%) Colon (14%) Lymphoma (1%)	Random allocation Power (%): NA Sample size: NA	<i>Experimental group</i> PSA ($n = 53$): using intervention software loaded onto a laptop computer Sessions: 10 contacts (six contacts: face to face; four contacts: telephone; 2-week intervals) Dosage: no list Duration: 20 weeks <i>Control group</i> Conventional care: as prescribed by oncology care team ($n = 60$)	<i>Number of Symptoms</i> (Symptom Experience Scale) Physical and social functioning (two SF-36 subscales: measuring the impact on patients' physical and social role performance)	Follow-up: after the first interview 10 and 20 weeks Finding: Few patients in the experimental group reported pain and fatigue at 20 weeks Experimental group had a significant reduction in the number of other symptoms and improved physical and social functioning
7	Mishel <i>et al.</i> (2002), UAS, nursing	239 patients with prostate carcinoma (134 Caucasian + 105 African-American) Patient age: 66.7 years Gender: 100% male Stage: Stage: NA	Random allocation Power (%): NA Sample size: NA	<i>Experimental group</i> PSA + mailed printed materials, audiotapes and videotapes for two experimental arms Treatment direct group for patient ($n = NA$) Treatment supplemented group for patient and caregiver dyads ($n = NA$) Sessions: eight contacts (weekly telephone) Dosage: no list Duration: eight weeks <i>Control group</i> Usual care: during data collection, printed general health information was given and offered four intervention calls after completed the final data collection ($n = NA$)	Uncertainty (Mishel Scale) Uncertainty in Illness Scale Uncertainty Management Strategies Cognitive reframing Problem solving Cancer knowledge Patient-provider communication <i>Symptom management</i> Number of symptom Symptom intensity Control over urine flow Ability to have an erection Satisfaction with sexual function	Follow-up: after the baseline (T1) four months postbaseline (T2) and seven months postbaseline (T3) weeks Finding: Four months postbaseline Mean number of symptoms reported for Caucasian men in the treatment supplemented group No significant differences between these groups from four to seven months Significant improvement in control over urine flow and satisfaction with sexual function in intervention group

*COPE is an educational model that modified problem-solving therapy by Peter S Houts, PhD (Houts *et al.* 1996).

Table 2 Quality assessment of reviewed studies

Indicator	Reference number						
	1	2	3	4	5	6	7
Adequate concealment?	0	0	0	0	0	0	0
3 Randomisation strategy stated and adequate							
2 –*							
1 –*							
0 Randomisation strategy stated and inadequate or not stated							
Patients randomly selected?	3	3	3	3	3	3	3
3 Stated that patients randomly							
2 –*							
1 –*							
0 Volunteer or non-random or patient selection process unclear							
Patients blinded to treatment group (I or C)	0	0	0	0	0	0	0
3 Stated how achieved (e.g., separate information sheets, placebo, deception)							
2 –*							
1 –*							
0 Stated or clear that patients aware of group differences or unclear whether patients blinded to group differences							
Care-providers blinded to treatment group	0	0	3	0	0	0	0
3 Stated how achieved							
2 –*							
1 –*							
0 Stated or clear that providers aware of group differences or unclear whether providers blinded to group differences							
Except trial intervention, other treatments equivalent	3	0	3	0	3	3	3
3 Treatments states for each group and clearly equivalent							
2 Stated I groups treatment and usual care for C group							
1 –*							
0 Treatments stated for each group and clearly non-equivalent or treatment poorly stated for each differences							
Care-providers' adherence monitored?	3	2	3	3	3	2	2
3 Stated how monitored (e. g., videotape, audiotape or asked patients)							
2 Monitoring not stated but detailed description of group interventions							
1 Monitoring not stated but some description of group interventions or detailed description of individual interventions							
0 Stated monitoring not performed or poor description of interventions and unclear if any monitoring							
Detailed loss to follow-up information?	2	3	2	1	1	0	0
3 <i>n</i> lost and reasons given by group							
2 Either <i>n</i> lost or reasons given by group							
1 <i>n</i> lost and reasons given overall							
0 Either <i>n</i> lost or reasons given overall or no information about loss to follow-up							
% patients not in analysis?	1	1	3	1	1	0	3
3 ≤ 10%							
2 11–12%							
1 21–50%							
0 > 50% or could not be calculated							
Intention-to-treat analysis	0	1	1	1	1	1	0
3 Explicitly stated or no loss to follow-up							
2 –*							
1 Not intention-to-treat but some data adjustments made							
0 Patients lost to follow-up clearly not in analysis							
Outcomes measured blind?	0	0	3	0	3	0	0
3 All objective measures or subjective measures with blinded rater							
2 Mostly objective or blinded subjective measures but some unblinded subjective measures							
1 Mostly un-blinded subjective measures but some objective or blinded subjective measures							
0 All un-blinded subjective measures or all subjective measures where unclear if rater blinded							
Total score	12	10	21	9	15	9	11

*, classification not used for this indicator; I, Intervention; C, control; *n*, number of participants; 0, not at all fulfilled or with insufficient information for assessment; 1, mostly not fulfilled; 2, mostly fulfilled; 3, entirely fulfilled.

A total greater than 20 points indicated the quality is good, 11–20 points indicated fair, below 11 point indicated poor.

References: 1, McMillan and Small (2007); 2, Doorenbos *et al.* (2006); 3, McMillan *et al.* (2006); 4, Doorenbos *et al.* (2005); 5, Sherwood *et al.* (2005); 6, Given *et al.* (2002); 7, Mishel *et al.* (2002).

2006, Sherwood *et al.* 2005) used 'conventional care' as a control, two studies (McMillan & Small 2007, McMillan *et al.* 2006) used 'standard care' and one study (Mishel *et al.* 2002) used 'usual care'. Only two studies (McMillan & Small 2007, Sherwood *et al.* 2005) used power calculations to determine sample size and none of the papers described any strategies to prevent attrition.

Problem-solving approach (intervention)

The mean number of PSA sessions evaluated was seven and ranged from 3–10 (median = 8; SD 3.27). The duration of the interventions tested ranged from nine days to 20 weeks (median = 56 days; mean = 74.57 days; SD 56.07) among seven studies. Three studies (Given *et al.* 2002, Mishel *et al.* 2002, Sherwood *et al.* 2005) did not provide any information on the length of time for the PSA intervention; however, in the other four studies (Doorenbos *et al.* 2006, 2005, McMillan & Small 2007, McMillan *et al.* 2006), the interventions lasted a minimum 30 minutes for each contact with participants. In most of the studies (Doorenbos *et al.* 2006, 2005, Given *et al.* 2002, Mishel *et al.* 2002, Sherwood *et al.* 2005), there was a two-week interval between each intervention. Four studies (Doorenbos *et al.* 2006, 2005, Given *et al.* 2002, Sherwood *et al.* 2005) compared a problem-solving intervention with a control group and two studies (McMillan & Small 2007, McMillan *et al.* 2006) compared a PSA intervention with other interventions (e.g., supportive therapy). The specifics of the interventions used can be seen in Table 1; however, interventions usually consisted of face-to-face or telephone counselling to develop coping mechanisms, decision-making skills and the use of cognitive behavioural techniques to address the perception of symptoms and other cancer-related problems.

Outcome measures

Symptom intensity was the most frequently measured outcome variable (McMillan & Small 2007, Mishel *et al.* 2002, Sherwood *et al.* 2005) with some studies also measuring symptom distress (McMillan & Small 2007, McMillan *et al.* 2006), symptom limitation (Doorenbos *et al.* 2006, 2005) and number of symptoms (Given *et al.* 2002, Mishel *et al.* 2002). The most frequently measure variable was depression (Doorenbos *et al.* 2006, 2005, Sherwood *et al.* 2005). Tools used to assess symptomatic improvement included the 'Memorial Symptom Assessment Tool, a 24-item scale to measure the frequency of a wide range of physical symptoms, their severity and the distress

they cause, The 'Symptom Distress scale' and the 'Symptom Experience Scale' were also used. All three scales have been extensively used in the cancer care literature and are reliable instruments.

Follow-up assessments

To evaluate outcomes, all studies (Doorenbos *et al.* 2006, 2005, Given *et al.* 2002, McMillan & Small 2007, McMillan *et al.* 2006, Mishel *et al.* 2002, Sherwood *et al.* 2005) conducted at least two follow-up evaluations. Two studies (Doorenbos *et al.* 2006, 2005) carried out evaluations at 10, 20 and 32 weeks postintervention (with newly diagnosed cancer patients), one study (Sherwood *et al.* 2005) evaluated after 10 and 20 weeks (with advanced cancer patients), two studies (McMillan & Small 2007, McMillan *et al.* 2006) evaluated after 16 days and 30 days (with hospice cancer patients) and one study (Mishel *et al.* 2002) collected evaluation data after four and seven months.

The effectiveness of the PSA was demonstrated by a decrease in symptom intensity (5) at 10- and 20- week follow-up in advanced cancer patient for five contacts during eight weeks, especially for younger patients (≤ 60 years). Symptom distress (McMillan & Small 2007, McMillan *et al.* 2006) was improved at a 30- day follow-up in hospice patients for three contacts during nine days. Symptoms were limited by the use of a PSA particularly in younger patients (Doorenbos *et al.* 2005), and two studies (Given *et al.* 2002, Mishel *et al.* 2002) demonstrated a decreased number of symptoms post-PSA intervention.

Methodological quality

None of the studies achieved adequate concealment but all seven studies reported that participants were randomly assigned with four studies (Doorenbos *et al.* 2006, 2005, McMillan & Small 2007, McMillan *et al.* 2006) using a computerised randomisation procedure with the remainder not describing the randomisation process. Four studies (Doorenbos *et al.* 2005, McMillan & Small 2007, McMillan *et al.* 2006, Sherwood *et al.* 2005) had some strategies to monitor those who conducted the PSA such as reviewing audiotapes (McMillan & Small 2007, McMillan *et al.* 2006), monitoring the adherence to a computer-guided protocol by reviewing the computer data (Doorenbos *et al.* 2005) and reviewing the computer record of every intervention (Sherwood *et al.* 2005). Two studies (McMillan *et al.* 2006, Sherwood *et al.* 2005) were blinded to collect the measures. None of the studies used intention-to-treat (ITT) to handle attrition in the analysis but used other statistical analysis

(e.g., ANOVA and chi-square tests) to determine whether attrition had an impact on the results. Only one study (McMillan *et al.* 2006) was of a 'good' methodological quality, three studies (McMillan & Small 2007, Mishel *et al.* 2002, Sherwood *et al.* 2005) were 'fair' and three studies (Doorenbos *et al.* 2006, 2005, Given *et al.* 2002) were 'poor' (Table 2).

Discussion

Evidence of symptom management

Based on this review, there is some evidence that a PSA approach can have an impact on symptom management in cancer. The results were particularly clear in five of the studies (Given *et al.* 2002, Mishel *et al.* 2002, Sherwood *et al.* 2005, McMillan *et al.* 2006, McMillan & Small 2007) indicating that a PSA can help patients manage symptoms better, reduce the impact of symptoms and help patients develop coping strategies to deal with persistent symptoms. Two studies demonstrated that a PSA is particularly useful in younger cancer patients for symptom management (Doorenbos *et al.* 2005, Sherwood *et al.* 2005). It was found in the research that comparing to older cancer patients, younger cancer patients are more likely to need help with relieving distressing symptoms (Addington-Hall *et al.* 1998). Future studies should explore the issue of age in more detail.

Involving patients with cancer and their caregivers in the research design is an important consideration for studies exploring the effectiveness of PSA. This is particularly important with patients in late stage disease in the home environment as several of the studies revealed that family and other care-givers were heavily involved in patient care (Cotrim & Pereira 2008, Tang *et al.* 2008). Indeed, in one study, it was suggested that couple counselling may be a more effective intervention strategy than individual counselling in the PSA approach (Toseland *et al.* 1995).

Methodological issues

RCTs must be internally valid with the research design eliminating the possibility of bias (Rothwell 2006). All the studies in this review were randomised clinical trials; however, the methodological quality scores were not good. This could lead to an overestimation of the treatment effects as no studies demonstrated adequate concealment or undertook an ITT analysis and five studies did not include blinding – all important methodological aspects that should be included in randomised clinical trial design (Huwiler-Müntener *et al.* 2002). In this review, only

McMillan *et al.* (2006) gave explicit and precise information about blinding.

Only two studies described how the research was based on power calculations and used these to determine sample size (McMillan & Small 2007, Sherwood *et al.* 2005). However, no studies achieved their estimated sample size. In addition, the high rate of attrition was an important issue. For instance, one study showed a high attrition rate (32%) in patients with advanced cancer (Sherwood *et al.* 2005). Future studies need to consider the attrition rate more substantially and take a greater note of the different cancer stages or disease progress when estimating sample size. Using the ITT analysis could also help avoid the effects of drop-out (Feinstein 1991).

Another key methodological consideration is the description of the PSA intervention itself. Even though there was evidence for the effectiveness of a PSA in symptom management in some studies, there was insufficient evidence to determine the impact of one particular PSA protocol over another. There was too little information on the nature of the sessions, frequency, duration or follow-up measurement time. This lack of information obviously limits the ability of practitioners to assess the relative impact of various types and models of PSA intervention (Sidani & Braden 1998). For instance, McMillan and Small (2007) describe no difference between symptom intensity in the experimental group and control group. This could be a true outcome of the experiment, but could also be that the follow-up measurement missed any change. For future PSA research design providing more comprehensive information on the protocol delivered is an important consideration.

Limitations of the review

The central limitation of this review is the variations in the target participants and the fact that apparently quite different PSA protocols were used. There were also variations in the research designs and varying sample sizes together with different outcome measurement.

Conclusion

There does appear to be an evidence base that supports the effectiveness of PSA interventions in improving symptom management in adults' cancer patients. However, because of the small number of studies and wide variations in population, different protocols delivering the PSA and some deficiencies in gap in methodological rigour, there is a need for more well-designed research in this area. Nevertheless, the PSA approach does seem to have a useful place in cancer

symptom management and should be considered in the scope of cancer care nursing.

Relevance to clinical practice

Cancer care nurses should explore the use of PSA interventions in their practice as the evidence base suggests the value of this approach – but caution is needed in regard to the precise structure of the PSA protocol.

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Contributions

Study design and data collection: YHL, PYC; data analysis, interpretation and manuscript critical revisions: YHL, PYC, MH.

Conflict of interest

None.

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