Communication skills training for healthcare professionals working with people who have cancer (Review)

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Communication skills training for healthcare professionals working with people who have cancer

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ABSTRACT

Background

This is an updated version of a review that was originally published in the Cochrane Database of Systematic Reviews in 2004, Issue 2. People with cancer, their families and carers have a high prevalence of psychological stress which may be minimised by effective communication and support from their attending healthcare professionals (HCPs). Research suggests communication skills do not reliably improve with experience, therefore, considerable effort is dedicated to courses that may improve communication skills for HCPs involved in cancer care. A variety of communication skills training (CST) courses have been proposed and are in practice. We conducted this review to determine whether CST works and which types of CST, if any, are the most effective.

Objectives

To assess whether CST is effective in improving the communication skills of HCPs involved in cancer care, and in improving patient health status and satisfaction.

Search methods

We searched the following electronic databases: Cochrane Central Register of Controlled Trials (CENTRAL) Issue 2, 2012, MEDLINE, EMBASE, PsycInfo and CINAHL to February 2012. The original search was conducted in November 2001. In addition, we handsearched the reference lists of relevant articles and relevant conference proceedings for additional studies.

Selection criteria

The original review was a narrative review that included randomised controlled trials (RCTs) and controlled before-and-after studies. In this updated version, we limited our criteria to RCTs evaluating 'CST' compared with 'no CST' or other CST in HCPs working in cancer care. Primary outcomes were changes in HCP communication skills measured in interactions with real and/or simulated patients with cancer, using objective scales. We excluded studies whose focus was communication skills in encounters related to informed consent for research.

Data collection and analysis

Two review authors independently assessed trials and extracted data to a pre-designed data collection form. We pooled data using the random-effects model and, for continuous data, we used standardised mean differences (SMDs).

Main results

We included 15 RCTs (42 records), conducted mainly in outpatient settings. Eleven studies compared CST with no CST intervention, three studies compared the effect of a follow-up CST intervention after initial CST training, and one study compared two types of CST. The types of CST courses evaluated in these trials were diverse. Study participants included oncologists (six studies), residents (one study) other doctors (one study), nurses (six studies) and a mixed team of HCPs (one study). Overall, 1147 HCPs participated (536 doctors, 522 nurses and 80 mixed HCPs).

Ten studies contributed data to the meta-analyses. HCPs in the CST group were statistically significantly more likely to use open questions in the post-intervention interviews than the control group (five studies, 679 participant interviews; P = 0.04, I² = 65%) and more likely to show empathy towards patients (six studies, 727 participant interviews; P = 0.004, I² = 0%); we considered this evidence to be of moderate and high quality, respectively. Doctors and nurses did not perform statistically significantly differently for any HCP outcomes. There were no statistically significant differences in the other HCP communication skills except for the subgroup of participant interviews with simulated patients, where the intervention group was significantly less likely to present 'facts only' compared with the control group (four studies, 344 participant interviews; P = 0.01, I² = 70%).

There were no significant differences between the groups with regard to outcomes assessing HCP 'burnout', patient satisfaction or patient perception of the HCPs communication skills. Patients in the control group experienced a greater reduction in mean anxiety scores in a meta-analyses of two studies (169 participant interviews; P = 0.02; I² = 8%); we considered this evidence to be of a very low quality.

Authors' conclusions

Various CST courses appear to be effective in improving some types of HCP communication skills related to information gathering and supportive skills. We were unable to determine whether the effects of CST are sustained over time, whether consolidation sessions are necessary, and which types of CST programs are most likely to work. We found no evidence to support a beneficial effect of CST on HCP 'burnout', patients' mental or physical health, and patient satisfaction.

PLAIN LANGUAGE SUMMARY

Are courses aimed at improving the way doctors and nurses communicate with patients with cancer helpful?

People with cancer, and those who care for them, often suffer from psychological stress which may be reduced by effective communication and support from their attending doctor, nurse or other healthcare professional (HCP). Research suggests communication skills do not reliably improve with experience, therefore, considerable effort is dedicated to courses to improve communication skills for HCPs involved in cancer care. Many different types of communication skills training (CST) courses have been proposed and are in practice. We conducted this review to determine whether CST works and which types of CST, if any, are the most effective.

We found 15 studies to include in this review. All of these studies except one were conducted in nurses and doctors. To measure the impact of CST, some studies used encounters with real patients and some used role-players (simulated patients). We found that CST significantly improved some of the communication skills used by healthcare workers, including using 'open questions' in the interview to gather information and showing empathy as a way of supporting their patients. Other communication skills evaluated showed no significant differences between the HCPs who received the training and those who did not. We did not find evidence to suggest any benefits of CST to patients' mental and physical health, patient satisfaction levels or quality of life, however, few studies addressed these outcomes. Furthermore, it is not clear whether the improvement in HCP communication skills is sustained over time and which types of CST are best.

Communication skills training compared with no communication skills training for improving healthcare professionals (HCP) communication with cancer patients

Patient or population: healthcare professionals working with patients with cancer
Settings: outpatient or primary care
Intervention: A communications skills training program
Comparison: No communication skill training

Outcomes	Relative effect: (P value)	No of participant interviews (studies)	Quality of the evidence (GRADE)	Comments
HCP showed 'empathy'	Favoured the intervention (P = 0.004)	727 (6 studies)	⊕⊕⊕⊕ **high**	These data were consistent and did not display statistical heterogeneity ($I^2 = 0\%$)
HCP used 'open questions'	Favoured the intervention (P = 0.04)	679 (5 studies)	⊕⊕⊕◯ **moderate**	We downgraded the quality of the evidence due to the statistical heterogeneity of the studies ($I^2 = 65\%$)
HCP 'gave facts only' (simulated patients only)	Favoured the control group (P = 0.01)	406 (4 studies)	⊕⊕⊕◯ **moderate**	We downgraded the quality of this evidence due to the clinical and statistical heterogeneity of the studies ($I^2 = 70\%$). This effect was not evident in the subgroup of 'real patients'. Tests for subgroup differences were statistically significant
Patient satisfaction with communication	Not significantly different P = 0.36	429 (2 studies)	⊕⊕◯◯ **low**	We downgraded the quality of the evidence due to clinical and statistical heterogeneity ($I^2 = 74\%$) and the fact that only two studies contributed data
Patient anxiety: State trait Anxiety Inventory	Favoured the control group (P = 0.02)	169 (2 studies)	⊕◯◯◯ **very low**	We downgraded the quality of the evidence due to the clinical heterogeneity of the studies and the fact that

only two studies contributed data. In addition, one of these studies reported baseline differences in anxiety between the two groups (significantly higher in the control group) and it was not clear from the report whether the results were adjusted for this difference

GRADE Working Group grades of evidence:
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

BACKGROUND

This is an updated version of a review that was originally published in the Cochrane Database of Systematic Reviews in 2003, Issue 2. Good communication between health professionals and patients is essential for high quality health care. Effective communication benefits the well-being of patients and health professionals, influencing the rate of patient recovery, effective pain control, adherence to treatment regimens, and psychological functioning (Fallowfield 1990; Gattellari 2001; Stewart 1989; Stewart 1996; Vogel 2009). Cancer sufferers have a high prevalence of psychological stress and need emotional and social support. Hence, it is important that from the start there is adequate communication about the diagnosis, prognosis and treatment alternatives (Hack 2011). Furthermore, treatment of psychological stress may have a positive effect on quality of life (Girgis 2009).

Conversely, ineffective communication can leave patients feeling anxious, uncertain and generally dissatisfied with their care (Hagerty 2005) and has been linked to a lack of compliance with recommended treatment regimens (Turnberg 1997). Avoiding disclosing cancer as the diagnosis has been linked to higher rates of depression and anxiety and lower use of coping skills (Donovan-Kicken 2011). Complaints about health professionals made by patients frequently focus, not on a lack of clinical competence per se, but rather on a perceived failure of communication and an inability to adequately convey a sense of care (Moore 2011; Lussier 2005). Communication issues are an important factor in litigation (Levinson 1997).

Ineffective communication is also linked to increased stress, lack of job satisfaction and emotional burnout amongst healthcare professionals (Fallowfield 1995; Ramirez 1995). Self-awareness, reflection and learning about communication skills may have benefits for health professionals, and prevent burnout.

Most patients with cancer prefer a patient-centred or collaborative approach (Dowsett 2000; Hubbard 2008; Tariman 2010); however, there is a minority who prefer a more task-centred approach. Furthermore, patient preferences regarding the communication of bad news have been found to be culturally dependent (Fujimori 2009).This makes it imperative that health professionals understand the needs of the individual patient (Dowsett 2000; Sepucha 2010). The type of relationship that occurs in reality can be very different from that preferred by patients and doctors (Tariman 2010; Taylor 2011) and the literature suggests that patients with cancer continue to have unmet communication needs (Hack 2005). Taylor 2011 reported that a majority of clinicians liked to include emotional issues during their interviews with patients with cancer, however, clinical interviews tend to be predominated by biomedical discussion with only a minimal time dedicated to psychosocial issues (Hack 2011; Vail 2011).

The ability to communicate effectively is a pre-condition of qualification for most healthcare professionals (HCPs) (ACGME 2009; CanMEDS 2011; GMC 2009). As communication skills do not reliably improve with experience alone (Cantwell 1997), communication skills training (CST) is mandatory in many training programs, therefore, considerable effort and expense is being dedicated to CST.

Description of the intervention

CST courses/workshops generally focus on communication between HCPs and patients during the formal assessment procedure (interview), and include emphasis on skills for building a relationship, providing structure to the interview, initiating the session, gathering information, explaining, planning and closure (Silverman 2005). Building a relationship may be particularly relevant with patients with cancer where promoting a greater disclosure of individual concerns and feelings may enable optimum care. Breaking bad news and shared decision-making have been other focuses of CST for HCPs involved in cancer care (Fallowfield 2004; Paul 2009).

Most approaches to teaching communication in health care incorporate cognitive, affective and behavioural components, with the general aim of promoting greater self-awareness in the HCP. CST based on acquiring skills may be more effective than programmes based on attitudes or specific tasks (Kurtz 2005) and is considered to be more effective if experiential. The essential components that facilitate learning have been highlighted in guidelines (Gysels 2004; Stiefel 2010) and include the following.

- Systematic delineation and definition of the essential skills (verbal, non-verbal and paralinguistic). Skills that are effective in communication with patients with cancer are defined (e.g. the use of open questions, incorporating a psychosocial assessment, demonstrating empathy). Pitfalls include leading questions, focusing only on the physical and failing to explore the more psychological issues and premature reassurance. However, some claim that the evidence base for this definition of essential skills is still weak (Cegala 2002; Paul 2009).

- Observation of learners: through the use of learning techniques such as role-play, participants are then given the opportunity to practice their communication skills using facilitating behaviours and avoiding blocking behaviours in a 'safe' environment. Often, role-playing is aided by the use of simulated patients trained to represent someone with cancer, and who can provide a range of cues and responses to communication in the role-play, thus providing a safe opportunity for healthcare professionals to practice communication/skills without distressing patients (Aspegren 1999; Kruijver 2001; Nestel 2007).

- Well-intentioned, descriptive feedback, which may be verbal or written.

- Video or audio-recordings and review permitting self-reflection.
- Repeated practice.
- Active small group or one-to-one 'learner-centred' learning.
- Facilitators with training and experience (Bylund 2009).

CST has been delivered in a variety of ways, for example, via sessions integrated into degree or diploma studies (e.g. Wilkinson 1999) or three to five day workshops using actors as simulated patients (Fallowfield 1990; Heaven 1996; Razavi 2000). The optimal length for CST is under debate. Gysels 2004 argues that longer courses are more effective.

There is a wide variety of models and approaches to trials of communication skills training and interpreting the data is often hampered by poor methodological quality (Fallowfield 2004). The original 2004 version of this Cochrane review concluded, based on three randomised controlled trials, that there was some evidence that courses on CST for HCPs working with patients with cancer may be effective in improving HCP communication skills (Fellowes 2003). Since then, other reviewers have reached the same conclusions in different ways (Barth 2011; Bylund 2010; Kissane 2012). Whilst some have suggested that these positive effects can be maintained over time, others have concluded that a strong evidence base for a significant effect on trial outcomes is lacking (Alvarez 2006), particularly for an effect on patient outcomes (Uitterhoeve 2010).

Why it is important to do this review

There has been much research in this area since the original Cochrane review was published, including the conduct of several randomised controlled trials (RCTs), which were scant at the time of the original review. Other more recent reviews in the field have included a variety of studies with different study designs, however, none have conducted meta-analyses of the results from RCTs. By undertaking this systematic review and keeping it up-to-date we aimed to critically evaluate all RCTs that have investigated the effectiveness of CST for HCPs working in cancer care, in order to enable evidence-based teaching and practice in this important and expanding area. Furthermore, we hoped that a review and meta-analysis of data from such RCTs would provide stronger evidence of any potential benefits that CST may have on HCP behaviour and provide guidance on the optimal methodology and length of training, as well as how to ensure that these newly acquired skills are transferred to the work-place.

O B J E C T I V E S

To assess whether communication skills training is effective in changing behaviour of HCPs working in cancer care and in improving patient health status and satisfaction.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials (RCTs), including cluster-randomised studies.

Types of participants

Types of healthcare professionals (*HCPs*): All qualified HCPs (medical, nursing and allied health professionals) within all hospital, hospice and ambulatory care settings, working in cancer care. If a study included other non-professionals, the percentage of professionals in the sample was > 60%. If a study also included HCPs working in non-cancer care, the percentage of HCP working in cancer care was > 60%. Training of intermediaries (e.g. interpreters, advocates, self-help groups) was not considered.

Types of patients: Men and women with a diagnosis of cancer, at any stage of treatment. If a study included patients with other diagnoses, patients with cancer made up > 60% of the study sample. We included studies that assessed interviews in both real and simulated patients (for definition see Appendix 1).

Types of encounters: Consultations and interviews where cancer patient care is the main aim. We excluded trials that studied encounters where the aim was to improve the quality of informed consent or to disclose information for informed patient consent to participate in a RCT.

Types of interventions

We included only studies in which the intervention group had communication skills training (e.g. study days, teaching pack, distance learning, workshops; and including any mode of training such as audiotape feedback, videotape recording of interviews, role-play, group discussion, didactic teaching), and in which the control group received nothing beyond the usual, or received an alternative training to the intervention group. We included all types and approaches to teaching, any length of training and any focus of communication between professionals and patients with cancer within the context of patient care. We excluded studies whose focus was communication skills in encounters related to informed consent for research. This specific type of CST is under discussion as the subject of a separate Cochrane review.

Types of outcome measures

We included outcomes that measured changes in HCP behaviour or skills, other HCP outcomes and patient-related outcomes at any time after the intervention. We anticipated that many of these outcomes would be measured by validated study-specific observational rating scales and potentially subject to a high degree of inter-trial methodological heterogeneity. Studies that only reported outcomes of changes in attitudes/knowledge on the part of the HCPs or patients without examining resulting changes in behaviour of HCPs were excluded from the review, as self-perceived improvements have been shown to be over-optimistic (Chant 2002).

Primary outcomes

HCP communication skills

- Information gathering skills, such as open questions, leading questions, facilitation, clarifying and summarising
- Discovering the patients perspective such as eliciting concerns
- Explaining and planning skills such as giving the appropriate information, checking understanding, and negotiating procedures and future arrangements
- Supportive, building relationship skills such as empathy, responding to emotions/psychological utterances; and offering support
- Undesirable outcomes, including blocking behaviours such as interruptions and false reassurances, and providing facts only

Secondary outcomes

Other HCP outcomes

- Burnout

Patient-rated outcomes

- Patient health status
  - Anxiety level/psychological distress
  - Quality of life
- Patient Perception
  - Perception of HCP's communication skills: clarification, assessment of concerns, information, support, trust
  - Satisfaction

Outcomes of 'significant other'

- Perception of significant other
  - Perception of HCP's communication skills: clarification, assessment of concerns, information, support, trust
  - Satisfaction

Search methods for identification of studies

Electronic searches

For the original review, the following databases were searched.
- CENTRAL (*The Cochrane Library*, 2001, Issue 3)
- MEDLINE (1966 to November 2001)
- EMBASE (1980 to November 2001)
- PsycInfo (1887 to November 2001)
- CINAHL (1982 to November 2001)
- AMED (1985 to October 2001)
- SIGLE (Start to March 2002) (Grey literature database held by British Library)
- Dissertation Abstracts International (1861 to March 2002)
- Evidence-Based Medical Reviews (1991 to March/April 2001)

For the updated review, the search strategy was modified by Jane Hayes (JH) of the Cochrane Gynaecological Cancer Review group (CGCRG), who extended the searches of CENTRAL, MED-LINE, EMBASE, PsycInfo and CINAHL to Febuary 2012. In addition, JH searched the Database of Reviews of Effects (DARE) in *The Cochrane Library* in September 2011. No language restrictions were applied. (See Appendix 2, Appendix 3, Appendix 4 for search strategies).

Searching other resources

We handsearched the reference lists of relevant studies that we identified from the electronic searches and the conference abstracts of the annual International Psycho-Oncology Society meetings.

Data collection and analysis

Selection of studies

For the original review, two of three review authors, Deborah Fellowes (DF), Susie Wilkinson (SW) and Philippa Moore (PM) independently applied inclusion criteria to each identified study. For the update, PM and Solange Rivera Mercado (SRM) or Monica Grez Artigues(MGA) independently evaluated identified studies for inclusion. Disagreements were resolved by discussion between all three review authors. We identified potentially eligible studies from the search abstracts and retrieved the full text of the articles if the review criteria were met, or if the abstract contained insufficient information to assess the review criteria.

Data extraction and management

For the original data extraction, two review authors recorded the methodology (including study design, participants, sample size, intervention, length of follow-up and outcomes), quality and results of the included studies on a standardised data extraction form. For the updated review, we designed a new data extraction form to include some specific outcomes and a 'Risk of bias' assessment. Two review authors extracted data independently (PM and SRM or MGA) and resolved any disagreement by discussion. We entered the data into Review Manager software (RevMan 2011) and checked for accuracy.

Assessment of risk of bias in included studies

The quality of eligible studies was assessed independently by three review authors (DF, SW, PM) for the original review, and by two review authors (PM, SRM) for the updated review. For included studies, we assessed the risk of bias as follows.
1. Selection bias: random sequence generation and allocation concealment.
2. Detection bias: blinding of outcome assessment.
3. Attrition bias: incomplete outcome data.
4. Reporting bias: selective reporting of outcomes.
5. Other possible sources of bias.
For further details see Appendix 5. Results are summarised in a 'Risk of bias' graph (Figure 1) and a 'Risk of bias' summary.

Figure 1. 'Risk of bias' graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.
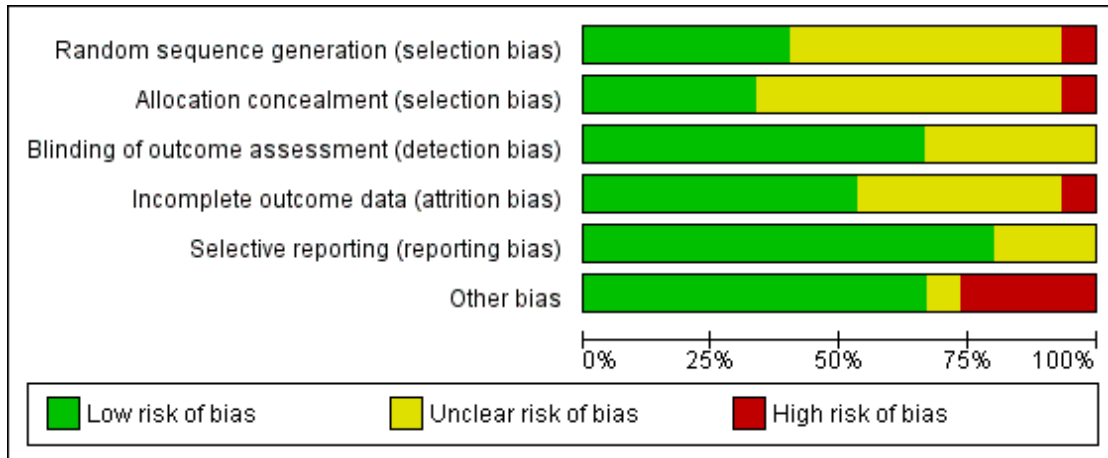
Measures of treatment effect

Tools for assessing communication were diverse and usually consisted of validated questionnaires and scales. Data for all outcomes were continuous. We had planned to measure the mean difference (MD) between treatment arms, however most trials measured the same outcome using different scales, and so we used the standardised mean difference (SMD) for all meta-analyses.

Unit of analysis issues

The units of analyses included the HCPs, their patients and significant others, and their encounters/conversations/interviews. Two review authors (PM and SRM or MG) reviewed unit of analysis issues according to Higgins 2011 and differences were resolved by discussion. These included reports where there were multiple observations for the same outcome, e.g. several interviews involving the same HCP for the same outcome at different time points. When there were multiple time points for observation, we considered the data from the time point closest to the end of intervention as the post-intervention measurement. This ranged from immediately post-intervention to three months post-intervention. We also analysed the longest follow-up measurement for each study which ranged from two to 12 months.

Dealing with missing data

For included studies we noted the level of attrition. Studies with greater than 20% attrition were considered at moderate to high risk of bias. For all outcomes, we attempted to carry out analyses on an intention-to-treat basis. We did not impute missing outcome data. If data were missing or only imputed data were reported, we attempted to contact trial authors to request the missing data.

Assessment of heterogeneity

We assessed the heterogeneity between studies by visual inspection of forest plots, by estimation of the percentage heterogeneity between trials (the I^2 statistic) (Higgins 2003), and by a formal statistical test of the significance of the heterogeneity (Deeks 2001). We considered a P value of less than 0.10 and an $I^2 > 50\%$ to represent substantial heterogeneity.

Assessment of reporting biases

We intended to examine funnel plots corresponding to meta-analysis of the primary outcome to assess the potential for small study effects such as publication bias if a sufficient number of studies were identified, however, there were fewer than 10 studies in all meta-analyses.

Data synthesis

We used the random-effects model with inverse variance weighting for all meta-analyses (DerSimonian 1986) and pooled the standardised mean differences (SMDs), presenting these results with the corresponding 95% confidence intervals (CIs).

Subgroup analysis and investigation of heterogeneity

To investigate heterogeneity, we carried out subgroup analyses of the primary outcomes according to staff group (e.g. doctors and

nurses), patient type (e.g. real or simulated) and type of comparison (e.g. CST versus no-CST or CST with follow-up versus CST alone). We had intended to carry out subgroup analyses according to the type of CST e.g. didactic teaching, distance learning, role-play workshops, however this was not possible due to the wide variety of interventions included. We will attempt subgroup analyses in future versions of this review.

Sensitivity analysis

We performed sensitivity analysis for the primary outcomes to investigate heterogeneity between studies. Three studies compared a CST intervention with no CST after giving preliminary CST to all HCP participants (intervention and control groups). Where any of these three studies contributed to meta-analyses, we performed sensitivity analyses by excluding these data and compared the results.

R E S U L T S

Description of studies

Results of the search

For the original review, we identified 51 potentially relevant articles, of which we included three studies (Fallowfield 2002; Razavi 1993; Razavi 2002) and excluded 48 studies (Figure 2). For the updated review, we retrieved a total of 5472 articles; 4948 were either duplicates or were excluded on title. Of the remainder, we identified 119 records for classification. On retrieval of the full text of these records, we included 39 records (pertaining to 15 studies) and excluded 80 records (pertaining to 70 studies; see Figure 3).

Figure 2.   Study flow diagram of original searches (November 2001and November 2003)
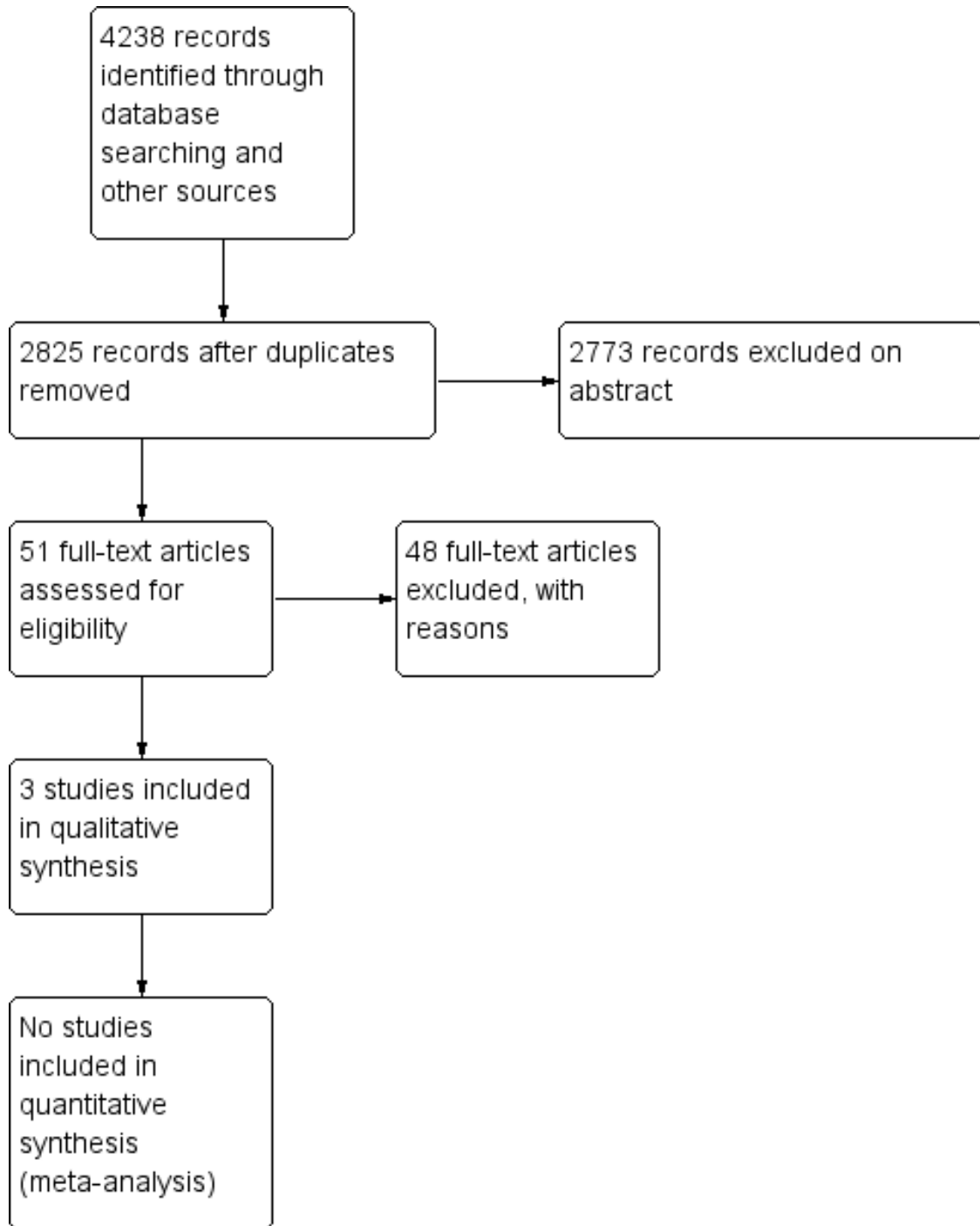
Figure 3. Study flow diagram of updated searches to 28 February 2012.*Therefore, 15 studies and 42 records in total (updated search results plus original results)
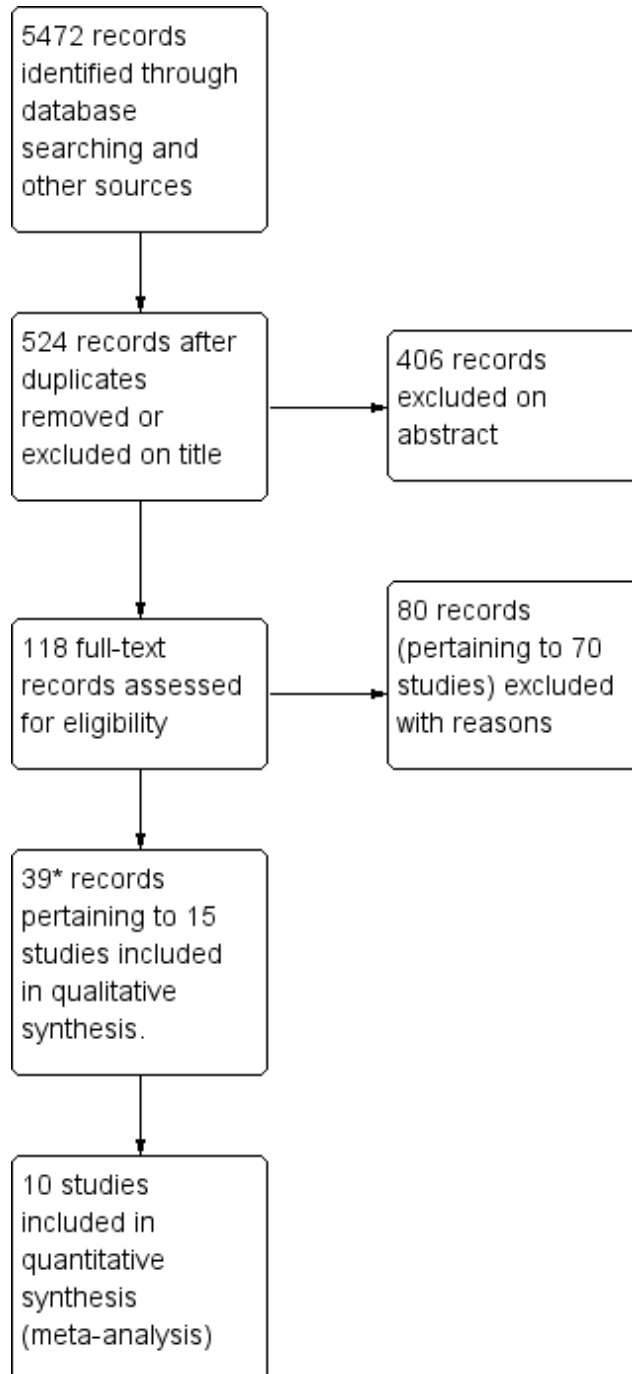
Included studies

Of the 42 records included (3+39) from all the searches to date, we identified 15 trials in total (nine of which had multiple publications, including the original three included studies). Fourteen trials were published in full and one (Fujimori 2011) was available as a conference abstract only.

- Ten studies (Butow 2008; Fujimori 2011; Gibon 2011; Goelz 2009; Kruijver 2001; Lienard 2010; Razavi 1993; Razavi 2002; van Weert 2011; Wilkinson 2008) investigated the effect of CST in the intervention group compared with a control group with no intervention.
- One study (Fallowfield 2002) compared two interventions in four comparative groups: CST or no training, and the provision of individual feedback or no feedback.
- Three studies assessed the effect of a follow-up intervention after initial training: six bi-monthly consolidation workshops of three hours in length (Razavi 2003), four half-day supervision sessions spread over four weeks (Heaven 2006) and CD-ROM (Tulsky 2011).
- One study compared different durations of CST (Stewart 2007).

Overall, the communication skills of 1147 healthcare professional (HCP) participants were reported in these studies and 2105 patient encounters were analysed. Patients with cancer were from various cancer care settings (59% women; mean age 60 years) and the studies enrolled the following HCPs.

- Doctors (eight studies): Butow 2008 = 30 oncologists; Fallowfield 2002 = 160 oncologists; Fujimori 2011 = 30 oncologists; Goelz 2009 = 41 mainly haematology/oncology doctors; Lienard 2010 = 113 residents; Razavi 2003 = 63 physicians (62% oncologists); Stewart 2007 = 51 doctors (18 oncologists, 17 family physicians and 16 surgeons); Tulsky 2011 = 48 oncologists.
- Nurses (six studies): Heaven 2006 = 61 nurses; Kruijver 2001 = 53 nurses; van Weert 2011 = 48 nurses; Razavi 1993 = 72 nurses; Razavi 2002 = 116 nurses; Wilkinson 2008 = 172 nurses.
- Other HCPs: one trial studied the effect of CST on radiotherapy teams which included a mixed group of 80 doctors, nurses, physicists and secretaries (Gibon 2011).

The majority of the trials were conducted in Europe, with the exception of Stewart 2007 (Canada), Butow 2008 (Australia); Fujimori 2011 (Japan) and Tulsky 2011 (USA). The average age of the HCP participants (13 studies) was 39 years and the number of HCPs in the studies ranged from 30 to 172 (mean, 75). Women comprised approximately 50% of participants in the trials involving doctors and approximately 90% of those involving nurses. Their experience working with patients with cancer ranged from < two years to 24 years. With regard to previous CST, one study reported that 47% of the participants had received > 50 hours of CST prior to the trial (Heaven 2006); two studies re-

ported that participants had received no previous CST (Goelz 2009; Wilkinson 2008). Fujimori 2011 reported no data relating to participant characteristics and we were unsuccessful in contacting the authors for more details.

Most studies were conducted in the hospital outpatient setting except for two studies that involved professionals working in the community (primary care and hospices) (Heaven 2006; Wilkinson 2008) and four that involved HCPs working in an inpatient setting (Kruijver 2001; Lienard 2010; Razavi 2002; van Weert 2011).

Type of intervention

The objective of most trials was to train the professionals in general communication skills (Fallowfield 2002; Fujimori 2011; Gibon 2011; Heaven 2006; Razavi 1993; Razavi 2002; Stewart 2007; van Weert 2011; Wilkinson 2008). Two trials aimed to train professionals specifically to detect and respond to patients emotions (Butow 2008;Tulsky 2011). Two trials trained HCPs in giving bad news (Lienard 2010; Razavi 2003) and Goelz 2009 trained HCPs in addressing the transition to palliative care. Kruijver 2001 concentrated on CST for nurses' admission interviews.

Most trials specified the use of learner-centred, experiential, adult education methods by experienced facilitators (10 trials: Butow 2008; Fallowfield 2002; Goelz 2009; Heaven 2006; Lienard 2010; Razavi 2003; Stewart 2007; Tulsky 2011; van Weert 2011; Wilkinson 2008). Co-teaching was stated in four studies (Goelz 2009; Heaven 2006; Kruijver 2001; Razavi 1993). CST was taught in small groups (range three to 15 participants) in 12 trials (Butow 2008;Fallowfield 2002; Goelz 2009; Heaven 2006; Kruijver 2001; Lienard 2010; Razavi 1993; Razavi 2002; Razavi 2003; Stewart 2007; van Weert 2011; Wilkinson 2008). All small-group studies used role-play, although it was often unclear if the cases used were pre-defined or true cases of the participants, and if the role-play was between participants or with simulated patients. In all studies, real patients were only used for the assessment interviews, and not during training.

Most interventions included written material (10 trials; Butow 2008; Fallowfield 2002; Goelz 2009; Kruijver 2001; Razavi 1993; Razavi 2002; Razavi 2003; Stewart 2007; van Weert 2011; Wilkinson 2008) and short didactic lectures (eight trials; Butow 2008; Goelz 2009; Kruijver 2001; Lienard 2010; Razavi 1993; Razavi 2002; Razavi 2003; Wilkinson 2008). Six trials specified the use of role-modelling (Butow 2008; Heaven 2006; Kruijver 2001; Stewart 2007; Tulsky 2011; Wilkinson 2008); and 10 trials specified the use of video material (Butow 2008; Goelz 2009; Fallowfield 2002; Heaven 2006; Kruijver 2001; Razavi 1993; Stewart 2007; Tulsky 2011; van Weert 2011;Wilkinson 2008). Two trials described e-learning: 1.5 hour video conferences as follow-up after the CST (Butow 2008) and use of a CD-ROM as follow-up after a communication skills lecture (Tulsky 2011). The type of learning in Fujimori 2011 was not specified.

The participants received feedback from their tutors either verbally (Butow 2008; Goelz 2009; Heaven 2006; Kruijver 2001;Lienard

2010; Razavi 1993; Razavi 2002; Razavi 2003; Stewart 2007; Tulsky 2011; van Weert 2011;Wilkinson 2008) or in writing (Fallowfield 2002). In addition, Butow 2008 described feedback from the simulated patients, and Goelz 2009 from the participants' peers. No study stated whether the feedback was structured using a check-list.

Duration of intervention

One trial had very short on-site training with no follow-up: Stewart 2007 (six hours). Four trials included on-site training that lasted 24 hours or less with no follow-up intervention (two2 days: Fujimori 2011; 24 hours: Razavi 1993; 24 hours over three days:Fallowfield 2002 and Wilkinson 2008).

Seven trials included on-site training of less than 24 hours but with follow-up sessions, including:

- three-day course followed by four three-hour weekly sessions with one-to-one supervision (Heaven 2006);
- 1.5-day course followed by four 1.5-hour monthly video conferences (Butow 2008);
- one day course with a follow-up meeting at six weeks (van Weert 2011);
- 19-hour course followed by six three-hour consolidation workshops (Razavi 2003);
- 18-hour course with a follow-up meeting at two months (Kruijver 2001);
- 11-hour course followed by one-to-one coaching at 12 weeks (Goelz 2009);
- 1-hour lecture followed by the use of a CD-ROM for one month (Tulsky 2011).

Three trials had longer on-site training: 38 hours (Gibon 2011), 40 hours (Lienard 2010) and 105 hours (Razavi 2002). Some on-site training was on consecutive days (Fallowfield 2002: three-day residential course; Wilkinson 2008: three days; Fujimori 2011: two days); other on-site training was spread over a longer period of time (Kruijver 2001; Lienard 2010; Razavi 1993; Razavi 2002; Razavi 2003), ranging from weekly for three weeks (Razavi 2003) to bimonthly over an eight-month period (Lienard 2010).

Measurement of Outcomes

Primary Outcomes

Most studies measured outcomes before and after the CST (or no CST). Changes in HCP behaviour were measured in interviews involving simulated and/or real patients as follows.

- simulated patients only: five trials (Fujimori 2011; Gibon 2011; Goelz 2009; Razavi 1993; Stewart 2007);
- real patients only: four trials (Fallowfield 2002; Heaven 2006; Tulsky 2011; van Weert 2011);
- real and simulated patients: five trials (Butow 2008; Kruijver 2001; Lienard 2010; Razavi 2002; Razavi 2003).

One trial measured HCP behaviour in interviews with simulated patients only when real patients were not available, however, the data were analysed together (Wilkinson 2008). It is not clear whether the patients in the study by Fujimori 2011 were simulated or real, or how many patient encounters were evaluated. Without counting Fujimori 2011, investigators reported on a total of 1,761 tapes of simulated patient encounters and 1,932 tapes of real patient encounters.

The number of real patient interviews per HCP, assessed at each assessment point, ranged from one (Razavi 2002; Razavi 2003) to six (Kruijver 2001). Interviews were mostly assessed using audio recording (Gibon 2011; Heaven 2006; Lienard 2010; Razavi 2002; Razavi 2003; Stewart 2007; Tulsky 2011) or video recording (Butow 2008; Fallowfield 2002; Goelz 2009; Kruijver 2001; Razavi 1993; Razavi 2002; Razavi 2003; Wilkinson 2008). The Fujimori 2011 abstract does not describe how participants were assessed.

HCP communication skills were evaluated using a variety of scales (see Table 1). Almost every trial used its own unique scale; only two scales were used in more than one study: the Cancer Research Campaign Workshop Evaluation Manual (CRCWEM) (Booth 1991) (Razavi 1993; Razavi 2002; Razavi 2003); and LaComm, a French Communication Analysis Software (LaComm; Gibon 2010) (Gibon 2011; Lienard 2010). Most studies mention that their scale had been validated. The scales had an average of 25 variables (range six to 84). Most studies used more than one rater, and the inter-rater reliability was considered acceptable by the authors and ranged from 0.49 to 0.94.

All the trials included measurement of outcomes relating to HCPs' supportive/building relationship skills (Table 2). One study measured supportive skills only for HCPs outcomes (Tulsky 2011). Other frequently measured outcomes related to:

- information gathering e.g. open questions (10 studies: Butow 2008; Fallowfield 2002; Gibon 2011; Heaven 2006; Kruijver 2001; Lienard 2010; Razavi 1993; Razavi 2002; Razavi 2003; Wilkinson 2008); clarifying or summarising (seven studies: Fallowfield 2002; Gibon 2011; Goelz 2009; Kruijver 2001; Razavi 1993; Razavi 2002; Razavi 2003) and eliciting concerns (eight studies: Butow 2008; Goelz 2009; Heaven 2006; Kruijver 2001; Razavi 1993; Razavi 2002; Razavi 2003; Stewart 2007);
- explaining and planning e.g. appropriate information giving (nine studies: (Fallowfield 2002; Fujimori 2011; Goelz 2009; Lienard 2010; Razavi 2002; Razavi 2003; Stewart 2007; van Weert 2011; Wilkinson 2008) and negotiating (seven studies: Butow 2008; Gibon 2011; Heaven 2006; Lienard 2010; Razavi 1993; Razavi 2003; Stewart 2007).

Secondary Outcomes

Other HCP outcomes that were measured in these studies included:

- HCP health status (six trials: Butow 2008; Kruijver 2001; Lienard 2010; Razavi 1993; Razavi 2002; Razavi 2003);

- HCP perception of the interview (three trials: Fallowfield 2002; Razavi 2002; Razavi 2003);
- HCP perception of their behaviour change (eight trials: Fallowfield 2002; Fujimori 2011; Gibon 2011; Kruijver 2001; Razavi 2002; Razavi 2003; Tulsky 2011; Wilkinson 2008);
- HCP perception of their attitude change (eight trials: Butow 2008; Fallowfield 2002; Kruijver 2001; Lienard 2010; Razavi 1993; Razavi 2002; Razavi 2003; Wilkinson 2008).

We considered HCP perceptions to be very subjective outcomes and so excluded these from our review.

Patient outcomes were measured in 11 trials (Butow 2008; Fallowfield 2002; Fujimori 2011; Kruijver 2001; Lienard 2010; Razavi 2002; Razavi 2003; Stewart 2007; Tulsky 2011; van Weert 2011; Wilkinson 2008) including:
- patients' perception of the interview (nine trials: Fallowfield 2002; Fujimori 2011; Kruijver 2001; Lienard 2010; Razavi 2002; Razavi 2003; Stewart 2007; Tulsky 2011; Wilkinson 2008);
- patient health status (seven trials: Butow 2008; Fujimori 2011; Kruijver 2001; Razavi 2003; Stewart 2007; Wilkinson 2008);
- objective measure of patients communication (five trials: Kruijver 2001; Lienard 2010; Razavi 2002; Razavi 2003; van Weert 2011).

Two trials measured HCP communication with 'significant others' (Goelz 2009; Razavi 2003); one trial measured the satisfaction of 'significant others' (Razavi 2003).

All secondary outcomes except the objective measurement of patient communication were measured with questionnaires, most of which were developed locally and it was not always stated whether they had been previously validated (see Table 3 and Table 4). The following validated questionnaires were used:
- HCP health status: Maslach Burnout Inventory (MBI) (used by Butow 2008; Kruijver 2001; Lienard 2010; Razavi 2003);
- patients' perception of or satisfaction with the interview (used by Fallowfield 2002; Butow 2008; Razavi 2002; Razavi 2003; Stewart 2007; Wilkinson 2008);
- patient health status:
  ○ General Health Questionnaire 12 or GHQ12 (used by Fallowfield 2002; Wilkinson 2008);
  ○ European Organization for Research and Treatment of Cancer (EORTC) Quality of Life Questionnaire-30 or QLQ-C30 (used by Butow 2008; Kruijver 2001);
  ○ Hospital Anxiety and Depression Scale (HADS) (used by Butow 2008; Razavi 2002; Razavi 2003);
  ○ Speilberger's State Trait Anxiety Inventory (STAI-S) (used by Razavi 2003; Wilkinson 2008).

Timing of the measurement of outcomes

Most studies measured communication skills prior to the intervention (within one to four weeks) and after a post-intervention period (between one week and six months). Two studies had a further measurement at 12 and 15 months post-intervention respectively (Butow 2008; Fallowfield 2002). Three studies evaluated the effects of follow-up CST interventions conducted between one and six months after the preliminary CST intervention (Heaven 2006; Razavi 2003; Tulsky 2011).

Excluded studies

We excluded 118 studies in total, 48 of which were excluded in the original review (November 2001 and November 2003 searches) (see Figure 2). From the updated search, we excluded 80 full text records (pertaining to 70 studies). Of the 118 studies excluded, 97 of these studies were either not RCTs, or were not intervention studies of communication skills training. We excluded the remaining 21 RCTs for the following reasons:
- CST for patients not HCPs (de Bie 2011; Clark 2009; Shields 2010; Street 2010; Smith 2010; Rosenbloom 2007);
- CST in HCPs who did not work specifically in cancer care (Brown 1999; Hainsworth 1996; Roter 1995; Szmuilowicz 2010; Wetzel 2011);
- intervention was not CST (Cort 2009);
- CST was aimed at facilitating recruitment of patients to trials (Wuensch 2011);
- CST was only measured in the intervention group not the control group (Fukui 2008);
- HCP behaviour change was not measured or was self-assessed (Bernard 2010; Brown 2012; Claxton 2011; Hundley 2008; Ke 2008; Pelayo 2011; Rask 2009).

See Characteristics of excluded studies and Appendix 6.

Risk of bias in included studies

We considered studies to be at a low risk of overall bias if we assessed the individual 'risk of bias' criteria as 'low risk' in 3/6 criteria. As a result, we considered 12 of the 15 included RCTs to be at a low risk of overall bias (see Characteristics of included studies and Figure 1).

Randomisation was computer-generated in four trials (Goelz 2009; Lienard 2010; Tulsky 2011; Wilkinson 2008); by random number tables in two trials (Butow 2008; Stewart 2007); and was not described in nine trials. Allocation concealment was described in six trials (Butow 2008; Goelz 2009; Lienard 2010; Razavi 1993; Stewart 2007; Tulsky 2011) and unclear (not described) in nine trials.

Blinding of participants was not possible in these trials, however, outcome assessment was clearly stated as blinded in nine of the 15 trials. Most studies pre-specified their outcomes and reported their pre-specified primary outcomes. The following studies stated measuring some patient outcomes, however, did not report these results: Fallowfield 2002; Razavi 2002 and Razavi 2003. Loss to

follow-up in relation to the primary outcomes was unclear in seven trials and considered 'low risk' in eight trials with attrition rates ranging from 0% to 20%.

Three studies reported differences between the study groups in baseline characteristics of the HCPs (Gibon 2011; Goelz 2009; Wilkinson 2008) or patients (Razavi 2003). In two studies that measured outcomes at several points in time, it was unclear which participant interviews were included in their analyses (Lienard 2010; van Weert 2011). In Fujimori 2011, the study methods provided in the abstract were very limited, therefore, we considered all 'risk of bias' criteria to be 'unclear'. We expect that these study methods will be clearly described when this study is published in full.

Effects of interventions

See: **Summary of findings for the main comparison**

CST compared to no CST

A. HCP outcomes

A.1. Communication skills

Six studies (Gibon 2011; Lienard 2010; Razavi 1993; Razavi 2002; Razavi 2003; Tulsky 2011) contributed data to these meta-analyses: four of these studies contributed data to the 'simulated patients' subgroup and four contributed data to the 'real patients' subgroup. HCPs in these studies included 233 doctors (three studies: Lienard 2010; Razavi 2003; Tulsky 2011), 188 nurses (Razavi 1993; Razavi 2002), and one mixed group/radiotherapy team of 80 HCPs (Gibon 2011). At the post-intervention assessment, HCPs in the intervention group were statistically significantly more likely than the control group to:

- use open questions (five studies, 679 participant interviews; standardised mean difference (SMD) 0.28, 95% confidence interval (CI) 0.02 to 0.54; Analysis 1.1; P = 0.04, I² = 65%);
- show empathy (six studies, 727 participant interviews; SMD 0.21, 95% CI 0.07 to 0.36; Analysis 1.4; P = 0.004, I² = 0%).

There were no statistically significant differences between the intervention and control groups with regard to the following HCP outcomes: clarifying and/or summarising, eliciting concerns, giving appropriate information, giving facts only and negotiation. However, in the subgroup of 'simulated' patients only, HCPs in the intervention group were also:

- significantly less likely to 'give facts only' (five studies, 406 participant interviews; SMD -0.42, 95% CI -0.77 to -0.06; Analysis 1.6; P = 0.02, I² = 69%). P = 0.04 for subgroup differences.

Other HCP communication skills that were evaluated in some studies but that were either not included in our 'Types of outcome measures', or that gave insufficient data for inclusion in meta-analyses (e.g. only gave P values), included the following.

- Emotional depth: Gibon 2011 and Kruijver 2001 reported significantly greater emotional depth in the intervention groups compared with the control groups, P = 0.03 and P = 0.05, respectively.
- Empathy: Butow 2008 found less empathy in intervention group compared with the control group at six months post-intervention (P = 0.024).
- Checking that the patient understands: Kruijver 2001 reported significantly less checking of patient understanding in the CST group than in the control group; whereas Fallowfield 2002 and Goelz 2009 reported no significant difference between the groups.
- Emotional support: Fujimori 2011 reported an 'improvement' in emotional support scores in the intervention group compared with the control group. It is not stated whether this improvement was statistically significant.
- Appropriate information: There was less appropriate information giving in the CST groups than the control groups in Kruijver 2001 (P < 0.05), Lienard 2010 (P < 0.001) and van Weert 2011 (P < 0.01). Fujimori 2011 reported an 'improvement' in information-giving skills in the CST group compared with the control group.
- Team orientated focus: Gibon 2011 reported greater team orientated focus in favour of the intervention group (P = 0.023).
- Blocking behaviours: No significant effect of CST was found by Butow 2008 (P = 0.66), Heaven 2006 and Razavi 1993; whereas, Wilkinson 2008 found significantly less blocking behaviour in the intervention group (P = 0.001).
- Global score: Wilkinson 2008 and Goelz 2009 reported significantly better global communication scores for the CST groups than the control groups (P < 0.001 and P = 0.007, respectively).

Doctors only

Three studies enrolling doctors contributed data to these subgroup analyses (Lienard 2010; Razavi 2003; Tulsky 2011); the results were consistent with the main findings. At the post-intervention assessment, doctors in the intervention group were statistically significantly more likely than those in the control group to:

- use open questions (two studies, 306 participant interviews; SMD 0.27, 95% CI 0.05 to 0.50; Analysis 2.1; P = 0.02, I² = 0%);
- show empathy (two studies, 354 participant interviews; SMD 0.22, 95% CI 0.01 to 0.43; Analysis 2.4; P = 0.04, I² = 0%).

There were no statistically significant differences between the in-

tervention and control groups in the meta-analyses of the following outcomes: clarifying and summarising, eliciting concerns, giving appropriate information and giving facts only.

Nurses only

Only two studies contributed data to these subgroup analyses (Razavi 1993; Razavi 2002). At the post-intervention assessment, there were no statistically significant differences between the intervention and control groups in any of the meta-analyses (Analysis 3.1; Analysis 3.4; Analysis 3.5; Analysis 3.6).

Sensitivity analyses

We performed sensitivity analyses of our primary HCP outcomes to exclude studies that evaluated follow-up interventions, i.e. Razavi 2003 and Tulsky 2011. We noted the following effects:

- Analysis 1.1: the use of 'open questions' became no longer statistically significant (four studies, participant interviews; SMD 0.26; 95% CI -0.08 to 0.60; P = 0.13; I² = 75%);
- Analysis 1.4: showing 'empathy' remained statistically significant when these two studies were excluded (four studies, participant interviews; 0.21 95% CI 0.04 to 0.38; P = 0.010; I² = 0%);
- the results of the other primary analyses either remained either very similar to the original analyses, or they contained insufficient studies for meta-analyses to be performed.

We also performed subgroup analyses to determine whether there were significant differences in primary outcomes between nurses and doctors participating in these trials (Analysis 4.1; Analysis 4.2; Analysis 4.3; Analysis 4.4; Analysis 4.5; Analysis 4.6), however, tests for subgroup differences were not significant.

A.2. Other HCP outcomes

Two studies (Kruijver 2001; Razavi 2003) contributed data to meta-analyses relating to HCP 'burnout'. Kruijver 2001 enrolled nurses and Razavi 2003 enrolled doctors (62% were oncologists). Burnout was measured using the Maslach Burnout Inventory (MBI). For the outcome 'emotional exhaustion' there was no statistically significant difference in mean scores between the intervention and control groups (106 participant interviews: SMD -0.25, 95% CI -0.67 to 0.18; Analysis 5.1; P = 0.25, I² = 16%). Butow 2008 also reported 'burnout' and found no significant effect of CST on this outcome, however did not report these data in a usable form for this meta-analysis. For the outcome 'personal accomplishment' there was no statistically significant difference between the intervention and control groups (91 participant interviews; SMD 0.26, 95% CI -0.24 to 0.76; Analysis 5.2; P = 0.30, I² = 25%).

B. Patient outcomes

Two studies (Razavi 2003; Wilkinson 2008) evaluated 'patient anxiety' using the Spielberger State of Anxiety Inventory (STAI-S). Anxiety scores decreased in both groups in both studies after all the interviews, however, the mean reduction in anxiety scores (pre- and post-interview) was significantly greater in the control group (169 participant interviews; SMD 0.40; 95% CI 0.07 to 0.72; Analysis 6.2; P = 0.02; I² = 8%).
Wilkinson 2008 evaluated patient 'psychiatric morbidity', assessed by the GHQ 12 questionnaire, and found it to be significantly lower in the intervention group than the control group (one study, 127 participant interviews; SMD -0.36, 95% CI -0.71 to -0.01; Analysis 6.1; P = 0.05), however, this study reported significantly greater baseline anxiety in the control group.
Two studies contributed data to each of the outcomes 'patient perception of HCP communication skills' (Analysis 6.3; Razavi 2002; Razavi 2003) and 'patient satisfaction with communication' (Analysis 6.4; Fallowfield 2002; Wilkinson 2008). There were no statistically significant differences in either of these outcomes between the groups.
Patient outcomes that were either not included in our 'Types of outcome measures', or that gave insufficient data for inclusion in meta-analyses (e.g. only gave P values), included the following.

- Patient trust: Tulsky 2011 reported significantly greater patient trust in the intervention group (P = 0.036).
- Quality of life: Kruijver 2001 found statistically significant improvement in only 1/30 items; and Butow 2008 found no statistically significant differences.
- Recall of information: van Weert 2011 reported a 'marginally significant' improvement in patient recall following HCP CST.
- Anxiety: Butow 2008 reported a statistically significant reduction in patient anxiety (telephone interviews) one week after the consultation in the intervention group (P = 0.021). This change was not maintained in telephone interviews three months later.
- Depression: Butow 2008 found no statistically significant difference in patient depression (telephone interviews) at one week after the consultation in the intervention group.
- Distress: Fujimori 2011 reported that distress scores were 'significantly decreased' in the intervention group compared with the control group.
- Satisfaction: Fujimori 2011 reported 'no significant difference' in satisfaction between patients of the intervention group and the control group.

C. 'Significant other' outcomes

One study (Razavi 2003) reported no statistically significant differences in relatives' anxiety or satisfaction between intervention and control groups, however the data given were insufficient for meta-analysis. Goelz 2009 found statistically significant improve-

ments in some HCP behaviour in relation to relatives in simulated interviews (P < 0.001).

D. Effect of CST over time

Two trials studied the effect of CST up to one year after the intervention. Butow 2008 reported that clinically significant improvements in doctors communication skills at six months were maintained at 12 months in the group that received CST, however these improvements were not statistically significant. Doctors in the intervention group scored lower on responding to distress than the control group at 12 months.

Fallowfield 2002 evaluated all participants at three months post-intervention, and evaluated the intervention group only at 15 months post-intervention. For the intervention group doctors, most statistically significant benefits of CST (appropriate questions and responses) displayed at three months were maintained at 15 months, however, there was a drop off in empathy scores (P < 0.001). At 15 months post-intervention, the investigators also noted a significant improvement in the HCPs' summarising of information for the patients (P = 0.038), and that they interrupted less (P < 0.001) than at the three-month assessment.

Follow-up CST compared with no follow-up CST

Three trials studied the effect of follow-up interventions (Heaven 2006; Razavi 2003; Tulsky 2011), however, they reported little data that we could use in our meta-analyses, most of which (Analysis 7.1; Analysis 7.2; Analysis 7.3; Analysis 7.4; Analysis 7.5; Analysis 7.6; Analysis 7.7) contain data from only one study (Razavi 2003). However, meta-analysis of two studies was possible for the outcome 'empathy'. We found no significant difference between the intervention and control groups with regard to this outcome (two studies, 168 participant interviews; SMD 0.23, 95% CI -0.07 to 0.54; P = 0.14; I² = 0%) (Analysis 7.4). Individually, these studies reported the following.

• Razavi 2003 reported some statistically significant improvements in doctors' communication skills after a single 2.5-day CST workshop followed by six, bimonthly, three-hour consolidation workshops compared with a single 2.5-day CST workshop only. These significant improvements included: open questions in simulated interviews (P = 0.014); checking understanding (P = < 0.01); and empathic statements in real patient interviews (P = 0.009) and in interviews where a relative was present. In addition, patients interviewed by doctors who received the follow-up CST perceived that their doctor had a better understanding of their disease than patients of doctors who received no follow-up CST (P = 0.04). The follow-up CST had no significant effect on patient satisfaction or anxiety levels, except in interviews with relatives, where the patients, but not the relatives, were reported to be more globally satisfied (P = 0.024).

• Tulsky 2011 reported a statistically significant improvement in oncologists communication skills in interviews with real

patients after a CST lecture and the use of a follow-up CD-ROM, compared with a control group who had received a CST lecture only: Empathic statements (P = 0.024) and 'response to empathic opportunity' (P = 0.03) were improved in the intervention group. Patient trust also improved (P = 0.036).

• Heaven 2006 failed to show any difference in nurses' communication skills in real patient encounters after receiving a three-day CST course followed by four half-day supervision sessions spread over four weeks, compared with the three-day CST course only.

Comparison of different types of CST

One trial with 51 participants (18 oncologists, 17 family physicians and 16 surgeons) compared a six-hour student-centred, experiential CST, to a two-hour small-group discussion commenced with a video (Stewart 2007). No statistically significant differences were found between the groups in HCP behaviour outcomes in the post-intervention simulated interviews, however, in the subgroup analysis of family physicians, those who participated in the six-hour course showed better scores in offering support (P = 0.02), information sharing (P = 0.05), and exploring and validating whole person issues (P = 0.02 and P = 0.05, respectively) compared with those who participated in the two-hour course. In the subgroup of surgeons, patient satisfaction and perception of well-being improved after the six-hour course (P = 0.02 and P= 0.03 respectively). Overall, there was no significant effect on the patients' psychological distress; however, using a single validated question, more patients "felt better" with HCPs who had undergone the six-hour training course than with HCP participants of the two-hour course (P = 0.02).

Feedback compared to no feedback

Only one study reported this comparison (Fallowfield 2002) and found no significant differences between HCP communication skills in groups receiving 'feedback' or 'no feedback'.

DISCUSSION

Summary of main results

We performed meta-analyses of seven HCP communication skill outcomes (using open questions, clarifying/summarising, eliciting concerns, showing empathy, giving appropriate information, giving facts only and negotiating), two 'other' HCP outcomes relating to 'burnout '(emotional exhaustion, personal accomplishment) and four patient outcomes (psychiatric morbidity, anxiety, perception of HCP communication, satisfaction with HCP communication). Overall, 10 studies contributed data to the meta-analyses.

HCPs in the intervention groups were statistically significantly more likely to use open questions in the post-intervention interviews than the control group (five studies, 679 participant interviews; P = 0.04, I² = 65%); they were also statistically significantly more likely to show empathy towards their patients (six studies, 727 participant interviews; P = 0.004, I² = 0%). We considered these findings to be of a moderate and high quality, respectively (see Summary of findings for the main comparison). In subgroup analyses according to staff type, these benefits of CST remained statistically significant when 'doctors only' were included in the meta-analyses, but not for 'nurses only', however, doctors and nurses did not perform statistically significantly differently for any HCP outcomes.

There were no statistically significant differences in the other HCP communication skills except for the subgroup of participant interviews with simulated patients, where the intervention group was significantly less likely to present simulated patients with 'facts only' compared with the control group (four studies, 344 participant interviews; P = 0.01, I² = 70%). Tests for subgroup differences (between real and simulated patients) were significant.

HCP 'burnout' was assessed post-intervention in three studies using the Maslach Burnout Inventory. Two studies could be included in a meta-analysis: one was conducted in nurses, the other in doctors (mainly oncologists). There were no statistically significant differences between the intervention and control groups with regard to 'emotional exhaustion' (106 participant interviews; P = 0.25, I² = 16%) or 'personal accomplishment' (91 participant interviews; P = 0.30, I² = 25%) when we combined these data. We consider this evidence to be of a low quality.

With regard to patient outcomes, two studies contributed data to the outcome 'patient anxiety'. Meta-analysis showed a significantly greater reduction in anxiety scores in the control group (169 participant interviews; P = 0.02). In a study of 172 nurses, psychiatric morbidity was found to be statistically significantly lower in the intervention group than the control group (P = 0.05). There were no statistically significant differences in 'patient perception of HCPs communication skills' (two studies, 170 participant interviews) and 'patient satisfaction with communication' (two studies, 429 participant interviews) in meta-analyses of these outcomes. We consider this evidence to be of a low to very low quality.

Overall completeness and applicability of evidence

These meta-analyses offer limited evidence that communications skills training of HCPs working in cancer care has a beneficial effect on some HCP communication skills when assessed up to six months after the training course or workshop. The types of skills that showed statistically significant improvement in our meta-analyses were related to information gathering (open questions) and supportive or relationship-building skills (empathy). These bene-

fits probably apply to both doctors and nurses as tests for subgroup differences were not statistically significant.

There was a statistically significant difference in the outcome 'give facts only' when we subgrouped studies by the type of patient (real or simulated); HCPs in the simulated patient subgroup were statistically significantly less likely to 'give facts only' compared with controls. As this did not hold true for 'real' patients, it suggests that CST may not always translate into clinically meaningful results. This is supported by the findings of two studies that measured HCP behaviour with identical scales in both real and simulated patients, and reported that the benefits were less when measured in real patients (Kruijver 2001; Razavi 2002).

The types of CST, length of training and time spread were diverse and it was not possible to draw conclusions as to the relative efficacy of the different programs. These results, therefore, are not necessarily applicable to all types of CST. In future versions of this review, it may be desirable to subgroup our results according to intervention type; this was not possible for the current version due to the small number of contributing studies. Furthermore, longer-term follow-up is necessary to ascertain whether these skills are retained. In the 15 included studies, the longest follow-up occurred in Butow 2008 and Fallowfield 2002, at 12 and 15 months post-intervention, respectively. These studies give conflicting results and we were unable to combine these data in a meta-analysis. Three trials (Heaven 2006; Razavi 2003; Tulsky 2011) studied the effects of follow-up interventions on HCP communication skills and reported some positive effects on the maintenance of behaviour change in clinical practice, however, the longest follow-up period was six months, and meta-analyses including these studies were not possible except for the outcome 'empathy', for which we found no statistically significant difference. The efficacy of follow-up CST is inconclusive based on the available evidence.

Few studies reported patient health-related outcomes and those that did had little usable data. Evidence for a beneficial effect on patients' psychological and physical health is lacking and further research is needed in this regard. All trials were performed in developed countries and, thus, the results may not be widely applicable to less-developed regions.

Quality of the evidence

We graded the review evidence according to guidelines from the *Cochrane Handbook for Systematic Reviews of Interventions*, that supports the GRADE approach, defining the quality of the body of evidence as the extent to which one can be confident that an estimate of effect or association is close to the quantity of specific interest (Higgins 2011). Downgrading of evidence can occur if there are limitations in the design and implementation of available studies, the data are heterogeneous or imprecise reflected by wide confidence intervals, the evidence is indirect or there is a high probability of publication bias.

We consider the evidence related to two primary outcomes, 'empathy' and 'open questions' to be of a high and moderate quality, respectively (see Summary of findings for the main comparison for reasons). We downgraded the evidence relating to 'open questions' due to the substantial heterogeneity amongst studies included in the meta-analysis of this outcome.

The quality of evidence for the other primary outcomes and secondary outcomes is low to very low. This is due to a number of factors including the small numbers of studies with usable data for various meta-analyses. In addition, the included studies displayed considerable heterogeneity in terms of the types of CST, the types of patients (real or simulated), the outcomes assessed, the measurement tools used to evaluate outcomes, and other variables.

Potential biases in the review process

For the protocol and original 2002 review, we defined 'Types of outcomes' simply as '*changes in behaviour or skills measured using objective and validated scales*'. However, for the update, we defined primary and secondary outcomes more clearly. By so doing, we may have introduced bias into the review. In addition, by choosing to extract data and perform meta-analyses, thereby possibly limiting the review findings to a handful of outcomes, rather than present the data of the 15 studies in a narrative review, we may have introduced bias. Several studies reported other HCP behavioural outcomes (i.e. that were not included in our list of outcomes) and we hope that by presenting these additional data, we have been able to present the wide range of evidence (and quality of evidence) available to inform opinion.

Some trials reported statistically significant effects (both positive and negative) of various HCP communication outcomes but were limited by the inadequate reporting of data such that the data could not be used in meta-analyses. Types of limited reporting included only giving P values, percentages, or means without numbers assessed or standard deviations. The fact that useable data for these outcomes were not available, may have inherently biased the review. For example, three studies (Kruijver 2001; Lienard 2010; van Weert 2011) individually reported statistically significantly less 'appropriate information giving' in their intervention groups than the control groups, suggesting that CST may negatively impact this outcome, but there were no accompanying extractable data to support the reports. Our meta-analysis of this outcome included data from only two studies and we found no significant difference between the two groups, although the point-estimate favoured the control group (Analysis 1.5).

In some studies, outcomes consisted of phrases, or aspects of scales that we had not included as outcomes for this review. Almost every trial used its own unique scale with an average of 25 variables (range, six to 84); with only two scales used in more than one study. We used standardised mean differences to adjust for these different scales and random-effects methods for all meta-analyses, to minimise potential biases.

Lastly, by including data from the studies of follow-up interventions (three studies) in our meta-analyses of 'CST versus no CST', we may have introduced bias into our meta-analyses. All HCPs in these studies received preliminary CST and then subsequently randomised to receive a follow-up CST intervention. We performed sensitivity analyses to determine what effect including these studies had on our overall results and reported these findings.

Agreements and disagreements with other studies or reviews

Previous reviews Barth 2011; Paul 2009; Uitterhoeve 2010 have consistently concluded that CST leads to better HCP communication behaviours. Barth 2011 included 13 studies (three non-randomised) and extracted effect sizes for the outcomes HCP behaviour, HCP attitudes and patient outcomes. It is not clear to us how they combined the several aspects of HCP behaviour into a single effect size as the included studies reported diverse behaviour outcomes, however, they report a low to moderate effect of CST on HCP behaviour. Thus, our findings seem to agree. Barth 2011 also performed subgroup analysis to assess the effect of the duration of the CST course on HCP behaviour and reported a trend toward shorter courses being less successful than longer ones; this finding supports the conclusions of Gysels 2004, but we were unable to corroborate these findings.

HCP attitude change is a very subjective outcome and, although CST has been reported in other reviews to have a positive effect on this outcome (Barth 2011), we have not included it in our review. Barth 2011 suggests that the inability to show profound results following CST workshops may be due to the high pre-intervention competencies in the participants taking part in the CST. This is a good point. Most of our included studies were conducted in oncologists and cancer care nurses with experience ranging from two to 24 years.

We agree with the findings of other reviews (Barth 2011; Paul 2009; Uitterhoeve 2010), that CST in HCPs appears to have little effect on patient outcomes, however high-quality data for patient outcomes are scarce. The Kissane 2012 review expressed uncertainty as to whether the skills acquired from CST are maintained in the long term; we agree that the long-term benefits of CST are not clearly established. Our findings support the recommendations for the development of standardised outcome measures for future research in the consensus statement of European experts (Stiefel 2010).

AUTHORS' CONCLUSIONS

Implications for practice

Communication skills training for HCPs working in cancer care using learner-centred, experiential education methods by experi-

enced facilitators, can result in improvements of some communication skills, particularly gathering information skills and empathy. Whilst improving these information-gathering and supportive skills, CST courses should also aim to ensure appropriate information-giving skills in HCP participants. CST appears to have little measurable benefit to the patient and it is unclear whether the skills acquired by HCPs are retained in the long term. In addition, it is unclear what type, duration and intensity of CST is most effective, and whether consolidation workshops may improve the impact of CST.

Implications for research

The original version of this review called for further research and the number of randomised trials has since increased dramatically. However the diversity of studies, particularly in the scales used to measured HCP communication skills, has limited the conclusions of this updated review. We recommend that RCTs use standard validated scales, and that (limited) core study outcomes (both for HCP outcomes and patient outcomes) are identified and pre-specified. Several validated scales to measure HCP communication now exist (Table 1) but investigators should ensure that their outcomes permit comparability between studies. It may be preferable to use real patients for measurement of HCP communication in studies of CST interventions to ensure clinically meaningful results. Trials should include clear reporting of trial methods and study outcomes, and data should be reported in full e.g. continuous data as means with standard deviations and the number analysed per outcome.

Other Important questions remain unanswered.

- The optimal length of training/course structure

- The long-term efficacy of communication skills training

- The role of e-learning

- Compulsory rather than voluntary training

- The role of consolidation courses

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Butow 2008

Methods	RCT.
Participants	30 medical and radiation oncologists from 6 Australian teaching hospitals: Age = 36.5 to 51 years; years of experience = 7.5 to 24.3 years 343 cancer patients (60% women) answered questionnaires post-consultation
Interventions	1.5 day work-shop with 3 to 6 participants, followed by four 1.5 hour video conferences incorporating role-play of doctor-generated scenarios. Work shop included DVD modelling ideal behaviour; role-play and feedback with an SP using standardised cases and from own experience, booklet summarising evidence, video of own role-play. Emphasis on how to establish a collaborative framework, and how to respond to anxiety, depression, distress and anger
Outcomes	HCP (oncologist) outcomes on video of SP interview at baseline, immediately post-intervention and 6 months post-intervention (or equivalent timings for control group) • Communication skills (2 major categories: creating environment and responding to specific emotions) in SP encounters immediately and 6 months post-intervention. HCP (oncologist) Burnout' measured using MBI* Patient outcomes: • QOL (EORTC QLQ C30)*, Anxiety and Depression (HADS*) and perceived needs (SCNS*) measured by telephone interview 1 week and 3 months post-consultation.
Notes	There was a trend for training to be successful in increasing some HCP communication skills, however, no changes were statistically significant Anxiety was reduced in patients interviewed by oncologists from the intervention group one week later (P = 0.021) No other statistically significant differences were found in patient outcomes

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomised at individual level using random number tables and Excel software
Allocation concealment (selection bias)	Low risk	Allocated centrally by research team.
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Not described.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No description of total number of HCP measured post-intervention. Low attrition in HCP and patient questionnaires

Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported.
Other bias	Low risk	Baseline characteristics of the two groups were similar.

Fallowfield 2002

Methods	RCT. Written feedback followed by course, or course alone, or written feedback alone, or control
Participants	160 medical, surgical and radiation oncologists from 34 cancer centres in the UK; 69% men 640 cancer patients (60% women) participated in the videotaped consultations (2 videotapes per oncologist at baseline and 3 months post-intervention) 2331 cancer patients answered questionnaires.
Interventions	Cancer Research UK Communication Skills Program. Intensive 3-day residential course and/or feedback pack
Outcomes	HCP (oncologist) outcomes on video of RP interviews at baseline, and 3 months post-intervention (or equivalent timings for control group).: • Communication skills as assessed in 2 videotapes per oncologist of RP encounters, before and 3 months post-intervention, rated using MIPS*; • Attitudes and beliefs 3 months post-intervention, rated using PPSB*. Patient outcomes: • Patient satisfaction with communication (PSCQ*) measured immediately after consultation with oncologist pre- and 3 months post-intervention.
Notes	CST group had a statistically significant improvement in oncologists' attitudes to psychosocial issues (P = 0.002) and a non-significant positive effect on patient satisfaction. Follow-up for 12 months revealed no demonstrable attrition in most of the skills improvement, some new skills, but a decline in expressions of empathy

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Not fully described.
Allocation concealment (selection bias)	Unclear risk	Not described.
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Video raters blinded as far as possible for time-point of assessment and group

Fallowfield 2002 *(Continued)*

Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Low risk on HCP behaviour outcomes; 21% attrition for patient outcomes; only intervention group followed up at 12 months
Selective reporting (reporting bias)	Low risk	All prespecified outcomes were described.
Other bias	Low risk	Baseline characteristics of two groups were similar.

Fujimori 2011

Methods	RCT conducted in Japan.
Participants	30 oncologists
Interventions	A 2-day CST workshop (intervention) or 'no CST' (control).
Outcomes	HCP outcomes: • Communication skills measured in SP encounters • Self-perception of self-confidence. Patient outcomes: • Distress; • Satisfaction with doctor's communication and consultation. Assessed at baseline, post-CST or one-week later.
Notes	Only the abstract, which contained no data, was available at the time of publication. The abstract reports that skills relating to emotional support and information-giving were higher in the intervention compared with the control group, patient distress scores were lower, and patient satisfaction scores were similar at the follow-up assessment

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	'Randomly assigned'.
Allocation concealment (selection bias)	Unclear risk	Not described.
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Not described.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Not described.

Fujimori 2011   (*Continued*)

Selective reporting (reporting bias)	Unclear risk	Only a conference abstract available. No data reported.
Other bias	Unclear risk	Attempts to contact the authors for data were unsuccessful.

Gibon 2011

Methods	RCT.
Participants	80 participants of 4 radiotherapy teams comprising secretaries (16%), physicists (7.5%) , nurses (49%), doctors (27.5 %)
Interventions	38 hours of CST; not described in detail.
Outcomes	HCP communication skills rated using the scale LaComm* on audio of simulated breast cancer patient (SP) interview at baseline and post-intervention (or equivalent timings for control group)
Notes	For some communication skill outcomes, course attendees (intervention group) had significantly more appropriate behaviours/skills than those who had not attended; these included a team orientated focus (P = 0.023), empathy (P = 0.037) and emotional words (P = 0.030)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Not described.
Allocation concealment (selection bias)	Unclear risk	Not described.
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Not described.
Incomplete outcome data (attrition bias) All outcomes	Low risk	83% follow-up.
Selective reporting (reporting bias)	Unclear risk	No details of data extracted using LaComm*.
Other bias	High risk	Some differences in baseline characteristics of two groups including work experience in oncology, full-time occupation, and % of non-professionals

Goelz 2009

Methods	RCT conducted from June 2007 - Feb 2009.
Participants	41 doctors (39 from Department of Haematology/Oncology, one from Gynaecology, one from Surgery)
Interventions	CST in the form of COM-ON-p(**COM**munication challenges in **ON**cology related to the transition to **p**alliative care training program), including a one hour pre-assessment with SPs, an 11-hour training course (main focus practice with SPs using cases of participants) plus a half-hour individual coaching session two weeks later. The courses were run in groups of 8/9 participants by two experienced facilitators
Outcomes	HCP (Doctors') communication skills in video-recorded SP consultations pre-intervention and five weeks post-intervention using COM-ON-checklist included: " specific skills for palliative care", "general communication skills", "involvement of significant other", 2 global scores on "global communication skills" and "global involvement of significant other".
Notes	The average overall estimate of effect favoured the intervention group (P=0.0007). There was a statistically significant difference between intervention and control group in all sections in favour of the intervention group including: specific palliative communication skills (P<0.0026); general communication skills (P<0.0078); and involvement of significant others (P<0.0051)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer-generated randomisation to two groups in blocks of 8 by an 'external statistician'
Allocation concealment (selection bias)	Unclear risk	Allocation by fax.
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Outcome assessors blinded to group allocation.
Incomplete outcome data (attrition bias) All outcomes	Low risk	100% follow-up.
Selective reporting (reporting bias)	Low risk	All pre-specified outcomes reported.
Other bias	High risk	Doctors in the intervention group had significantly more professional (P = 0.02) experience compared with those in the control group

Heaven 2006

Methods	RCT.
Participants	61 UK nurses all of who received basic 3-day CST training prior to randomisation: 68% working in palliative care; mean age 42 years; all but one female; 41% worked in community only, 21% hospital only, 38% hospital and community 366 RP encounters (75% women, mean age 61years)
Interventions	Four 3-hour supervision sessions plus feedback on video of interview with RPs Both intervention and control groups had basic training prior to baseline
Outcomes	HCP (nurses') communication skills assessed in audio-recording of 3-RP interviews at 1 and 3 months post-intervention, rated using MIARS: • 10 key interviewing skills, • psychological exploration, • overall communication profile.
Notes	Some communication behaviours were enhanced in the intervention group after supervision, including psychological exploration (P = 0.039)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Not described.
Allocation concealment (selection bias)	Unclear risk	Not described.
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Data collectors and judges were blinded to time and group.
Incomplete outcome data (attrition bias) All outcomes	Low risk	84% follow-up at 3 months.
Selective reporting (reporting bias)	Low risk	All pre-specified outcomes were reported.
Other bias	Low risk	Baseline characteristics of two groups were similar except the control group had more communication skills training (P = 0. 037)

Kruijver 2001

Methods	RCT.
Participants	53 nurses from 11 wards in 3 Dutch hospitals: mean age was 32 years, 83% women; mean of 5 years' experience in oncology 265 recently diagnosed cancer patients admitted for treatment 106 patient encounters (55% women, mean age 55 years).

Kruijver 2001 (*Continued*)

Interventions	Six 3-hour sessions with 10-15 participants run by two trainers with experience in clinical patient care. CST included theory, demonstration of skills, and feedback on role-playing
Outcomes	HCP (nurses') communication skills assessed on video recordings of SP interviews (one month post-intervention) and 5 RP admission interviews between 1-7 months post-intervention using RIAS*: • Instrumental communication (information collecting and giving)' • affective communication (psychosocial and emotional topics). Nurses' 'burnout' was measured using MBI. Patients outcomes: • Satisfaction with care (PSQ-C)*; quality of life (EORTC QLQ-C30)* were measured after the video taped interview, at discharge and 3 months after discharge.
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	53 participants " randomised at ward level".
Allocation concealment (selection bias)	Unclear risk	Not described.
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Independent rater but blinded status not described.
Incomplete outcome data (attrition bias) All outcomes	Low risk	83% to 86% follow-up.
Selective reporting (reporting bias)	Low risk	All pre-specified outcomes were reported.
Other bias	Low risk	Baseline characteristics of two groups were similar.

Lienard 2010

Methods	RCT.
Participants	113 Belgian residents who had been, or were, working with cancer patients 759 hospitalised patients answered questionnaires. 88 patient encounters analysed (56% women;.mean age 55 years)
Interventions	40-hour training programme (17 hours on two-person interview skills, 10 hours on three-person interviews, 10 hours on stress management, 3 hours on integration of skills) bimonthly over an 8-month period. Small groups (maximum 7 participants). Comprised a one-hour theoretical session, role-plays of pre-defined cases, and cases from participants

Lienard 2010   (*Continued*)

	with immediate feedback
Outcomes	HCP (residents) communication skills were analysed in audiotapes of 1 SP encounter and 1 RP interview during a clinical round pre- and post-intervention or at 8 months (control group) using LaComm*: • type of question, • supportiveness, • information giving and negotiation. Also time spent on the 3 phases of breaking bad news and precision of the delivery of diagnosis Residents' burnout was measured pre- and post-intervention using MBI Residents' physiological arousal was measured during the SP interviews Patient outcomes: • Satisfaction was measured on a three-item questionnaire using a visual analogue scale patients seen on a half-day clinical round per resident, pre- and post-intervention (mean of 4.5 patients per round).
Notes	Statistically significant improvement was found in 2 of 12 items of HCP skills with RPs. No effect on empathy or supportive skills in RPs. Significant increase in open questions, empathy, and concise precise diagnoses in SPs, but significant decrease in other information with SP

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer-generated.
Allocation concealment (selection bias)	Unclear risk	Not described.
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Assessor blinded to time assessment and group allocation
Incomplete outcome data (attrition bias) All outcomes	High risk	Trained residents took part in an average of 25 hours (62%) of a training program (range 8-40 hours). 77% follow-up in RPs; 86% follow-up in SPs
Selective reporting (reporting bias)	Unclear risk	Subgroup analysis of % training attendance.
Other bias	High risk	Selection of interview for HCP communication analysis unclear. Number of patients with cancer : < 40% of patient interviews analysed and numbers are unclear in 'patient satisfaction' outcome

Razavi 1993

Methods	RCT.
Participants	72 oncology nurses from 4 hospitals in France and Belgium participated
Interventions	24-hour training program taught in 8 weekly, 3-hour sessions
Outcomes	HCP (nurses') communication skills in first 5 minutes of video-taped SP interviews, pre- and 2 months post-training, rated using CRCWEM* (Cancer Research Campaign Workshop Evaluation Manual); • Information collecting skills, • creating relationship skills, • structure, • control of session. Nurses' attitudes (SDAQ*), occupational stress (NSS*) and self-perception
Notes	Trained group were assessed as 'more in control of the interview' than the untrained group during the follow-up interview (P = 0.02)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Twelve participants per institution were "randomly assigned" to two groups
Allocation concealment (selection bias)	Low risk	Allocation by sealed envelopes.
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Video raters blinded for group; questionnaire assessors not blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	Low attrition rates: one drop out, three incomplete data sets out of 72 participants
Selective reporting (reporting bias)	Low risk	All pre-specified outcomes were reported.
Other bias	Low risk	Baseline characteristics of two groups were similar.

Razavi 2002

Methods	RCT.
Participants	115 oncology nurses from 33 hospitals in Belgium. 114 cancer patients during first week of hospitalisation.
Interventions	105-hour communications skills workshop with 10 participants, run by psychologist, taught over 3 months for one week per month

Razavi 2002   (*Continued*)

Outcomes	HCP (nurses') communication skills in video-taped SP interviews and audio-taped RP interviews pre- and post-intervention (or equivalent timings for control group), and three months later rated using CRCWEM* (Cancer Research Campaign Workshop Evaluation Manual), plus dictionaries (HPSD* and MRID*) and LACOMM* • collecting information, • creating relationships, including empathy and depth of emotional words. Nurses' Stress (NSS*) and Attitudes (SDAQ*). Patient outcomes: • expression of affect (CRCWEM*), • quality of life, • satisfaction with interview (PSIAQ).
Notes	Patients interviewed by trained nurses also used more emotional words associated with 'distress' than did those seen by untrained nurses (P = 0.005). There was a positive training effect on patient satisfaction (P < 0.01)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Randomisation was performed every time there were 20 nurses enrolled
Allocation concealment (selection bias)	High risk	Randomisation was performed every time there were 20 nurses enrolled
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Raters blinded by time and group.
Incomplete outcome data (attrition bias) All outcomes	Low risk	86% follow-up for HCP behavioural outcome.
Selective reporting (reporting bias)	Low risk	All pre-specified outcomes were reported.
Other bias	Low risk	Baseline characteristics were similar in both groups.

Razavi 2003

Methods	RCT of follow-up consolidation sessions after both groups had basic training
Participants	63 physicians (62% oncologists) from Belgium hospitals, age 43+/-7, 55% men, with average 14 years of experience in oncology and 43% no prior CST. All had participated in a 19-hour CST workshop (consisting of two, 8-hour/day sessions and one, 3-hour evening session) 59 cancer patients, undergoing a 'breaking news' interview (67% women mean age 58 years) 53 cancer patients (65% women mean age 60 years) in encounters with relatives (48%

	women mean age 57 years)
Interventions	Six, 3-hour per evening, bimonthly, consolidation sessions over three months
Outcomes	HCP (doctors) outcomes: • Communication skills: assessment skills (collecting information), information (giving) skills and supportive skills (empathy and emotional depth) were measured in audio-taped SP 'breaking bad news' interviews and video-taped RP interviews, rated using CRCWEM* before basic training and 5 months after training. Some interviews with accompanying significant other. • Ability to detect distress (10-point visual analogue scale). Patient outcomes: • anxiety (STAI)*, • anxiety and depression (HADS)*, • perception of interview (PIQ)*. Significant other outcomes: • anxiety (STAI)*, • anxiety and depression (HADS)*.
Notes	There was no effect of consolidation workshops on doctors' ability to detect patient distress

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	72 participants "randomly assigned".
Allocation concealment (selection bias)	Unclear risk	Not described.
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Raters blinded for time (pre/post) and group.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	81% follow-up for SP and RP; and 77% follow-up for RP interview with significant other
Selective reporting (reporting bias)	Low risk	All pre-specified outcomes were reported.
Other bias	Low risk	Baseline characteristics of the two HCP groups were similar. Baseline scores of patient anxiety were markedly higher in patients seen by the control group

Stewart 2007

Methods	RCT.
Participants	51 doctors (18 oncologists, 17 family doctors and 16 surgeons) from 3 towns in Canada 102 cancer patients who attended outpatient clinics of oncologists and surgeons
Interventions	6-hour intensive CST course including literature, physicians and patients perspectives, video modelling poor and better behaviour, role-play, video and feedback with SP using standardized cases. Emphasis on exploring patients perspectives Control group received the standard 2hr small group discussion triggered by video of interview between physician and breast cancer standardised patient
Outcomes	HCP (doctors) communication skills in video-taped SP interviews at baseline and after intervention. Rated using PCCM*: • overall estimate of effect, • 7 subscores including validation of patient-expressed experiences, expression of support, building relationships, sharing information, control and mastering whole person experience. Patient outcomes (measured only for surgeons and oncologists in both groups): • patient distress (BSI*), • perception of interview (CDIS*; PPPC*), • a single item ('Feel better?').
Notes	Training had a positive impact on patients' satisfaction (P = 0.03) and "feeling better" (P = 0.02)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Random number table.
Allocation concealment (selection bias)	Low risk	Randomized done by project co-ordinator.
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Raters and patients were blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	100% for HCP behaviour outcome; 44.3% patient response rate to patient questionnaire
Selective reporting (reporting bias)	Low risk	Subgroup analysis (family physicians) on selected outcomes.
Other bias	Low risk	

Tulsky 2011

Methods	Single-blind RCT. Stratified by site, gender and oncologist speciality
Participants	48 oncologists (medical, gynaecological and radiation), all of whom received a one hour lecture on communication skills 264 patients with advanced cancer (65% women mean age 60 years)
Interventions	Computerised intervention (interactive CD-ROM) organised in five 15-minute modules and included principles of effective communication, recognising and responding to empathic opportunities, conveying prognosis and answering difficult questions. Included tailored feedback from oncologists' own recorded conversations
Outcomes	HCP (oncologists) outcomes: • communication skills (empathic statements and empathetic response to patient expression of emotions) in audiotaped RP encounters at one month post-intervention. Patient outcomes (measured one week after the encounter by telephone survey): • trust; perception of doctors' communication skills (empathy, knowledge of patient, therapeutic alliance).
Notes	CST aimed to influence a limited number of skills. Median time of training program = 64 minutes (58-99)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Balanced randomisation in a 1:1 ratio by site, sex and speciality. Statistician performed minimisation method of randomisation to ensure balanced groups
Allocation concealment (selection bias)	Low risk	Statistician revealed the randomisation results only to project co-ordinator and principal investigators
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Single-blind. Patients were blinded to their oncologists' group allocation, as were the two audio-coders
Incomplete outcome data (attrition bias) All outcomes	Low risk	21/24 used CD-ROM in intervention, but all included in evaluation. 4/264 encounters could not be assessed due to technical problems. Overall missing data < 20%
Selective reporting (reporting bias)	Low risk	All pre-specified outcomes were reported.
Other bias	Low risk	Baseline characteristics comparable except for fewer Caucasian doctors in the intervention group (76% vs 92%). Unclear if scales/questionnaires used were validated

van Weert 2011

Methods	RCT conducted in inpatients.
Participants	48 hospital nurses providing patient education about chemotherapy; 210 older cancer patients receiving chemotherapy (35% women, mean age 72 years)
Interventions	Individualised web-based video feedback; a 1-day CST conducted in groups of 6-11 nurses focusing on patient education about chemotherapy; observation and feedback of colleagues interviews; and a half-day follow-up session and booklet
Outcomes	HCP (nurses) outcomes: • communication skills (67 communication aspects in seven dimensions) coded from video-recordings of RP interviews pre- and post-intervention, rated by QUOTE*. Patient outcomes: • recall of information immediately post-intervention.
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Not described.
Allocation concealment (selection bias)	Unclear risk	Not described.
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Independent observers of videos were blinded to group.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No description of the number of nurses who participated in the videos analysed post-treatment
Selective reporting (reporting bias)	Low risk	All 7 dimensions of communication reported.
Other bias	Low risk	Baseline characteristics comparable.

Wilkinson 2008

Methods	Multi-centre RCT.
Participants	160 nurses (94% women) from hospices (60%) and community (30%) in UK 312 cancer patients (85% women, mean age 32 years)
Interventions	A 3-day course for max. 12 participants run by 2 co-facilitators. Course included literature, nurses perspectives, video-modelling ideal behaviour, audio recording with RPs and role-play with SPs using standardised and participant cases, both with feedback.

Wilkinson 2008 *(Continued)*

	Emphasis on exploring nurses individual difficulties
Outcomes	HCP (nurses) outcomes (coded from audio-tapes of RP admittance interviews and 12 weeks' post-intervention; rated using CSRS*): • communication skills (structure, facilitating behaviours, blocking behaviours, depth of assessment), • interview content (physical and psychosocial assessment of patient). Patient outcomes: • anxiety (STAI-s)* • general health (GHQ-12)*, • satisfaction (PSCQ)*.
Notes	Tendency to improve patient satisfaction and general health. No statistical difference in mean change of patients' anxiety

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomisation using computer-generated numbers.
Allocation concealment (selection bias)	Low risk	Statistician performed randomisation before the study commenced and kept the results in sealed envelopes in the central research department
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Raters blinded.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	90% follow-up but missing data stated.
Selective reporting (reporting bias)	Low risk	All pre-specified outcomes described.
Other bias	High risk	Higher professional grades in control group.

Abbreviations:
CST = communication skills training; HCP = healthcare professional; RCT = randomised controlled trial; RP = real patient; SP = simulated patient;
* See Table 4; Table 1; and Table 3 for key to scale abbreviations.

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Acher 2004	Not an RCT, no objective behavioural outcome measurement.
Ades 2001	Not an RCT. No CST.
Alexander 2006	Not an RCT. Case-control study of a course to improve residents' communication skills with patients at end of life
Anderson 1982	Not an RCT. No controls, post-CST course measurement only.
Andrew 1998	Not an RCT. Qualitative study of CST in palliative care.
Arranz 2005	Not an RCT. Post-intervention assessment counselling course for nurses. No objective measurements of skills
Arrighi 2010	Not an RCT. Exploratory study conducted in patients not HCPs
Back 2005	Not an RCT. Questionaire survey of bereaved relatives.
Back 2007	Not an RCT. Pre-post cohort study of a 4-day residential workshop in oncology fellows with objective measurements of HCP behaviour
Baile 1997	Not an RCT. Pre-post cohort study of a 3-day CST. Only subjective measurement of behavioural change reported
Baile 1999	Not an RCT. Pre-post cohort study of a 2.5-day CST. Only subjective measurement of behavioural change reported
Berman 1983	Not an RCT. Post-study subjective measurement of behavioural change of an annual seminar for interns on caring for dying patients
Bernard 2010	Not an RCT. Case-control study of a course for medical oncologists and nurses with pre-post measurements of HCP skills and defence mechanisms
Bird 1993	Not an RCT. Post-study subjective measurement of behavioural change of 2.5-day residential workshop
Booth 1996	Not a RCT. Pre-post cohort study of a 6-session CST course for hospice nurses measuring HCP skills in audio-taped interviews
Brown 1999	An RCT of CST in ambulatory care, not in cancer care. No objective measure of HCP skills
Brown 2007	Not an RCT. A course of communication skills training for oncologists involved in conducting clinical trials in oncology. Training was aimed at improving patient understanding and acceptance of clinical trials
Brown 2011	Not an RCT. Study of oncologists communication during interviews when recruiting patients for Phase 1 trials

Brown 2012	HCP communication skills were not assessed.
Burgess 2008	Not an RCT.
Bylund 2010	Not an RCT. Pre-post study of CST course for oncologists.
Bylund 2011a	Not an RCT.Description of implementation of CST curriculum and impressions of participants
Bylund 2011b	Not an RCT. Before-after assessment of a non-controlled study of CST for patients
Cantwell 1997	A qualitative study of junior doctors opinion of undergraduate communication skills in relation to patients with cancer
Caps 2010	Not an RCT.
Chandawarkar 2011	Not an RCT. Pre-post assessment using simulated patients of CST for surgical residents
Charlton 1993	Not an RCT.
Clark 2009	An RCT of patients with cancer receiving patient-centred care or usual care
Claxton 2011	An RCT of email education for residents about palliative care. Not specifically communication skills. No objective measurement of skills reported
Connolly 2010	Not an RCT. Post course measurement of "Sage and Thyme" communication course. No objective measurement of skills reported
Cort 2009	RCT studying the effect of a course on cognitive behaviour therapy. No objective measurement of behavioural change reported
Cowan 1997	Not an RCT. Measured changes in attitudes/knowledge, not behaviour. No separate control group
Craytor 1978	Not an RCT. Measured changes in attitudes/knowledge, not behaviour. No separate control group
Crit 2006	Not an RCT.
de Bie 2011	Not communication skills training. Trial involved training patients to reduce anxiety prior to colonoscopy
de Rond 2000	Quasi-RCT on training nurses about pain management. Only subjective measurement of behavioural change
Del 2009	Not an RCT. Qualitative study of how experienced doctors give good and bad news
Delvaux 1997	Not an RCT. Psychological training programme.
Dixon 2001	Not an RCT. Pre-post study of 12 week distance education for nurses working in breast cancer care. Only subjective measurement of behavioural change reported

Durgahee 1997	Not an RCT. 5 years experience of reflection through story-telling for students of palliative care
Fallowfield 1998	Not an RCT. Cohort of 178 senior oncologists who assisted 1.5 or 3 day CST. Only subjective measurement of behavioural change reported
Fallowfield 2001	Not an RCT. Cohort of 129 nurses. Only subjective measurement of behavioural change reported
Faulkner 1984	Not an RCT. Cohort of 8 nurses working in cancer who assisted CST
Faulkner 1992	Not an RCT. Evaluation of training programmes for communication skills in palliative care
Favre 2007	Not an RCT. Pre-post defence mechanism assessment of CST for oncologists
Ferrell 1998a	Not an RCT. Pre-post assessment of HOPE course for HCP in palliative care. Only subjective measurement of behavioural change reported
Ferrell 1998b	Not an RCT. Pre-post assessment of HOPE course for HCP in palliative care. Only subjective measurement of behavioural change reported
Fineberg 2005	Not an RCT. Quasi experimental design with pre-post assessment of a course on family communication in palliative care for interdisciplinary students. Only subjective measurement of behavioural change reported
Finset 2003	Not an RCT. Pre-post assessment of CST for HCP. Only subjective measurement of behavioural change reported
Fujimori 2003	Not an RCT. Post course assessment of CST for oncologists. Only subjective measurement of behavioural change reported
Fukui 2008	RCT of CST for nurses in cancer care. No objective measurement of behavioural change reported. Patient outcomes were only measured in the intervention group, not in the control group
Girgis 1997	Not an RCT. Measured change in attitude/knowledge not skills, not behaviour
Glimelius 1995	Not an RCT.
Gordon 1995	Not an RCT. Post course assessment of 2.5-day or 5-day course of CST. Only subjective measurement of behavioural change reported
Gutheil 2005	Not an RCT. Patients not HCPs trained in communication skills
Hainsworth 1996	RCT of a course for nurses on death education. Not specifically for nurses working in cancer care. Only subjective measurement of behavioural change reported
Hall 1999	Not an RCT.
Hallenbeck 1999	Not an RCT. A questionnaire of interns before and after their rotation in palliative care

Heaven 1996	Not an RCT. A 10 week CST for hospice nurses with assessment of ability to elicit patient concerns
Heaven 1996b	Not an RCT. A 10-week CST for hospice nurses with assessment of abiltity to elicit patient concerns
Hellbom 2001	Not an RCT. Post course assessment of a 4-session CST course. Only subjective measurement of behavioural change reported
Hietanen 2007	Not an RCT. Case control study of a course on communication skills training for physicians involved in conducting clinical trials in oncology. Training was aimed at improving patient understanding and acceptance of clinical trials
Hoffman 2002	Not an RCT. Description of CST course for oncology residents and their views about the course
Hulsman 1997	Not an RCT. Pre-post assessment of a computer-assisted CST for doctors in cancer care. Only subjective measurement of behavioural change reported
Hulsman 2002	Not an RCT. Pre-post assessment of a computer assisted CST for doctors in cancer care using videotapes of real patient encounter
Hundley 2008	An RCT of a course of delivering bad news. Only subjective measurement of behavioural change reported
Jefford 2011	Not an RCT. Patients received care package.
Ke 2008	An RCT of 50-minute CST lecture for nurses. Only subjective measurement of behavioural change reported
Kinnane 2011	Not an RCT. Study conducted in volunteers not HCPs.
Kruse 2003	Not an RCT. Pre-post assessment of a comparison between 6-hour and 24-hour CST programs
La Monica 1987	Not an RCT. Study of 4-week session on responding to empathy
Ladouceur 2003	Not an RCT. Post course assessment of course of breaking bad news. Only subjective measurement of behavioural change reported
Larbig 2009	Not an RCT. On-line counselling for patients.
Lenzi 2011	Not an RCT. Pre- and post-assessment of a 3-day CST workshop in a cohort of 57 Italian oncologists. Only subjective measurement of behavioural change reported
Libert 2003	Not an RCT. A cohort of physicians were assessed with regard to their communication skills
Linder 1999	Measured change in attitude/knowledge not skills, not behaviour
Liu 2007	Not an RCT. Quasi-experimental study of CST in nurses.
Lloyd-Williams 1996	Not an RCT. Measured change in attitude/knowledge not skills, not behaviour

Loiselle 2011	Not an RCT.
Macauley 2011	Not an RCT.
Madhavan 2011	Not an RCT.
Maguire 1996a	Not an RCT. Pre-post assessment of a 3-5-day course on key communication skills for HCP in cancer care. Measurement with simulated and real patient encounters
Maguire 1996b	Not an RCT. Similar to Maguire 1996a.
Martinez 2009	Not an RCT, a survey of patient satisfaction with communication/information
Matrone 1990	Not an RCT.
Melo 2011	Not an RCT. A case-control study of a course on communication, spiritual advice and death for HCP. Only subjective measurements of behaviour change and measurement of burnout
O'Connor 2011	Not an RCT. A survey of focus groups including pharmacists, nurses and doctors
Parle 1997	Not an RCT. Post-course assessment of a 3-day workshop on difficult situations. Only subjective assessment of behavioural change reported
Pekmezaris 2011	Not an RCT. Pre-post assessment of a course for residents about end of life care. Only subjective measurement of behavioural change are reported
Pelayo 2011	RCT of on-line course on palliative care. Only subjective measurement of behavioural change reported
Pieterse 2006	Not an RCT. Pre- and post-test study of CST for genetic counsellors
Rask 2009	RCT of a 33-hour CST course for nurses. No objective measurement of behaviour change reported. Assessment of patient perception of HCP's skills
Razavi 1991	Not an RCT. Study of a brief psychological training for HCP working with terminal cancer patients. Only subjective measurements of behaviour and attitude change reported
Razavi 2000	Not an RCT. Study comparing different simulated patients to measure behavioural change after CST
Razavi 2009	Not an RCT, a summary of research.
Rose 2008	Not an RCT. A review of psycho-oncology interventions for patients with cancer
Rosenbloom 2007	RCT of an intervention for patients with cancer comparing nurse assessment of quality of life compared to normal care
Roter 1995	RCT of CST for primary care physicians. Study not primarily related to cancer care. Assessment using audio-tapes of encounters with distressed and non-distressed real and simulated patients

Rushton 2006	Not an RCT.
Rutter 1996	Not an RCT.
Schulman-Green 2003	Not an RCT. Qualitative study of how HCP learn about caring for the dying
Shannon 2011	Not an RCT. Post assessment study of a brief CST for nurses. Only subjective assessment of change reported
Shields 2010	An RCT of coaching for survivors of breast cancer.
Shipman 2008	Not an RCT.
Shorr 2000	Not an RCT. Cohort study of invention to help HCP discuss end of life issues with patients, not specifically limited to cancer care
Smith 1991	Not an RCT. Case-controlled study of a 1-month CST for residents. Only subjective measurement of change reported
Smith 2010	An RCT of an intervention comparing a pain/communication session to normal care for patients with cancer
Street 2010	RCT of CST training (tailored education-coaching) for patients with cancer
Szmuilowicz 2010	An RCT of CST in HCPs who did not work specifically in cancer care
Timmermans 2006	Not an RCT. Pre-post study of CST training for radiation oncologists. Assessment of oncologists and patient communication in audiotapes of real patient encounters
Ullrich 2011	Not an RCT. Pre-post quasi-RCT of CST for speech therapists. Only subjective measurement of change were reported
Von Gunten 1998	Not an RCT. Measured change in attitude/knowledge not skills, not behaviour
Wetzel 2011	RCT of training in stress management for surgeons, not communication training. Not limited to cancer care
Wilkinson 1998	Not an RCT. Cohort study with pre-post assessment of 26-hour CST (including knowledge, attitude and skills training) for nurses. Audiotaped patient encounters measured behavioural change
Wilkinson 1999	Not an RCT. Long-term follow-up of cohort study.
Wilkinson 2003	Not an RCT. Cohort study with pre-post assessment of 3-day CST for nurses. Audiotaped patient encounters measured behavioural change
Wong 2001	Not an RCT. Post-assessment of a course on death education for nurses. Only subjective measurement of changes reported

Wuensch 2011	RCT of communication skills training for physicians involved in conducting clinical trials in oncology. Training was aimed at improving patient understanding and acceptance of clinical trials

CST: communication skills training
HCP: healthcare professional
RCT: randomised controlled trial

DATA AND ANALYSES

Comparison 1. CST vs no CST: HCP communication skills

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Used open questions	5	679	Std. Mean Difference (IV, Random, 95% CI)	0.28 [0.02, 0.54]
1.1 Simulated patients	5	422	Std. Mean Difference (IV, Random, 95% CI)	0.38 [-0.01, 0.76]
1.2 Real patients	3	257	Std. Mean Difference (IV, Random, 95% CI)	0.09 [-0.15, 0.34]
2 Clarified and/or summarised	3	422	Std. Mean Difference (IV, Random, 95% CI)	0.09 [-0.30, 0.49]
2.1 Simulated patients	3	253	Std. Mean Difference (IV, Random, 95% CI)	0.32 [-0.18, 0.81]
2.2 Real patients	2	169	Std. Mean Difference (IV, Random, 95% CI)	-0.20 [-0.50, 0.11]
3 Elicited concerns	2	191	Std. Mean Difference (IV, Random, 95% CI)	0.31 [-0.10, 0.72]
3.1 Simulated patients	2	133	Std. Mean Difference (IV, Random, 95% CI)	0.27 [-0.42, 0.95]
3.2 Real patients	1	58	Std. Mean Difference (IV, Random, 95% CI)	0.40 [-0.12, 0.93]
4 Showed empathy	6	727	Std. Mean Difference (IV, Random, 95% CI)	0.21 [0.07, 0.36]
4.1 Simulated patients	5	422	Std. Mean Difference (IV, Random, 95% CI)	0.26 [0.07, 0.45]
4.2 Real patients	4	305	Std. Mean Difference (IV, Random, 95% CI)	0.15 [-0.07, 0.38]
5 Gave appropriate information	2	342	Std. Mean Difference (IV, Random, 95% CI)	-0.09 [-0.31, 0.12]
5.1 Simulated patients	2	173	Std. Mean Difference (IV, Random, 95% CI)	-0.16 [-0.46, 0.14]
5.2 Real patients	2	169	Std. Mean Difference (IV, Random, 95% CI)	-0.02 [-0.32, 0.28]
6 Gave facts only	5	663	Std. Mean Difference (IV, Random, 95% CI)	-0.24 [-0.53, 0.05]
6.1 Simulated patients	5	406	Std. Mean Difference (IV, Random, 95% CI)	-0.42 [-0.77, -0.06]
6.2 Real patients	3	257	Std. Mean Difference (IV, Random, 95% CI)	0.05 [-0.19, 0.30]
7 Negotiation	3	386	Std. Mean Difference (IV, Random, 95% CI)	0.16 [-0.08, 0.41]
7.1 Simulated patients	3	240	Std. Mean Difference (IV, Random, 95% CI)	0.13 [-0.12, 0.39]
7.2 Real patients	2	146	Std. Mean Difference (IV, Random, 95% CI)	0.23 [-0.45, 0.92]

Comparison 2. CST vs no CST: HCP communication skills: doctors only

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Used open questions	2	306	Std. Mean Difference (IV, Random, 95% CI)	0.27 [0.05, 0.50]
1.1 Simulated patients	2	160	Std. Mean Difference (IV, Random, 95% CI)	0.34 [0.03, 0.66]
1.2 Real patients	2	146	Std. Mean Difference (IV, Random, 95% CI)	0.20 [-0.13, 0.52]
2 Clarified and/or summarised	1		Std. Mean Difference (IV, Random, 95% CI)	Totals not selected
2.1 Simulated patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
2.2 Real patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
3 Elicited concerns	1	120	Std. Mean Difference (IV, Random, 95% CI)	0.15 [-0.33, 0.63]
3.1 Simulated patients	1	62	Std. Mean Difference (IV, Random, 95% CI)	-0.09 [-0.58, 0.41]
3.2 Real patients	1	58	Std. Mean Difference (IV, Random, 95% CI)	0.40 [-0.12, 0.93]
4 Showed empathy	3	354	Std. Mean Difference (IV, Random, 95% CI)	0.22 [0.01, 0.43]
4.1 Simulated patients	2	160	Std. Mean Difference (IV, Random, 95% CI)	0.27 [-0.05, 0.60]
4.2 Real patients	3	194	Std. Mean Difference (IV, Random, 95% CI)	0.18 [-0.12, 0.49]
5 Gave appropriate information	1		Std. Mean Difference (IV, Random, 95% CI)	Totals not selected
5.1 Simulated patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
5.2 Real patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
6 Gave facts only	2	306	Std. Mean Difference (IV, Random, 95% CI)	-0.19 [-0.74, 0.37]
6.1 Simulated patients	2	160	Std. Mean Difference (IV, Random, 95% CI)	-0.50 [-1.36, 0.35]
6.2 Real patients	2	146	Std. Mean Difference (IV, Random, 95% CI)	0.16 [-0.17, 0.49]

Comparison 3. CST vs no CST: HCP communication skills: nurses only

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Used open questions	2	293	Std. Mean Difference (IV, Random, 95% CI)	0.41 [-0.23, 1.06]
1.1 Simulated patients	2	182	Std. Mean Difference (IV, Random, 95% CI)	0.65 [-0.07, 1.37]
1.2 Real patients	1	111	Std. Mean Difference (IV, Random, 95% CI)	-0.04 [-0.42, 0.33]
2 Clarified and/or summarised	1		Std. Mean Difference (IV, Random, 95% CI)	Totals not selected
2.1 Simulated patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
2.2 Real patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
3 Elicited concerns	1		Std. Mean Difference (IV, Random, 95% CI)	Totals not selected
3.1 Simulated patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
4 Showed empathy	2	293	Std. Mean Difference (IV, Random, 95% CI)	0.19 [-0.04, 0.42]
4.1 Simulated patients	2	182	Std. Mean Difference (IV, Random, 95% CI)	0.23 [-0.06, 0.53]
4.2 Real patients	1	111	Std. Mean Difference (IV, Random, 95% CI)	0.11 [-0.27, 0.48]
5 Gave appropriate information	2	342	Std. Mean Difference (IV, Random, 95% CI)	-0.09 [-0.31, 0.12]
5.1 Simulated patients	2	173	Std. Mean Difference (IV, Random, 95% CI)	-0.16 [-0.46, 0.14]
5.2 Real patients	2	169	Std. Mean Difference (IV, Random, 95% CI)	-0.02 [-0.32, 0.28]
6 Gave facts only	2	293	Std. Mean Difference (IV, Random, 95% CI)	-0.24 [-0.65, 0.17]
6.1 Simulated patients	2	182	Std. Mean Difference (IV, Random, 95% CI)	-0.31 [-0.98, 0.37]
6.2 Real patients	1	111	Std. Mean Difference (IV, Random, 95% CI)	-0.09 [-0.47, 0.28]

Comparison 4. CST vs no CST: subgrouped by HCP type

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Used open questions	4	599	Std. Mean Difference (IV, Random, 95% CI)	0.34 [0.07, 0.61]
1.1 Doctors	2	306	Std. Mean Difference (IV, Random, 95% CI)	0.27 [0.05, 0.50]
1.2 Nurses	2	293	Std. Mean Difference (IV, Random, 95% CI)	0.41 [-0.23, 1.06]
2 Clarified and/or summarised	2	342	Std. Mean Difference (IV, Random, 95% CI)	0.01 [-0.47, 0.48]
2.1 Doctors	1	120	Std. Mean Difference (IV, Random, 95% CI)	-0.30 [-0.66, 0.06]
2.2 Nurses	1	222	Std. Mean Difference (IV, Random, 95% CI)	0.28 [-0.45, 1.02]
3 Elicited concerns	2	191	Std. Mean Difference (IV, Random, 95% CI)	0.31 [-0.10, 0.72]
3.1 Doctors	1	120	Std. Mean Difference (IV, Random, 95% CI)	0.15 [-0.33, 0.63]
3.2 Nurses	1	71	Std. Mean Difference (IV, Random, 95% CI)	0.61 [0.14, 1.09]
4 Showed empathy	5	647	Std. Mean Difference (IV, Random, 95% CI)	0.21 [0.05, 0.36]
4.1 Doctors	3	354	Std. Mean Difference (IV, Random, 95% CI)	0.22 [0.01, 0.43]
4.2 Nurses	2	293	Std. Mean Difference (IV, Random, 95% CI)	0.19 [-0.04, 0.42]
5 Gave appropriate information	2	342	Std. Mean Difference (IV, Random, 95% CI)	-0.09 [-0.31, 0.12]
5.1 Doctors	1	120	Std. Mean Difference (IV, Random, 95% CI)	-0.02 [-0.38, 0.34]

5.2 Nurses	1	222	Std. Mean Difference (IV, Random, 95% CI)	-0.13 [-0.40, 0.14]
6 Gave facts only	4	599	Std. Mean Difference (IV, Random, 95% CI)	-0.21 [-0.54, 0.12]
6.1 Doctors	2	306	Std. Mean Difference (IV, Random, 95% CI)	-0.19 [-0.74, 0.37]
6.2 Nurses	2	293	Std. Mean Difference (IV, Random, 95% CI)	-0.24 [-0.65, 0.17]

Comparison 5. CST vs no CST: Other HCP outcomes

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Emotional exhaustion: Maslach Burnout Inventory:	2	106	Std. Mean Difference (IV, Random, 95% CI)	-0.25 [-0.67, 0.18]
2 Personal accomplishment: Maslach Burnout Inventory	2	91	Std. Mean Difference (IV, Random, 95% CI)	0.26 [-0.24, 0.76]

Comparison 6. CST vs no CST: Patient outcomes

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Patient psychiatric morbidity (GHQ 12)	1		Std. Mean Difference (IV, Random, 95% CI)	Totals not selected
2 Patient anxiety: Spielberger's State Trait Anxiety Inventory	2	169	Std. Mean Difference (IV, Random, 95% CI)	0.40 [0.07, 0.72]
3 Patient perception of HCPs communication skills	2	170	Std. Mean Difference (IV, Random, 95% CI)	-0.14 [-0.44, 0.16]
4 Patient satisfaction with communication	2	429	Std. Mean Difference (IV, Random, 95% CI)	0.20 [-0.23, 0.63]

Comparison 7. Follow-up CST vs no follow-up CST: HCP communication skills

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Used open questions	1		Std. Mean Difference (IV, Random, 95% CI)	Totals not selected
1.1 Simulated patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
1.2 Real patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
2 Clarified and/or summarised	1		Std. Mean Difference (IV, Random, 95% CI)	Totals not selected
2.1 Simulated patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
2.2 Real patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
3 Elicited concerns	1		Std. Mean Difference (IV, Random, 95% CI)	Totals not selected
3.1 Simulated patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
3.2 Real patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
4 Showed empathy	2	168	Std. Mean Difference (IV, Random, 95% CI)	0.23 [-0.07, 0.54]

			Std. Mean Difference (IV, Random, 95% CI)	
4.1 Simulated patients	1	62	Std. Mean Difference (IV, Random, 95% CI)	0.07 [-0.43, 0.57]
4.2 Real patients	2	106	Std. Mean Difference (IV, Random, 95% CI)	0.33 [-0.06, 0.72]
5 Gave appropriate information	1		Std. Mean Difference (IV, Random, 95% CI)	Totals not selected
5.1 Simulated patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
5.2 Real patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
6 Gave facts only	1		Std. Mean Difference (IV, Random, 95% CI)	Totals not selected
6.1 Simulated patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
6.2 Real patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
7 Negotiation	1		Std. Mean Difference (IV, Random, 95% CI)	Totals not selected
7.1 Simulated patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
7.2 Real patients	1		Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]

Analysis 1.1. Comparison 1 CST vs no CST: HCP communication skills, Outcome 1 Used open questions.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 1 CST vs no CST: HCP communication skills

Outcome: 1 Used open questions

Study or subgroup	Experimental N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
1 Simulated patients							
Gibon 2011	51	0.3 (0.6)	29	0.4 (0.7)		12.2 %	-0.16 [-0.61, 0.30]
Razavi 1993	35	3.7 (3)	36	2.7 (4.1)		12.0 %	0.27 [-0.19, 0.74]
Lienard 2010	50	0.8 (1.1)	48	0.5 (0.8)		13.4 %	0.31 [-0.09, 0.71]
Razavi 2003	29	7.57 (4.51)	33	5.8 (4.2)		11.3 %	0.40 [-0.10, 0.91]
Razavi 2002	54	13.86 (7.5)	57	7.3 (5.31)		13.4 %	1.01 [0.61, 1.40]
Subtotal (95% CI)	**219**		**203**			**62.2 %**	**0.38 [-0.01, 0.76]**
Heterogeneity: Tau² = 0.14; Chi² = 15.20, df = 4 (P = 0.004); I² =74%							
Test for overall effect: Z = 1.91 (P = 0.056)							
2 Real patients							
Razavi 2002	54	5.53 (3.75)	57	5.73 (5.34)		13.9 %	-0.04 [-0.42, 0.33]
Lienard 2010	46	0.8 (0.7)	42	0.7 (0.7)		12.9 %	0.14 [-0.28, 0.56]
Razavi 2003	28	2.04 (1.59)	30	1.67 (1)		11.0 %	0.28 [-0.24, 0.79]
Subtotal (95% CI)	**128**		**129**			**37.8 %**	**0.09 [-0.15, 0.34]**
Heterogeneity: Tau² = 0.0; Chi² = 1.05, df = 2 (P = 0.59); I² =0.0%							
Test for overall effect: Z = 0.74 (P = 0.46)							
Total (95% CI)	**347**		**332**			**100.0 %**	**0.28 [0.02, 0.54]**
Heterogeneity: Tau² = 0.09; Chi² = 20.01, df = 7 (P = 0.01); I² =65%							
Test for overall effect: Z = 2.09 (P = 0.037)							
Test for subgroup differences: Chi² = 1.49, df = 1 (P = 0.22), I² =33%							

-4 -2 0 2 4

Favours control   Favours experimental

Analysis 1.2. Comparison 1 CST vs no CST: HCP communication skills, Outcome 2 Clarified and/or summarised.

Comparison: 1 CST vs no CST: HCP communication skills

Outcome: 2 Clarified and/or summarised

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Simulated patients							
Razavi 2003	29	7.33 (3.73)	33	8.26 (4.97)		18.8 %	-0.21 [-0.71, 0.29]
Gibon 2011	51	2.8 (2.8)	29	1.7 (1.8)		19.7 %	0.44 [-0.02, 0.90]
Razavi 2002	54	41.43 (13.06)	57	32.68 (13.25)		21.5 %	0.66 [0.28, 1.04]
Subtotal (95% CI)	**134**		**119**			**60.0 %**	**0.32 [-0.18, 0.81]**
Heterogeneity: Tau^2 = 0.14; Chi^2 = 7.41, df = 2 (P = 0.02); I^2 =73%							
Test for overall effect: Z = 1.25 (P = 0.21)							
2 Real patients							
Razavi 2003	28	7.89 (3.23)	30	9.61 (4.85)		18.4 %	-0.41 [-0.93, 0.11]
Razavi 2002	54	35.5 (13.28)	57	36.78 (15)		21.7 %	-0.09 [-0.46, 0.28]
Subtotal (95% CI)	**82**		**87**			**40.0 %**	**-0.20 [-0.50, 0.11]**
Heterogeneity: Tau^2 = 0.0; Chi^2 = 0.96, df = 1 (P = 0.33); I^2 =0.0%							
Test for overall effect: Z = 1.28 (P = 0.20)							
Total (95% CI)	**216**		**206**			**100.0 %**	**0.09 [-0.30, 0.49]**
Heterogeneity: Tau^2 = 0.15; Chi^2 = 16.29, df = 4 (P = 0.003); I^2 =75%							
Test for overall effect: Z = 0.47 (P = 0.64)							
Test for subgroup differences: Chi^2 = 3.01, df = 1 (P = 0.08), I^2 =67%							

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Favours control   Favours experimental

Analysis 1.3. Comparison 1 CST vs no CST: HCP communication skills, Outcome 3 Elicited concerns.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 1 CST vs no CST: HCP communication skills

Outcome: 3 Elicited concerns

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Simulated patients							
Razavi 2003	29	7.43 (4.89)	33	7.93 (6.5)		33.3 %	-0.09 [-0.58, 0.41]
Razavi 1993	35	19.8 (10.1)	36	13.7 (9.6)		34.8 %	0.61 [0.14, 1.09]
Subtotal (95% CI)	**64**		**69**			**68.1 %**	**0.27 [-0.42, 0.95]**
Heterogeneity: Tau² = 0.18; Chi² = 3.92, df = 1 (P = 0.05); I² =75%							
Test for overall effect: Z = 0.77 (P = 0.44)							
2 Real patients							
Razavi 2003	28	2.39 (2.85)	30	1.4 (1.92)		31.9 %	0.40 [-0.12, 0.93]
Subtotal (95% CI)	**28**		**30**			**31.9 %**	**0.40 [-0.12, 0.93]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.52 (P = 0.13)							
Total (95% CI)	**92**		**99**			**100.0 %**	**0.31 [-0.10, 0.72]**
Heterogeneity: Tau² = 0.07; Chi² = 4.08, df = 2 (P = 0.13); I² =51%							
Test for overall effect: Z = 1.50 (P = 0.13)							
Test for subgroup differences: Chi² = 0.10, df = 1 (P = 0.75), I² =0.0%							

-4 -2 0 2 4

Favours control   Favours experimental

Analysis 1.4. Comparison 1 CST vs no CST: HCP communication skills, Outcome 4 Showed empathy.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 1 CST vs no CST: HCP communication skills

Outcome: 4 Showed empathy

Study or subgroup	Experimental N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
1 Simulated patients							
Razavi 2003	29	2.37 (2.18)	33	2.22 (2.18)		8.6 %	0.07 [-0.43, 0.57]
Razavi 1993	35	22.3 (12)	36	20.2 (12.9)		9.9 %	0.17 [-0.30, 0.63]
Razavi 2002	54	21.75 (10.25)	57	18.59 (12.25)		15.4 %	0.28 [-0.10, 0.65]
Gibon 2011	51	0.3 (0.8)	29	0.1 (0.4)		10.3 %	0.29 [-0.17, 0.75]
Lienard 2010	50	0.5 (0.9)	48	0.2 (0.5)		13.4 %	0.41 [0.01, 0.81]
Subtotal (95% CI)	**219**		**203**			**57.6 %**	**0.26 [0.07, 0.45]**
Heterogeneity: Tau² = 0.0; Chi² = 1.26, df = 4 (P = 0.87); I² =0.0%							
Test for overall effect: Z = 2.63 (P = 0.0086)							
2 Real patients							
Lienard 2010	46	0.1 (0.3)	42	0.1 (0.2)		12.3 %	0.0 [-0.42, 0.42]
Razavi 2002	54	39.18 (14.44)	57	37.66 (13.71)		15.5 %	0.11 [-0.27, 0.48]
Tulsky 2011	24	0.4 (1)	24	0.3 (0.7)		6.7 %	0.11 [-0.45, 0.68]
Razavi 2003	28	0.49 (1.02)	30	0.11 (0.26)		7.8 %	0.51 [-0.01, 1.04]
Subtotal (95% CI)	**152**		**153**			**42.4 %**	**0.15 [-0.07, 0.38]**
Heterogeneity: Tau² = 0.0; Chi² = 2.39, df = 3 (P = 0.50); I² =0.0%							
Test for overall effect: Z = 1.32 (P = 0.19)							
Total (95% CI)	**371**		**356**			**100.0 %**	**0.21 [0.07, 0.36]**
Heterogeneity: Tau² = 0.0; Chi² = 4.15, df = 8 (P = 0.84); I² =0.0%							
Test for overall effect: Z = 2.86 (P = 0.0043)							
Test for subgroup differences: Chi² = 0.50, df = 1 (P = 0.48), I² =0.0%							

-4   -2   0   2   4

Favours control   Favours experimental

Analysis 1.5.   Comparison 1 CST vs no CST: HCP communication skills, Outcome 5 Gave appropriate information.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 1 CST vs no CST: HCP communication skills

Outcome: 5 Gave appropriate information

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Simulated patients							
Razavi 2002	54	7.93 (5.89)	57	9.95 (8.51)		32.3 %	-0.27 [-0.65, 0.10]
Razavi 2003	29	6.55 (4.31)	33	6.41 (4.6)		18.1 %	0.03 [-0.47, 0.53]
Subtotal (95% CI)	**83**		**90**			**50.4 %**	**-0.16 [-0.46, 0.14]**
Heterogeneity: Tau² = 0.0; Chi² = 0.91, df = 1 (P = 0.34); I² =0.0%							
Test for overall effect: Z = 1.07 (P = 0.28)							
2 Real patients							
Razavi 2003	28	24.8 (13.08)	30	25.75 (13.38)		17.0 %	-0.07 [-0.59, 0.44]
Razavi 2002	54	5.64 (7.51)	57	5.62 (5.53)		32.6 %	0.00 [-0.37, 0.38]
Subtotal (95% CI)	**82**		**87**			**49.6 %**	**-0.02 [-0.32, 0.28]**
Heterogeneity: Tau² = 0.0; Chi² = 0.05, df = 1 (P = 0.82); I² =0.0%							
Test for overall effect: Z = 0.14 (P = 0.88)							
Total (95% CI)	**165**		**177**			**100.0 %**	**-0.09 [-0.31, 0.12]**
Heterogeneity: Tau² = 0.0; Chi² = 1.39, df = 3 (P = 0.71); I² =0.0%							
Test for overall effect: Z = 0.86 (P = 0.39)							
Test for subgroup differences: Chi² = 0.42, df = 1 (P = 0.51), I² =0.0%							

```
        -4    -2     0     2     4

   Favours control       Favours experimental
```

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 1 CST vs no CST: HCP communication skills

Outcome: 6 Gave facts only

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Simulated patients							
Lienard 2010	50	53.8 (20.1)	48	74.2 (23.4)		13.0 %	-0.93 [-1.35, -0.51]
Razavi 2002	54	36.83 (16.36)	57	47.93 (18.17)		13.6 %	-0.64 [-1.02, -0.25]
Gibon 2011	35	69.8 (21.9)	29	90.1 (65.7)		11.6 %	-0.43 [-0.92, 0.07]
Razavi 2003	29	70.37 (8.28)	33	70.94 (11.28)		11.6 %	-0.06 [-0.56, 0.44]
Razavi 1993	35	66.8 (21.9)	36	65.7 (21.3)		12.2 %	0.05 [-0.41, 0.52]
Subtotal (95% CI)	**203**		**203**			**62.0 %**	**-0.42 [-0.77, -0.06]**
Heterogeneity: Tau² = 0.11; Chi² = 12.82, df = 4 (P = 0.01); I² =69%							
Test for overall effect: Z = 2.26 (P = 0.024)							
2 Real patients							
Razavi 2002	54	70.66 (16.26)	57	72.34 (19.37)		13.7 %	-0.09 [-0.47, 0.28]
Razavi 2003	28	86.2 (8.79)	30	86.37 (8.57)		11.4 %	-0.02 [-0.53, 0.50]
Lienard 2010	46	21 (12)	42	17.8 (10.5)		12.9 %	0.28 [-0.14, 0.70]
Subtotal (95% CI)	**128**		**129**			**38.0 %**	**0.05 [-0.19, 0.30]**
Heterogeneity: Tau² = 0.0; Chi² = 1.79, df = 2 (P = 0.41); I² =0.0%							
Test for overall effect: Z = 0.40 (P = 0.69)							
Total (95% CI)	**331**		**332**			**100.0 %**	**-0.24 [-0.53, 0.05]**
Heterogeneity: Tau² = 0.12; Chi² = 24.33, df = 7 (P = 0.00100); I² =71%							
Test for overall effect: Z = 1.59 (P = 0.11)							
Test for subgroup differences: Chi² = 4.41, df = 1 (P = 0.04), I² =77%							

-4   -2   0   2   4

Favours control   Favours experimental

Analysis 1.7. Comparison 1 CST vs no CST: HCP communication skills, Outcome 7 Negotiation.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 1 CST vs no CST: HCP communication skills

Outcome: 7 Negotiation

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Simulated patients							
Gibon 2011	51	2.1 (2.8)	29	1.4 (1.7)		19.8 %	0.28 [-0.18, 0.74]
Lienard 2010	50	1.3 (1.7)	48	1.4 (1.9)		24.1 %	-0.06 [-0.45, 0.34]
Razavi 2003	29	2.8 (2.47)	33	2.2 (2.11)		17.4 %	0.26 [-0.24, 0.76]
Subtotal (95% CI)	**130**		**110**			**61.4 %**	**0.13 [-0.12, 0.39]**
Heterogeneity: Tau² = 0.0; Chi² = 1.51, df = 2 (P = 0.47); I² =0.0%							
Test for overall effect: Z = 1.02 (P = 0.31)							
2 Real patients							
Lienard 2010	46	0.5 (0.8)	42	0.6 (1.2)		22.5 %	-0.10 [-0.52, 0.32]
Razavi 2003	28	1.25 (1.18)	30	0.64 (0.8)		16.1 %	0.60 [0.07, 1.13]
Subtotal (95% CI)	**74**		**72**			**38.6 %**	**0.23 [-0.45, 0.92]**
Heterogeneity: Tau² = 0.19; Chi² = 4.14, df = 1 (P = 0.04); I² =76%							
Test for overall effect: Z = 0.67 (P = 0.51)							
Total (95% CI)	**204**		**182**			**100.0 %**	**0.16 [-0.08, 0.41]**
Heterogeneity: Tau² = 0.02; Chi² = 5.69, df = 4 (P = 0.22); I² =30%							
Test for overall effect: Z = 1.31 (P = 0.19)							
Test for subgroup differences: Chi² = 0.07, df = 1 (P = 0.79), I² =0.0%							

-1   -0.5   0   0.5   1

Favours experimental   Favours control

Analysis 2.1. Comparison 2 CST vs no CST: HCP communication skills: doctors only, Outcome 1 Used open questions.

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Simulated patients							
Lienard 2010	50	0.8 (1.1)	48	0.5 (0.8)		32.0 %	0.31 [-0.09, 0.71]
Razavi 2003	29	7.57 (4.51)	33	5.8 (4.2)		20.0 %	0.40 [-0.10, 0.91]
Subtotal (95% CI)	**79**		**81**			**52.0 %**	**0.34 [0.03, 0.66]**
Heterogeneity: Tau² = 0.0; Chi² = 0.08, df = 1 (P = 0.78); I² =0.0%							
Test for overall effect: Z = 2.16 (P = 0.031)							
2 Real patients							
Lienard 2010	46	0.8 (0.7)	42	0.7 (0.7)		29.0 %	0.14 [-0.28, 0.56]
Razavi 2003	28	2.04 (1.59)	30	1.67 (1)		19.0 %	0.28 [-0.24, 0.79]
Subtotal (95% CI)	**74**		**72**			**48.0 %**	**0.20 [-0.13, 0.52]**
Heterogeneity: Tau² = 0.0; Chi² = 0.16, df = 1 (P = 0.69); I² =0.0%							
Test for overall effect: Z = 1.17 (P = 0.24)							
Total (95% CI)	**153**		**153**			**100.0 %**	**0.27 [0.05, 0.50]**
Heterogeneity: Tau² = 0.0; Chi² = 0.66, df = 3 (P = 0.88); I² =0.0%							
Test for overall effect: Z = 2.37 (P = 0.018)							
Test for subgroup differences: Chi² = 0.42, df = 1 (P = 0.52), I² =0.0%							

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         -4   -2    0    2    4
      Favours control    Favours experimental
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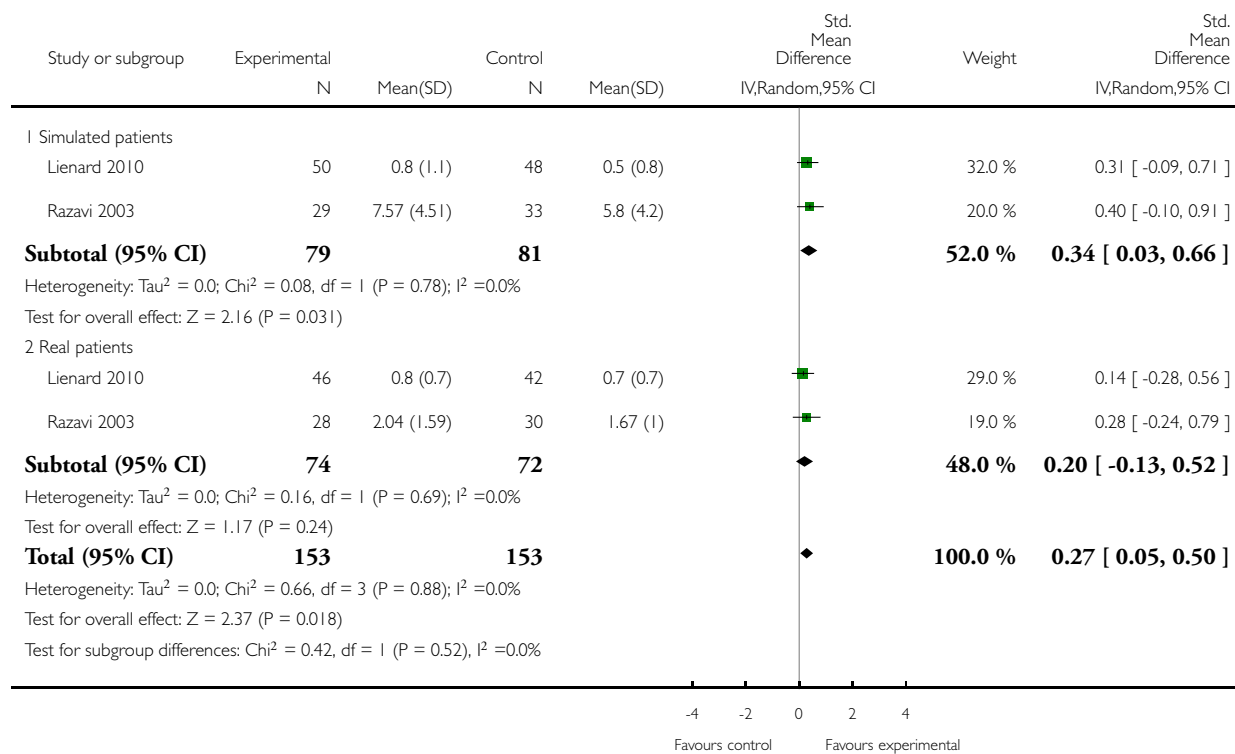
Analysis 2.2.   Comparison 2 CST vs no CST: HCP communication skills: doctors only, Outcome 2 Clarified and/or summarised.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 2 CST vs no CST: HCP communication skills: doctors only

Outcome: 2 Clarified and/or summarised

Study or subgroup	Experimental		Control		Std. Mean Difference	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI	IV,Random,95% CI
1 Simulated patients						
Razavi 2003	29	7.33 (3.73)	33	8.26 (4.97)		-0.21 [-0.71, 0.29]
2 Real patients						
Razavi 2003	28	7.89 (3.23)	30	9.61 (4.85)		-0.41 [-0.93, 0.11]

-4   -2   0   2   4

Favours control   Favours experimental
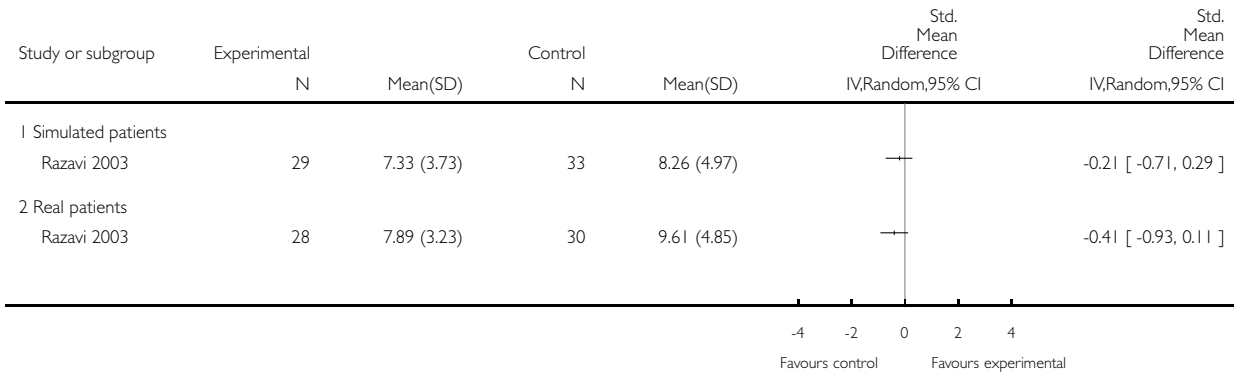
Analysis 2.3. Comparison 2 CST vs no CST: HCP communication skills: doctors only, Outcome 3 Elicited concerns.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 2 CST vs no CST: HCP communication skills: doctors only

Outcome: 3 Elicited concerns

Study or subgroup	Experimental N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
1 Simulated patients							
Razavi 2003	29	7.43 (4.89)	33	7.93 (6.5)		51.2 %	-0.09 [-0.58, 0.41]
Subtotal (95% CI)	**29**		**33**			**51.2 %**	**-0.09 [-0.58, 0.41]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.33 (P = 0.74)							
2 Real patients							
Razavi 2003	28	2.39 (2.85)	30	1.4 (1.92)		48.8 %	0.40 [-0.12, 0.93]
Subtotal (95% CI)	**28**		**30**			**48.8 %**	**0.40 [-0.12, 0.93]**
Heterogeneity: not applicable							
Test for overall effect: Z = 1.52 (P = 0.13)							
Total (95% CI)	**57**		**63**			**100.0 %**	**0.15 [-0.33, 0.63]**
Heterogeneity: Tau² = 0.05; Chi² = 1.77, df = 1 (P = 0.18); I² =44%							
Test for overall effect: Z = 0.63 (P = 0.53)							
Test for subgroup differences: Chi² = 1.77, df = 1 (P = 0.18), I² =44%							

-10   -5   0   5   10

Favours control   Favours experimental

Analysis 2.4. Comparison 2 CST vs no CST: HCP communication skills: doctors only, Outcome 4 Showed empathy.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 2 CST vs no CST: HCP communication skills: doctors only

Outcome: 4 Showed empathy

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Simulated patients							
Razavi 2003	29	2.37 (2.18)	33	2.22 (2.18)		17.7 %	0.07 [-0.43, 0.57]
Lienard 2010	50	0.5 (0.9)	48	0.2 (0.5)		27.5 %	0.41 [0.01, 0.81]
Subtotal (95% CI)	**79**		**81**			**45.1 %**	**0.27 [-0.05, 0.60]**
Heterogeneity: Tau² = 0.00; Chi² = 1.08, df = 1 (P = 0.30); I² =7%							
Test for overall effect: Z = 1.64 (P = 0.10)							
2 Real patients							
Lienard 2010	46	0.1 (0.3)	42	0.1 (0.2)		25.1 %	0.0 [-0.42, 0.42]
Tulsky 2011	24	0.4 (1)	24	0.3 (0.7)		13.7 %	0.11 [-0.45, 0.68]
Razavi 2003	28	0.49 (1.02)	30	0.11 (0.26)		16.0 %	0.51 [-0.01, 1.04]
Subtotal (95% CI)	**98**		**96**			**54.9 %**	**0.18 [-0.12, 0.49]**
Heterogeneity: Tau² = 0.01; Chi² = 2.30, df = 2 (P = 0.32); I² =13%							
Test for overall effect: Z = 1.17 (P = 0.24)							
Total (95% CI)	**177**		**177**			**100.0 %**	**0.22 [0.01, 0.43]**
Heterogeneity: Tau² = 0.0; Chi² = 3.58, df = 4 (P = 0.47); I² =0.0%							
Test for overall effect: Z = 2.07 (P = 0.039)							
Test for subgroup differences: Chi² = 0.15, df = 1 (P = 0.70), I² =0.0%							

-4 -2 0 2 4

Favours control   Favours experimental

Analysis 2.5. Comparison 2 CST vs no CST: HCP communication skills: doctors only, Outcome 5 Gave appropriate information.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 2 CST vs no CST: HCP communication skills: doctors only

Outcome: 5 Gave appropriate information

Study or subgroup	Experimental		Control		Std. Mean Difference	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI	IV,Random,95% CI
1 Simulated patients						
Razavi 2003	29	6.55 (4.31)	33	6.41 (4.6)		0.03 [-0.47, 0.53]
2 Real patients						
Razavi 2003	28	24.8 (13.08)	30	25.75 (13.38)		-0.07 [-0.59, 0.44]

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                                          -4   -2    0    2    4
                                       Favours control   Favours experimental
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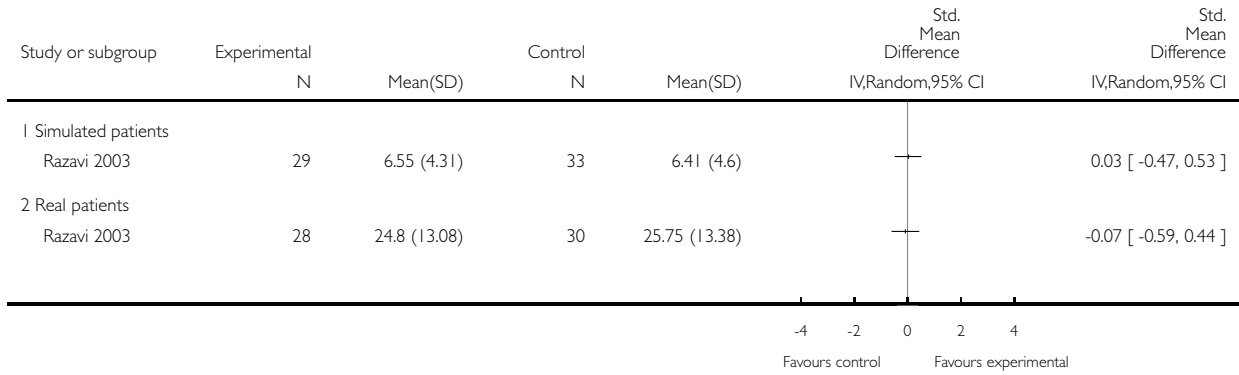
Analysis 2.6. Comparison 2 CST vs no CST: HCP communication skills: doctors only, Outcome 6 Gave facts only.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 2 CST vs no CST: HCP communication skills: doctors only

Outcome: 6 Gave facts only

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Simulated patients							
Lienard 2010	50	53.8 (20.1)	48	74.2 (23.4)		25.8 %	-0.93 [-1.35, -0.51]
Razavi 2003	29	70.37 (8.28)	33	70.94 (11.28)		24.3 %	-0.06 [-0.56, 0.44]
Subtotal (95% CI)	**79**		**81**			**50.2 %**	**-0.50 [-1.36, 0.35]**
Heterogeneity: Tau^2 = 0.33; Chi^2 = 6.91, df = 1 (P = 0.01); I^2 =86%							
Test for overall effect: Z = 1.15 (P = 0.25)							
2 Real patients							
Razavi 2003	28	86.2 (8.79)	30	86.37 (8.57)		24.0 %	-0.02 [-0.53, 0.50]
Lienard 2010	46	21 (12)	42	17.8 (10.5)		25.8 %	0.28 [-0.14, 0.70]
Subtotal (95% CI)	**74**		**72**			**49.8 %**	**0.16 [-0.17, 0.49]**
Heterogeneity: Tau^2 = 0.0; Chi^2 = 0.78, df = 1 (P = 0.38); I^2 =0.0%							
Test for overall effect: Z = 0.97 (P = 0.33)							
Total (95% CI)	**153**		**153**			**100.0 %**	**-0.19 [-0.74, 0.37]**
Heterogeneity: Tau^2 = 0.27; Chi^2 = 17.51, df = 3 (P = 0.00055); I^2 =83%							
Test for overall effect: Z = 0.66 (P = 0.51)							
Test for subgroup differences: Chi^2 = 2.03, df = 1 (P = 0.15), I^2 =51%							

-4 -2 0 2 4

Favours control   Favours experimental

Analysis 3.1. Comparison 3 CST vs no CST: HCP communication skills: nurses only, Outcome 1 Used open questions.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 3 CST vs no CST: HCP communication skills: nurses only

Outcome: 1 Used open questions

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Simulated patients							
Razavi 1993	35	3.7 (3)	36	2.7 (4.1)		32.1 %	0.27 [-0.19, 0.74]
Razavi 2002	54	13.86 (7.5)	57	7.3 (5.31)		33.7 %	1.01 [0.61, 1.40]
Subtotal (95% CI)	**89**		**93**			**65.8 %**	**0.65 [-0.07, 1.37]**
Heterogeneity: Tau² = 0.22; Chi² = 5.49, df = 1 (P = 0.02); I² =82%							
Test for overall effect: Z = 1.78 (P = 0.075)							
2 Real patients							
Razavi 2002	54	5.53 (3.75)	57	5.73 (5.34)		34.2 %	-0.04 [-0.42, 0.33]
Subtotal (95% CI)	**54**		**57**			**34.2 %**	**-0.04 [-0.42, 0.33]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.23 (P = 0.82)							
Total (95% CI)	**143**		**150**			**100.0 %**	**0.41 [-0.23, 1.06]**
Heterogeneity: Tau² = 0.28; Chi² = 14.75, df = 2 (P = 0.00063); I² =86%							
Test for overall effect: Z = 1.26 (P = 0.21)							
Test for subgroup differences: Chi² = 2.84, df = 1 (P = 0.09), I² =65%							

-10 -5 0 5 10

Favours control   Favours experimental

Analysis 3.2. Comparison 3 CST vs no CST: HCP communication skills: nurses only, Outcome 2 Clarified and/or summarised.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 3 CST vs no CST: HCP communication skills: nurses only

Outcome: 2 Clarified and/or summarised

Study or subgroup	Favours control		Control		Std. Mean Difference	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI	IV,Random,95% CI
1 Simulated patients						
Razavi 2002	54	41.43 (13.06)	57	32.68 (13.25)		0.66 [0.28, 1.04]
2 Real patients						
Razavi 2002	54	35.5 (13.28)	57	36.78 (15)		-0.09 [-0.46, 0.28]

-10   -5   0   5   10

Favours control   Favours experimental
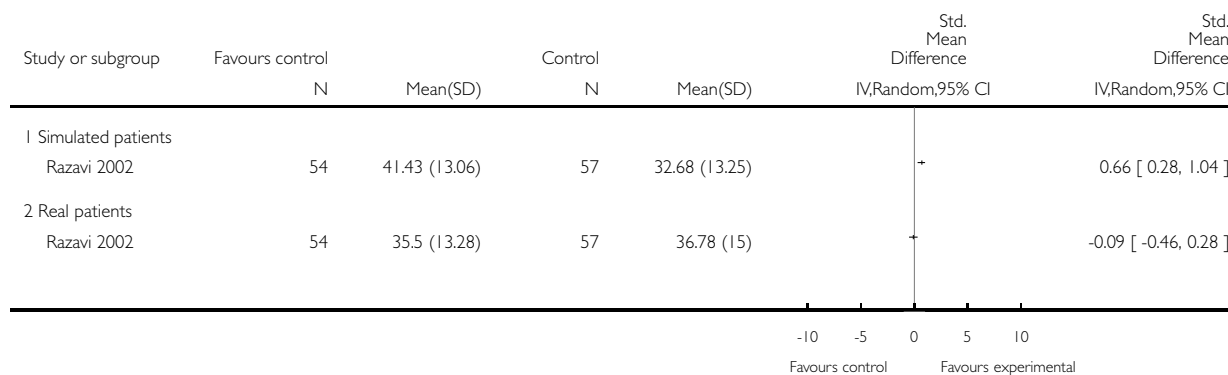
Analysis 3.3. Comparison 3 CST vs no CST: HCP communication skills: nurses only, Outcome 3 Elicited concerns.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 3 CST vs no CST: HCP communication skills: nurses only

Outcome: 3 Elicited concerns

Study or subgroup	Experimental		Control		Std. Mean Difference	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI	IV,Random,95% CI
1 Simulated patients						
Razavi 1993	35	19.8 (10.1)	36	13.7 (9.6)		0.61 [0.14, 1.09]

-4   -2   0   2   4

Favours control   Favours experimental
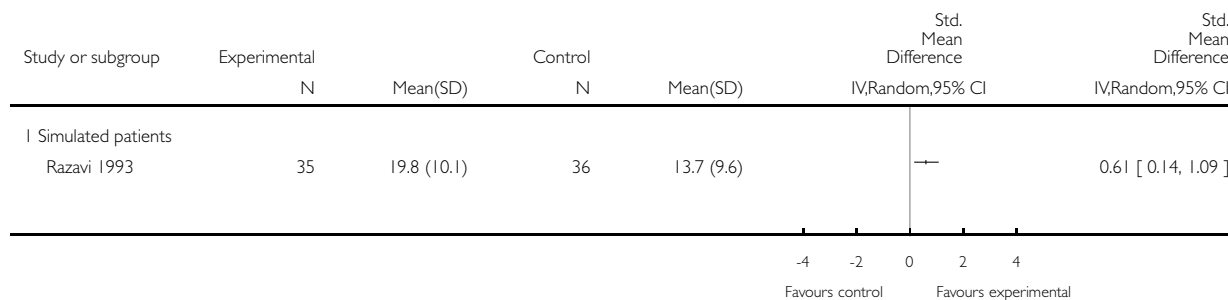
Analysis 3.4. Comparison 3 CST vs no CST: HCP communication skills: nurses only, Outcome 4 Showed empathy.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 3 CST vs no CST: HCP communication skills: nurses only

Outcome: 4 Showed empathy

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Simulated patients							
Razavi 1993	35	22.3 (12)	36	20.2 (12.9)		24.3 %	0.17 [-0.30, 0.63]
Razavi 2002	54	21.75 (10.25)	57	18.59 (12.25)		37.7 %	0.28 [-0.10, 0.65]
Subtotal (95% CI)	**89**		**93**			**62.0 %**	**0.23 [-0.06, 0.53]**
Heterogeneity: Tau² = 0.0; Chi² = 0.13, df = 1 (P = 0.72); I² =0.0%							
Test for overall effect: Z = 1.57 (P = 0.12)							
2 Real patients							
Razavi 2002	54	39.18 (14.44)	57	37.66 (13.71)		38.0 %	0.11 [-0.27, 0.48]
Subtotal (95% CI)	**54**		**57**			**38.0 %**	**0.11 [-0.27, 0.48]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.56 (P = 0.57)							
Total (95% CI)	**143**		**150**			**100.0 %**	**0.19 [-0.04, 0.42]**
Heterogeneity: Tau² = 0.0; Chi² = 0.41, df = 2 (P = 0.82); I² =0.0%							
Test for overall effect: Z = 1.59 (P = 0.11)							
Test for subgroup differences: Chi² = 0.28, df = 1 (P = 0.60), I² =0.0%							

```
        -4   -2   0   2   4
   Favours control   Favours experimental
```

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 3 CST vs no CST: HCP communication skills: nurses only

Outcome: 5 Gave appropriate information

Study or subgroup	Experimental N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
1 Simulated patients							
Razavi 2002	54	7.93 (5.89)	57	9.95 (8.51)		32.3 %	-0.27 [-0.65, 0.10]
Razavi 2003	29	6.55 (4.31)	33	6.41 (4.6)		18.1 %	0.03 [-0.47, 0.53]
Subtotal (95% CI)	**83**		**90**			**50.4 %**	**-0.16 [-0.46, 0.14]**
Heterogeneity: Tau² = 0.0; Chi² = 0.91, df = 1 (P = 0.34); I² =0.0%							
Test for overall effect: Z = 1.07 (P = 0.28)							
2 Real patients							
Razavi 2003	28	24.8 (13.08)	30	25.75 (13.38)		17.0 %	-0.07 [-0.59, 0.44]
Razavi 2002	54	5.64 (7.51)	57	5.62 (5.53)		32.6 %	0.00 [-0.37, 0.38]
Subtotal (95% CI)	**82**		**87**			**49.6 %**	**-0.02 [-0.32, 0.28]**
Heterogeneity: Tau² = 0.0; Chi² = 0.05, df = 1 (P = 0.82); I² =0.0%							
Test for overall effect: Z = 0.14 (P = 0.88)							
Total (95% CI)	**165**		**177**			**100.0 %**	**-0.09 [-0.31, 0.12]**
Heterogeneity: Tau² = 0.0; Chi² = 1.39, df = 3 (P = 0.71); I² =0.0%							
Test for overall effect: Z = 0.86 (P = 0.39)							
Test for subgroup differences: Chi² = 0.42, df = 1 (P = 0.51), I² =0.0%							

-4 -2 0 2 4

Favours control   Favours experimental

Analysis 3.6. Comparison 3 CST vs no CST: HCP communication skills: nurses only, Outcome 6 Gave facts only.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 3 CST vs no CST: HCP communication skills: nurses only

Outcome: 6 Gave facts only

Study or subgroup	Experimental N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
1 Simulated patients							
Razavi 2002	54	36.83 (16.36)	57	47.93 (18.17)		34.6 %	-0.64 [-1.02, -0.25]
Razavi 1993	35	66.8 (21.9)	36	65.7 (21.3)		30.3 %	0.05 [-0.41, 0.52]
Subtotal (95% CI)	**89**		**93**			**64.9 %**	**-0.31 [-0.98, 0.37]**
Heterogeneity: Tau² = 0.19; Chi² = 5.00, df = 1 (P = 0.03); I² =80%							
Test for overall effect: Z = 0.89 (P = 0.37)							
2 Real patients							
Razavi 2002	54	70.66 (16.26)	57	72.34 (19.37)		35.1 %	-0.09 [-0.47, 0.28]
Subtotal (95% CI)	**54**		**57**			**35.1 %**	**-0.09 [-0.47, 0.28]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.49 (P = 0.62)							
Total (95% CI)	**143**		**150**			**100.0 %**	**-0.24 [-0.65, 0.17]**
Heterogeneity: Tau² = 0.09; Chi² = 6.22, df = 2 (P = 0.04); I² =68%							
Test for overall effect: Z = 1.13 (P = 0.26)							
Test for subgroup differences: Chi² = 0.30, df = 1 (P = 0.59), I² =0.0%							

-4 -2 0 2 4

Favours control   Favours experimental

Analysis 4.1.   Comparison 4 CST vs no CST: subgrouped by HCP type, Outcome 1 Used open questions.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 4 CST vs no CST: subgrouped by HCP type

Outcome: 1 Used open questions

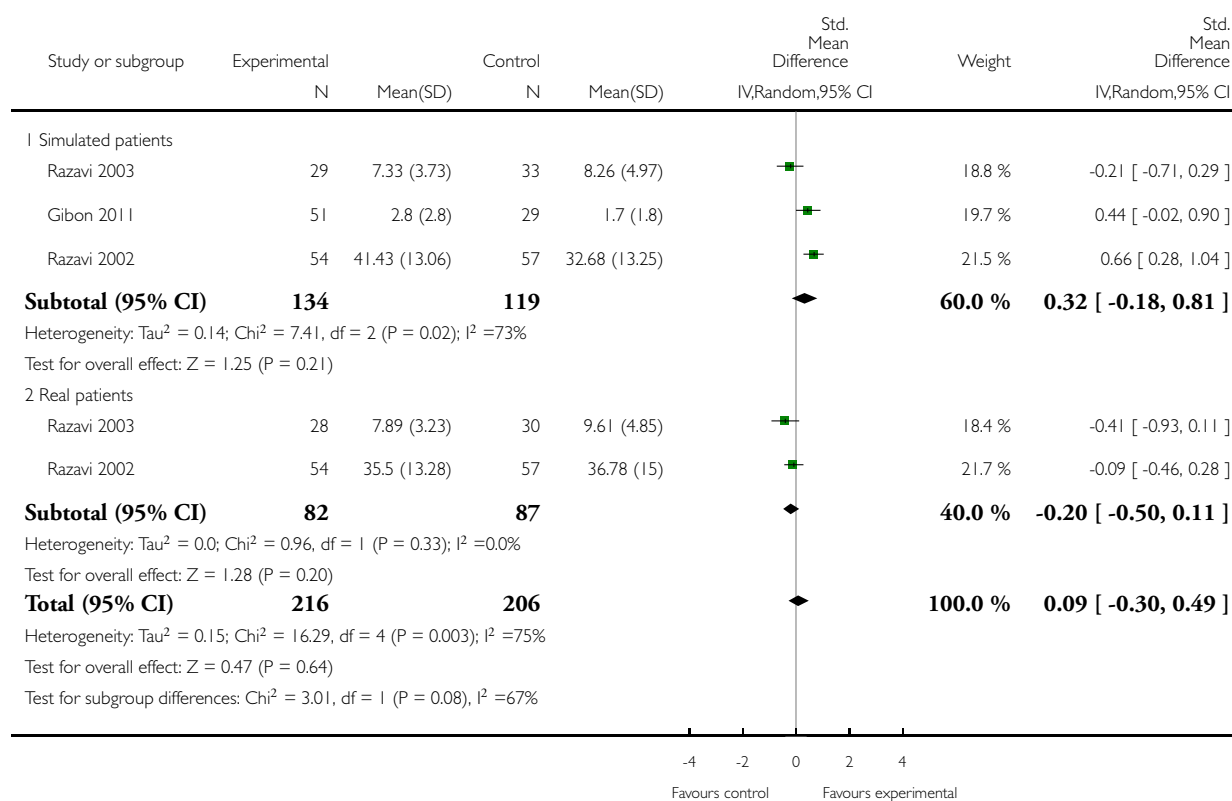| Study or subgroup	Experimental N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
1 Doctors							
Lienard 2010	46	0.8 (0.7)	42	0.7 (0.7)		14.8 %	0.14 [-0.28, 0.56]
Razavi 2003	28	2.04 (1.59)	30	1.67 (1)		12.4 %	0.28 [-0.24, 0.79]
Lienard 2010	50	0.8 (1.1)	48	0.5 (0.8)		15.3 %	0.31 [-0.09, 0.71]
Razavi 2003	29	7.57 (4.51)	33	5.8 (4.2)		12.7 %	0.40 [-0.10, 0.91]
Subtotal (95% CI)	**153**		**153**			**55.1 %**	**0.27 [0.05, 0.50]**
Heterogeneity: Tau² = 0.0; Chi² = 0.66, df = 3 (P = 0.88); I² =0.0%							
Test for overall effect: Z = 2.37 (P = 0.018)							
2 Nurses							
Razavi 2002	54	5.53 (3.75)	57	5.73 (5.34)		16.0 %	-0.04 [-0.42, 0.33]
Razavi 1993	35	3.7 (3)	36	2.7 (4.1)		13.6 %	0.27 [-0.19, 0.74]
Razavi 2002	54	13.86 (7.5)	57	7.3 (5.31)		15.3 %	1.01 [0.61, 1.40]
Subtotal (95% CI)	**143**		**150**			**44.9 %**	**0.41 [-0.23, 1.06]**
Heterogeneity: Tau² = 0.28; Chi² = 14.75, df = 2 (P = 0.00063); I² =86%							
Test for overall effect: Z = 1.26 (P = 0.21)							
Total (95% CI)	**296**		**303**			**100.0 %**	**0.34 [0.07, 0.61]**
Heterogeneity: Tau² = 0.08; Chi² = 16.05, df = 6 (P = 0.01); I² =63%							
Test for overall effect: Z = 2.47 (P = 0.013)							
Test for subgroup differences: Chi² = 0.16, df = 1 (P = 0.69), I² =0.0%							

-4 -2 0 2 4

Favours control   Favours experimental

Analysis 4.2. Comparison 4 CST vs no CST: subgrouped by HCP type, Outcome 2 Clarified and/or summarised.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 4 CST vs no CST: subgrouped by HCP type
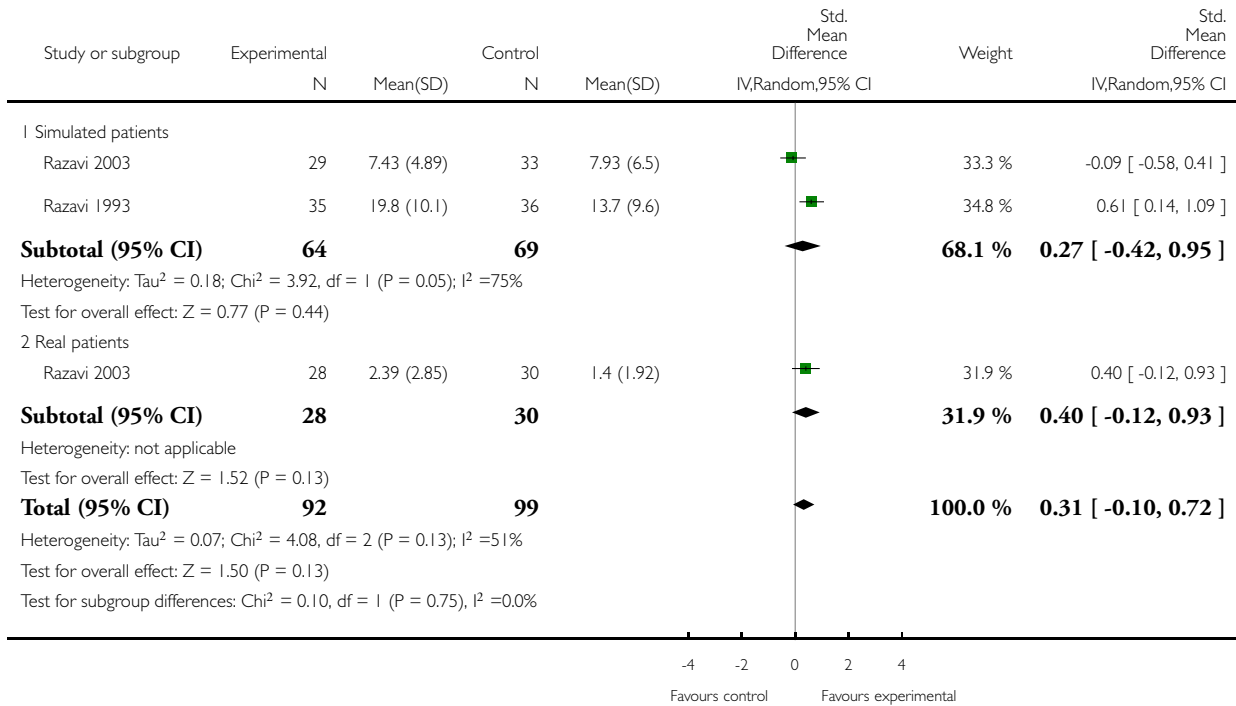
Outcome: 2 Clarified and/or summarised

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Doctors							
Razavi 2003	28	7.89 (3.23)	30	9.61 (4.85)		23.1 %	-0.41 [-0.93, 0.11]
Razavi 2003	29	7.33 (3.73)	33	8.26 (4.97)		23.6 %	-0.21 [-0.71, 0.29]
Subtotal (95% CI)	**57**		**63**			**46.8 %**	**-0.30 [-0.66, 0.06]**
Heterogeneity: Tau² = 0.0; Chi² = 0.30, df = 1 (P = 0.58); I² =0.0%							
Test for overall effect: Z = 1.65 (P = 0.099)							
2 Nurses							
Razavi 2002	54	35.5 (13.28)	57	36.78 (15)		26.7 %	-0.09 [-0.46, 0.28]
Razavi 2002	54	41.43 (13.06)	57	32.68 (13.25)		26.5 %	0.66 [0.28, 1.04]
Subtotal (95% CI)	**108**		**114**			**53.2 %**	**0.28 [-0.45, 1.02]**
Heterogeneity: Tau² = 0.24; Chi² = 7.58, df = 1 (P = 0.01); I² =87%							
Test for overall effect: Z = 0.76 (P = 0.45)							
Total (95% CI)	**165**		**177**			**100.0 %**	**0.01 [-0.47, 0.48]**
Heterogeneity: Tau² = 0.19; Chi² = 14.28, df = 3 (P = 0.003); I² =79%							
Test for overall effect: Z = 0.03 (P = 0.98)							
Test for subgroup differences: Chi² = 1.98, df = 1 (P = 0.16), I² =50%							

```
        -4    -2    0    2    4

    Favours control    Favours experimental
```

Analysis 4.3. Comparison 4 CST vs no CST: subgrouped by HCP type, Outcome 3 Elicited concerns.

Review: Communication skills training for healthcare professionals working with people who have cancer

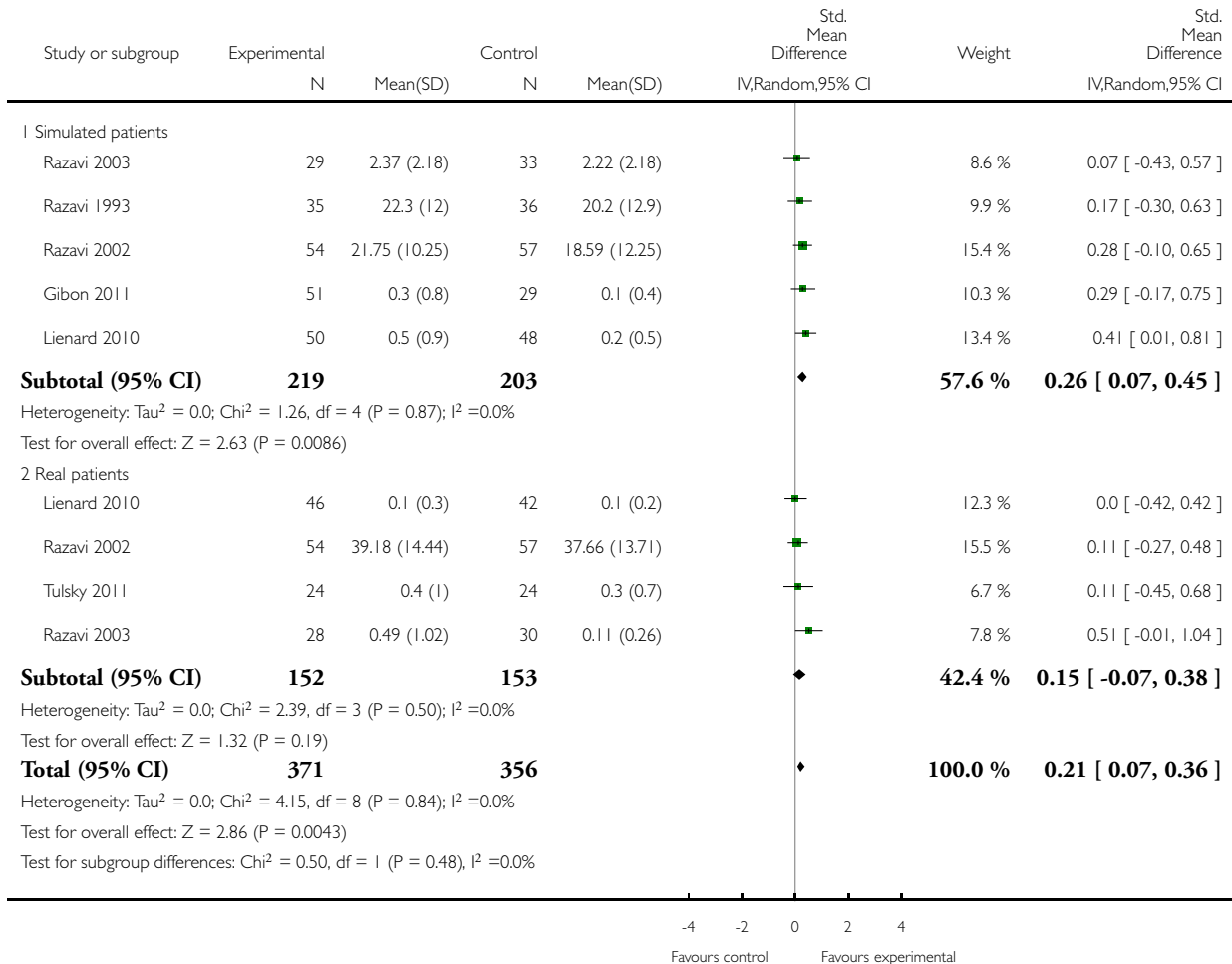Comparison: 4 CST vs no CST: subgrouped by HCP type

Outcome: 3 Elicited concerns

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Doctors							
Razavi 2003	29	7.43 (4.89)	33	7.93 (6.5)		33.3 %	-0.09 [-0.58, 0.41]
Razavi 2003	28	2.39 (2.85)	30	1.4 (1.92)		31.9 %	0.40 [-0.12, 0.93]
Subtotal (95% CI)	**57**		**63**			**65.2 %**	**0.15 [-0.33, 0.63]**
Heterogeneity: Tau² = 0.05; Chi² = 1.77, df = 1 (P = 0.18); I² =44%							
Test for overall effect: Z = 0.63 (P = 0.53)							
2 Nurses							
Razavi 1993	35	19.8 (10.1)	36	13.7 (9.6)		34.8 %	0.61 [0.14, 1.09]
Subtotal (95% CI)	**35**		**36**			**34.8 %**	**0.61 [0.14, 1.09]**
Heterogeneity: not applicable							
Test for overall effect: Z = 2.52 (P = 0.012)							
Total (95% CI)	**92**		**99**			**100.0 %**	**0.31 [-0.10, 0.72]**
Heterogeneity: Tau² = 0.07; Chi² = 4.08, df = 2 (P = 0.13); I² =51%							
Test for overall effect: Z = 1.50 (P = 0.13)							
Test for subgroup differences: Chi² = 1.77, df = 1 (P = 0.18), I² =43%							

-4 -2 0 2 4

Favours control   Favours experimental

Analysis 4.4.   Comparison 4 CST vs no CST: subgrouped by HCP type, Outcome 4 Showed empathy.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 4 CST vs no CST: subgrouped by HCP type

Outcome: 4 Showed empathy

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Doctors							
Lienard 2010	46	0.1 (0.3)	42	0.1 (0.2)		13.7 %	0.0 [-0.42, 0.42]
Razavi 2003	29	2.37 (2.18)	33	2.22 (2.18)		9.6 %	0.07 [-0.43, 0.57]
Tulsky 2011	24	0.4 (1)	24	0.3 (0.7)		7.5 %	0.11 [-0.45, 0.68]
Lienard 2010	50	0.5 (0.9)	48	0.2 (0.5)		15.0 %	0.41 [0.01, 0.81]
Razavi 2003	28	0.49 (1.02)	30	0.11 (0.26)		8.7 %	0.51 [-0.01, 1.04]
Subtotal (95% CI)	**177**		**177**			**54.5 %**	**0.22 [0.01, 0.43]**
Heterogeneity: Tau² = 0.0; Chi² = 3.58, df = 4 (P = 0.47); I² =0.0%							
Test for overall effect: Z = 2.07 (P = 0.039)							
2 Nurses							
Razavi 2002	54	39.18 (14.44)	57	37.66 (13.71)		17.3 %	0.11 [-0.27, 0.48]
Razavi 1993	35	22.3 (12)	36	20.2 (12.9)		11.0 %	0.17 [-0.30, 0.63]
Razavi 2002	54	21.75 (10.25)	57	18.59 (12.25)		17.1 %	0.28 [-0.10, 0.65]
Subtotal (95% CI)	**143**		**150**			**45.5 %**	**0.19 [-0.04, 0.42]**
Heterogeneity: Tau² = 0.0; Chi² = 0.41, df = 2 (P = 0.82); I² =0.0%							
Test for overall effect: Z = 1.59 (P = 0.11)							
Total (95% CI)	**320**		**327**			**100.0 %**	**0.21 [0.05, 0.36]**
Heterogeneity: Tau² = 0.0; Chi² = 4.04, df = 7 (P = 0.78); I² =0.0%							
Test for overall effect: Z = 2.60 (P = 0.0094)							
Test for subgroup differences: Chi² = 0.05, df = 1 (P = 0.82), I² =0.0%							

```
          -4    -2    0    2    4
       Favours control      Favours experimental
```

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 4 CST vs no CST: subgrouped by HCP type

Outcome: 5 Gave appropriate information

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Doctors							
Razavi 2003	28	24.8 (13.08)	30	25.75 (13.38)		17.0 %	-0.07 [-0.59, 0.44]
Razavi 2003	29	6.55 (4.31)	33	6.41 (4.6)		18.1 %	0.03 [-0.47, 0.53]
Subtotal (95% CI)	**57**		**63**			**35.1 %**	**-0.02 [-0.38, 0.34]**
Heterogeneity: Tau² = 0.0; Chi² = 0.08, df = 1 (P = 0.78); I² =0.0%							
Test for overall effect: Z = 0.10 (P = 0.92)							
2 Nurses							
Razavi 2002	54	7.93 (5.89)	57	9.95 (8.51)		32.3 %	-0.27 [-0.65, 0.10]
Razavi 2002	54	5.64 (7.51)	57	5.62 (5.53)		32.6 %	0.00 [-0.37, 0.38]
Subtotal (95% CI)	**108**		**114**			**64.9 %**	**-0.13 [-0.40, 0.14]**
Heterogeneity: Tau² = 0.00; Chi² = 1.05, df = 1 (P = 0.31); I² =5%							
Test for overall effect: Z = 0.97 (P = 0.33)							
Total (95% CI)	**165**		**177**			**100.0 %**	**-0.09 [-0.31, 0.12]**
Heterogeneity: Tau² = 0.0; Chi² = 1.39, df = 3 (P = 0.71); I² =0.0%							
Test for overall effect: Z = 0.86 (P = 0.39)							
Test for subgroup differences: Chi² = 0.26, df = 1 (P = 0.61), I² =0.0%							

-4   -2   0   2   4

Favours control   Favours experimental

Analysis 4.6.   Comparison 4 CST vs no CST: subgrouped by HCP type, Outcome 6 Gave facts only.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 4 CST vs no CST: subgrouped by HCP type

Outcome: 6 Gave facts only

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
1 Doctors							
Lienard 2010	50	53.8 (20.1)	48	74.2 (23.4)		14.6 %	-0.93 [-1.35, -0.51]
Razavi 2003	29	70.37 (8.28)	33	70.94 (11.28)		13.3 %	-0.06 [-0.56, 0.44]
Razavi 2003	28	86.2 (8.79)	30	86.37 (8.57)		13.0 %	-0.02 [-0.53, 0.50]
Lienard 2010	46	21 (12)	42	17.8 (10.5)		14.6 %	0.28 [-0.14, 0.70]
Subtotal (95% CI)	**153**		**153**			**55.5 %**	**-0.19 [-0.74, 0.37]**
Heterogeneity: Tau² = 0.27; Chi² = 17.51, df = 3 (P = 0.00055); I² =83%							
Test for overall effect: Z = 0.66 (P = 0.51)							
2 Nurses							
Razavi 2002	54	36.83 (16.36)	57	47.93 (18.17)		15.2 %	-0.64 [-1.02, -0.25]
Razavi 2002	54	70.66 (16.26)	57	72.34 (19.37)		15.4 %	-0.09 [-0.47, 0.28]
Razavi 1993	35	66.8 (21.9)	36	65.7 (21.3)		13.8 %	0.05 [-0.41, 0.52]
Subtotal (95% CI)	**143**		**150**			**44.5 %**	**-0.24 [-0.65, 0.17]**
Heterogeneity: Tau² = 0.09; Chi² = 6.22, df = 2 (P = 0.04); I² =68%							
Test for overall effect: Z = 1.13 (P = 0.26)							
Total (95% CI)	**296**		**303**			**100.0 %**	**-0.21 [-0.54, 0.12]**
Heterogeneity: Tau² = 0.14; Chi² = 23.81, df = 6 (P = 0.00057); I² =75%							
Test for overall effect: Z = 1.26 (P = 0.21)							
Test for subgroup differences: Chi² = 0.02, df = 1 (P = 0.88), I² =0.0%							

                    -4   -2   0   2   4

              Favours control   Favours experimental

Analysis 5.1. Comparison 5 CST vs no CST: Other HCP outcomes, Outcome 1 Emotional exhaustion: Maslach Burnout Inventory:.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 5 CST vs no CST: Other HCP outcomes

Outcome: 1 Emotional exhaustion: Maslach Burnout Inventory:
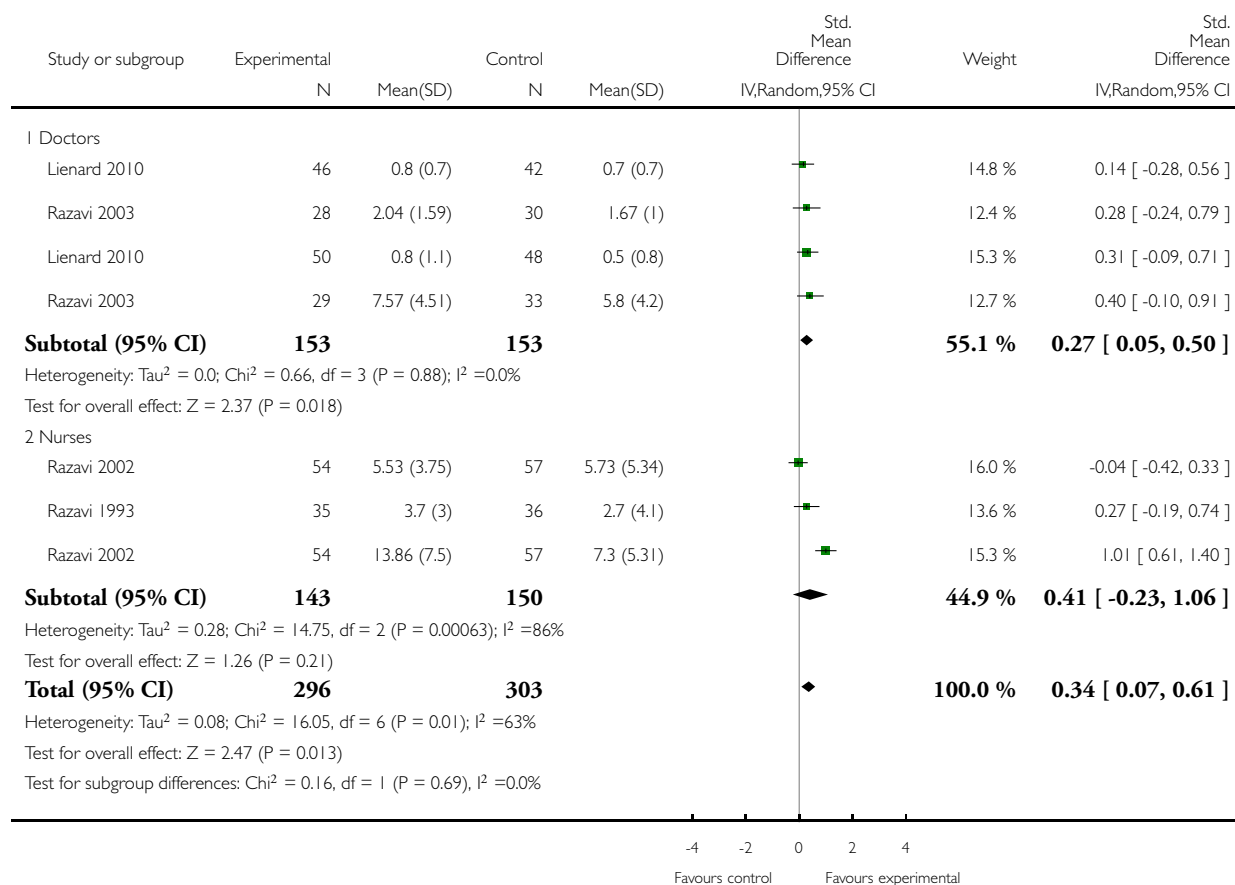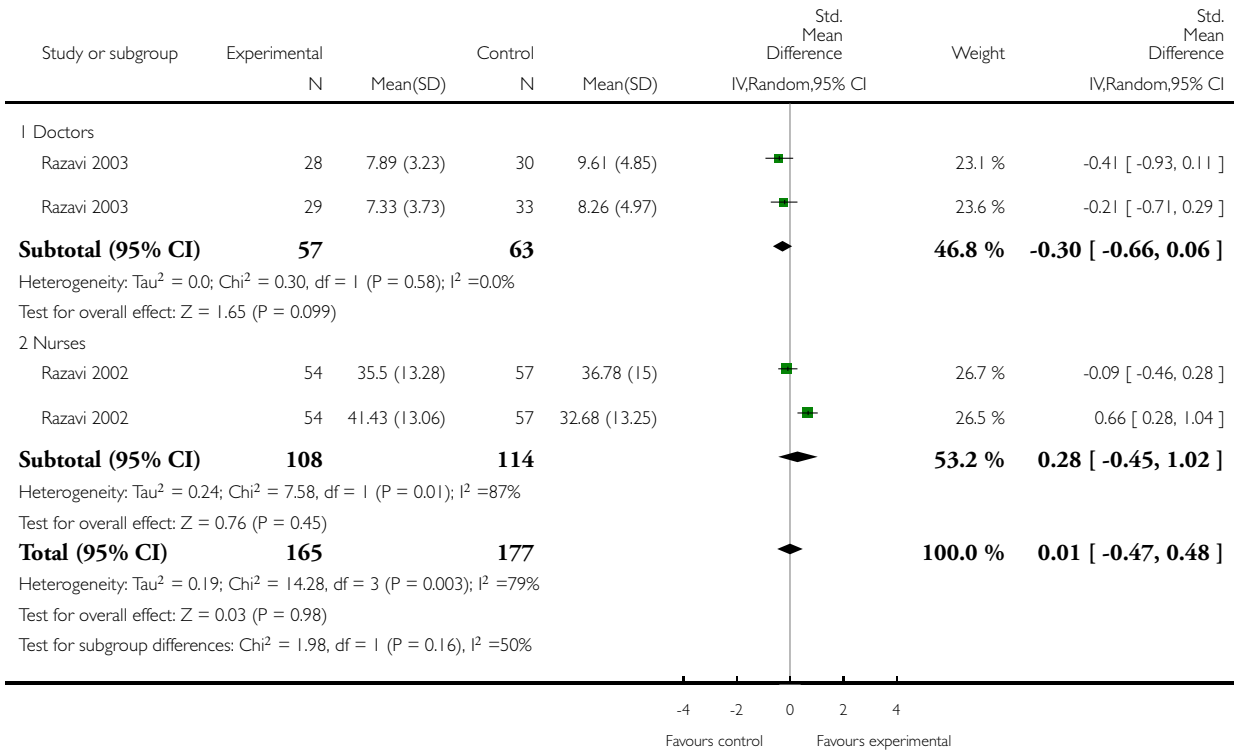
Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Kruijver 2001	23	3.1 (0.75)	21	3.1 (0.67)		43.4 %	0.0 [-0.59, 0.59]
Razavi 2003	33	18 (10)	29	22 (8)		56.6 %	-0.43 [-0.94, 0.07]
Total (95% CI)	**56**		**50**			**100.0 %**	**-0.25 [-0.67, 0.18]**

Heterogeneity: Tau^2 = 0.02; Chi^2 = 1.19, df = 1 (P = 0.28); I^2 =16%

Test for overall effect: Z = 1.14 (P = 0.25)

Test for subgroup differences: Not applicable

```
        -2    -1    0    1    2
      Favours control   Favours experimental
```
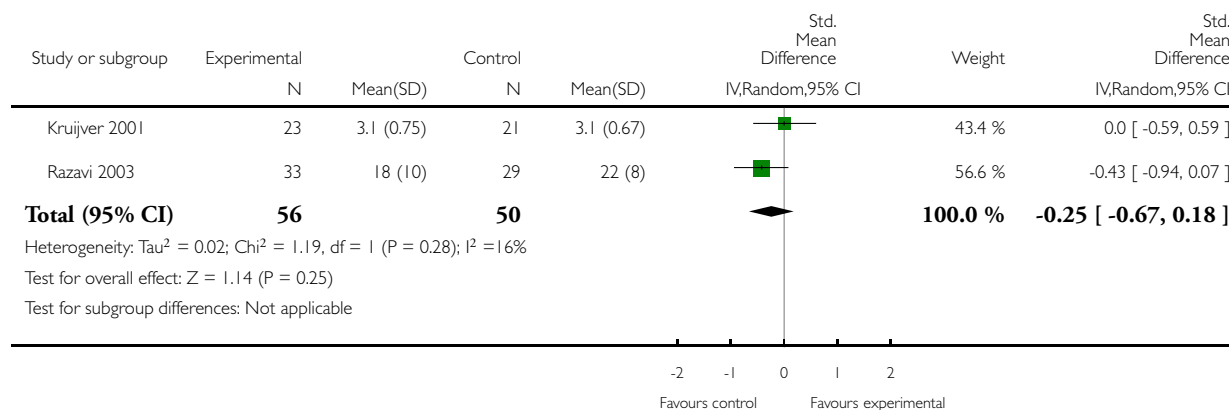
Analysis 5.2. Comparison 5 CST vs no CST: Other HCP outcomes, Outcome 2 Personal accomplishment: Maslach Burnout Inventory.

Review: Communication skills training for healthcare professionals working with people who have cancer

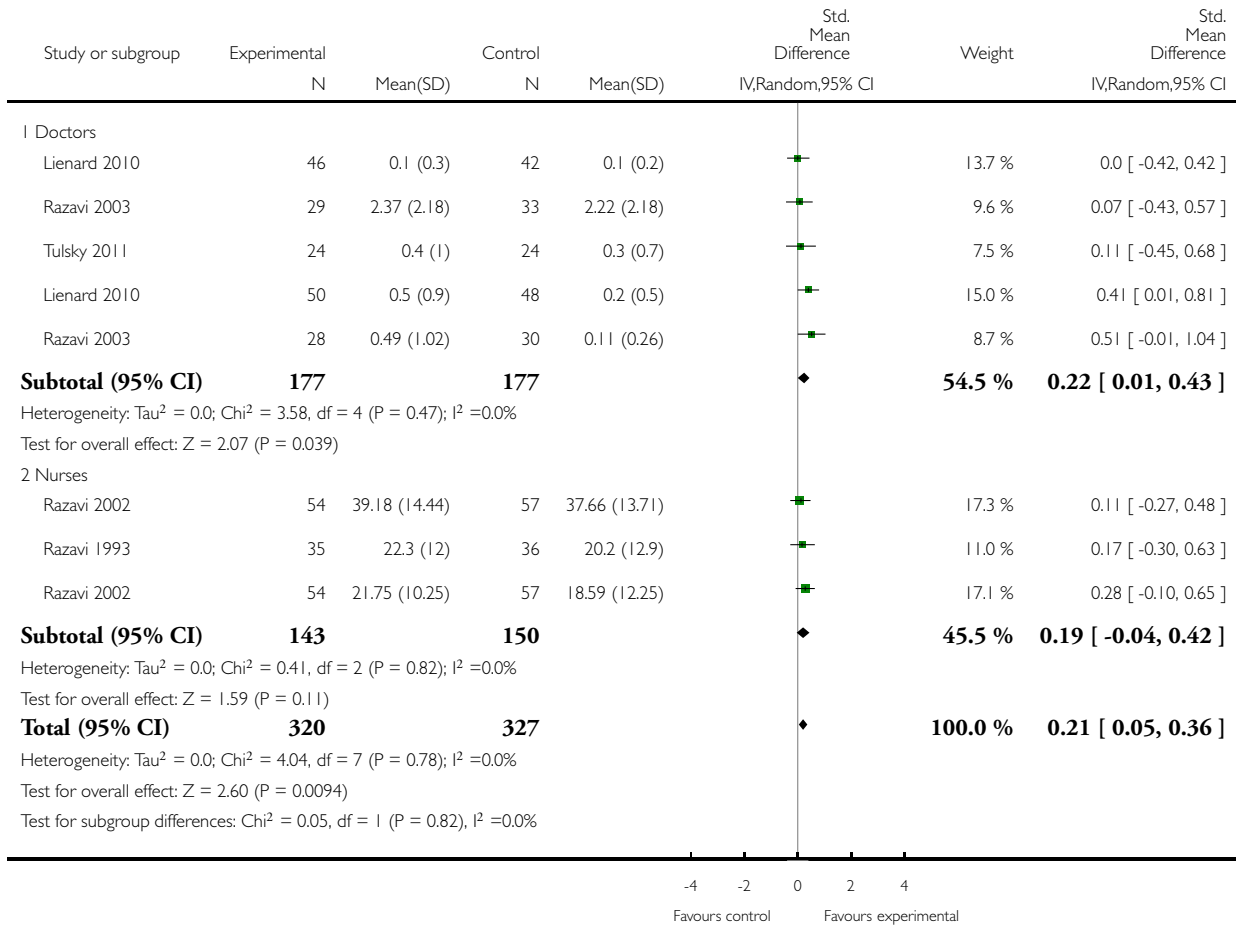Comparison: 5 CST vs no CST: Other HCP outcomes

Outcome: 2 Personal accomplishment: Maslach Burnout Inventory

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Kruijver 2001	23	5.2 (0.35)	21	5 (0.42)		51.4 %	0.51 [-0.09, 1.11]
Razavi 2003	33	39 (4)	14	39 (3)		48.6 %	0.0 [-0.63, 0.63]
Total (95% CI)	**56**		**35**			**100.0 %**	**0.26 [-0.24, 0.76]**

Heterogeneity: Tau^2 = 0.03; Chi^2 = 1.33, df = 1 (P = 0.25); I^2 =25%

Test for overall effect: Z = 1.03 (P = 0.30)

Test for subgroup differences: Not applicable

```
        -2    -1    0    1    2
      Favours control   Favours experimental
```
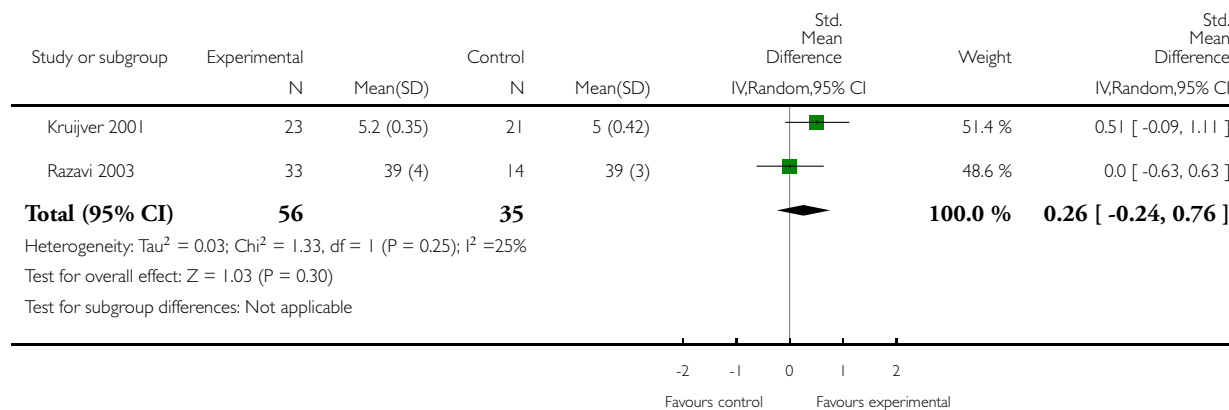
Analysis 6.1.   Comparison 6 CST vs no CST: Patient outcomes, Outcome 1 Patient psychiatric morbidity (GHQ 12).

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 6 CST vs no CST: Patient outcomes

Outcome: 1 Patient psychiatric morbidity (GHQ 12)

Study or subgroup	Experimental		Control		Std. Mean Difference	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI	IV,Random,95% CI
Wilkinson 2008	59	17.4 (8)	68	20.2 (7.6)		-0.36 [-0.71, -0.01]

```
                    -10    -5     0     5    10
              Favours experimental      Favours control
```
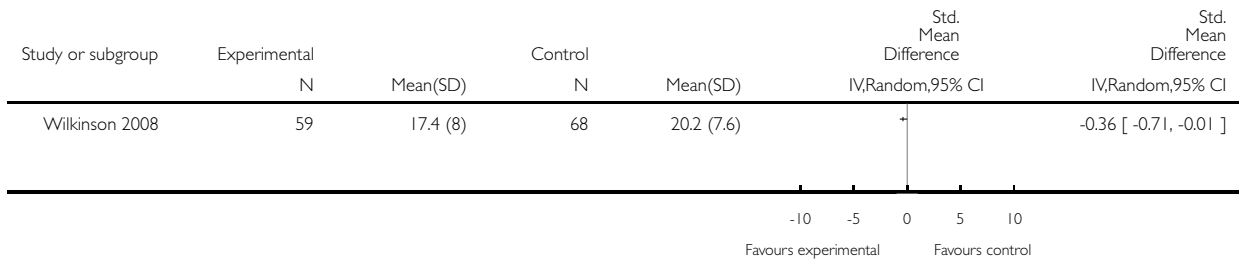
Analysis 6.2. Comparison 6 CST vs no CST: Patient outcomes, Outcome 2 Patient anxiety: Spielberger's State Trait Anxiety Inventory.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 6 CST vs no CST: Patient outcomes

Outcome: 2 Patient anxiety: Spielberger's State Trait Anxiety Inventory

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Razavi 2003	27	-0.8 (14.3)	30	-3.4 (14.9)		35.9 %	0.18 [-0.35, 0.70]
Wilkinson 2008	62	-3.8 (9.5)	50	-9.1 (10.9)		64.1 %	0.52 [0.14, 0.90]
Total (95% CI)	**89**		**80**			**100.0 %**	**0.40 [0.07, 0.72]**

Heterogeneity: Tau² = 0.00; Chi² = 1.09, df = 1 (P = 0.30); I² =8%

Test for overall effect: Z = 2.40 (P = 0.016)

Test for subgroup differences: Not applicable

-4 -2 0 2 4

Favours experimental   Favours control

Analysis 6.3. Comparison 6 CST vs no CST: Patient outcomes, Outcome 3 Patient perception of HCPs communication skills.

Review: Communication skills training for healthcare professionals working with people who have cancer

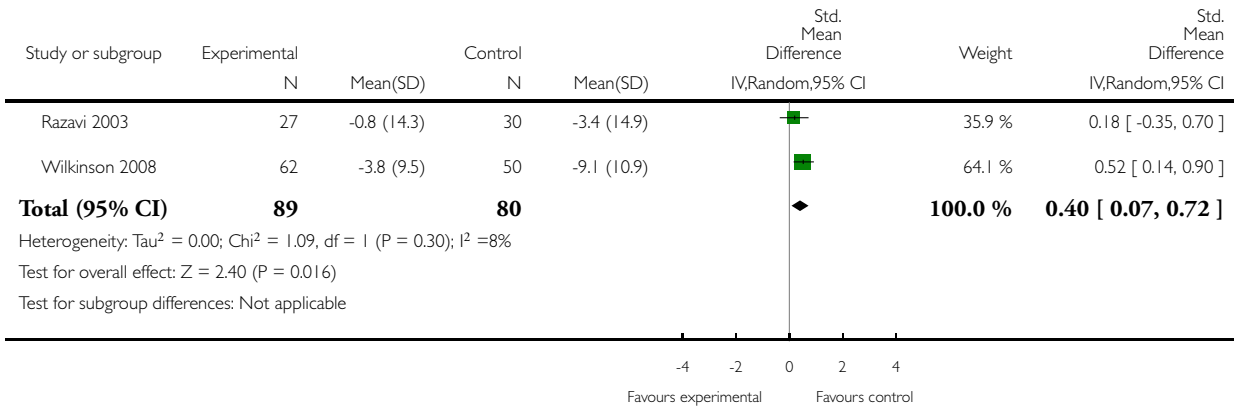Comparison: 6 CST vs no CST: Patient outcomes

Outcome: 3 Patient perception of HCPs communication skills

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Razavi 2002	54	3.59 (0.57)	57	3.7 (0.46)		65.2 %	-0.21 [-0.58, 0.16]
Razavi 2003	29	3.97 (0.19)	30	3.97 (0.18)		34.8 %	0.0 [-0.51, 0.51]
Total (95% CI)	**83**		**87**			**100.0 %**	**-0.14 [-0.44, 0.16]**

Heterogeneity: Tau² = 0.0; Chi² = 0.43, df = 1 (P = 0.51); I² =0.0%

Test for overall effect: Z = 0.90 (P = 0.37)

Test for subgroup differences: Not applicable
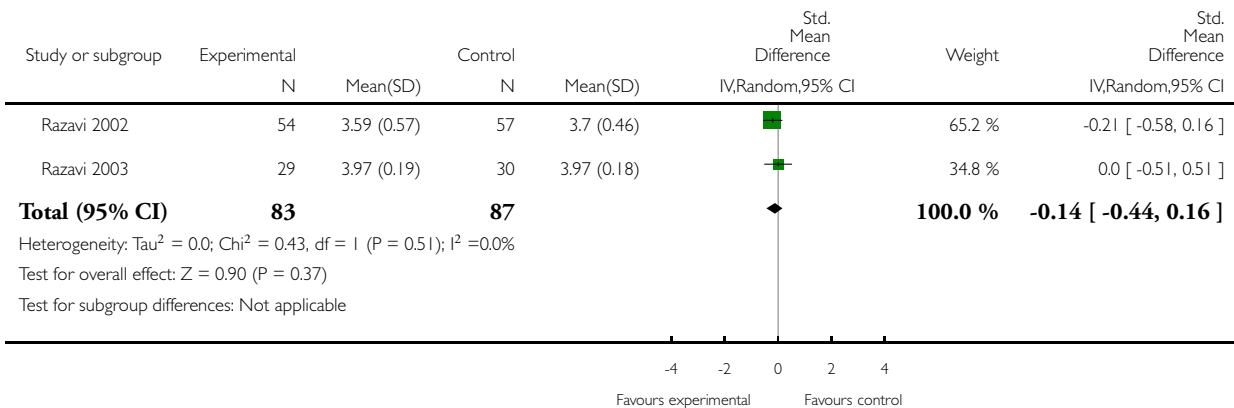
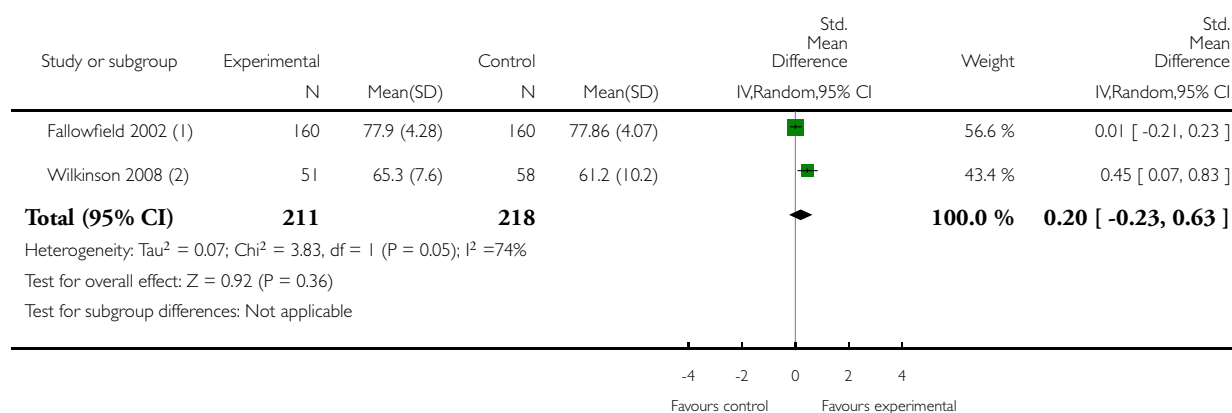-4 -2 0 2 4

Favours experimental   Favours control

Analysis 6.4. Comparison 6 CST vs no CST: Patient outcomes, Outcome 4 Patient satisfaction with communication.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 6 CST vs no CST: Patient outcomes

Outcome: 4 Patient satisfaction with communication

Study or subgroup	Experimental		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Fallowfield 2002 (1)	160	77.9 (4.28)	160	77.86 (4.07)		56.6 %	0.01 [-0.21, 0.23]
Wilkinson 2008 (2)	51	65.3 (7.6)	58	61.2 (10.2)		43.4 %	0.45 [0.07, 0.83]
Total (95% CI)	**211**		**218**			**100.0 %**	**0.20 [-0.23, 0.63]**

Heterogeneity: Tau² = 0.07; Chi² = 3.83, df = 1 (P = 0.05); I² =74%

Test for overall effect: Z = 0.92 (P = 0.36)

Test for subgroup differences: Not applicable

```
         -4    -2     0     2     4
      Favours control    Favours experimental
```

(1) This study assessed two participant interviews per enrolled HCP (doctors)

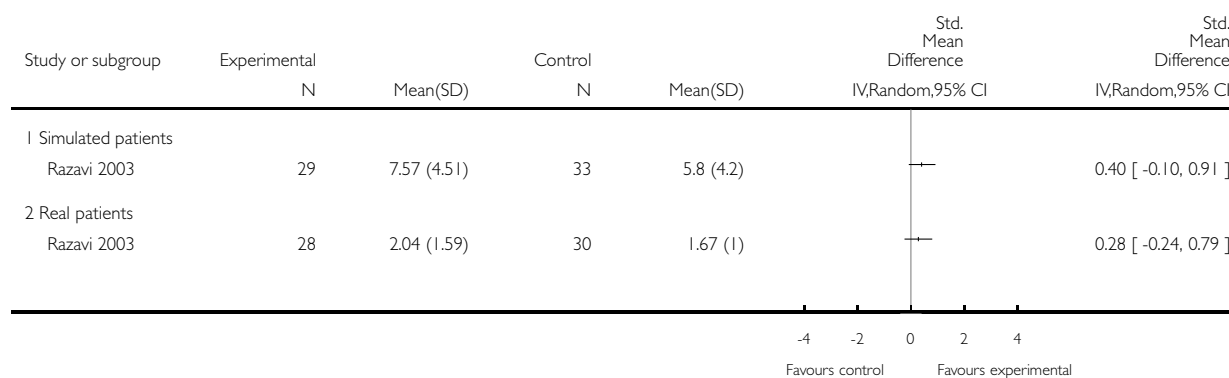(2) Enrolled nurses; incomplete data > 20%.

Analysis 7.1. Comparison 7 Follow-up CST vs no follow-up CST: HCP communication skills, Outcome 1 Used open questions.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 7 Follow-up CST vs no follow-up CST: HCP communication skills

Outcome: 1 Used open questions

Study or subgroup	Experimental		Control		Std. Mean Difference	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI	IV,Random,95% CI
1 Simulated patients						
Razavi 2003	29	7.57 (4.51)	33	5.8 (4.2)		0.40 [-0.10, 0.91]
2 Real patients						
Razavi 2003	28	2.04 (1.59)	30	1.67 (1)		0.28 [-0.24, 0.79]

-4 -2 0 2 4
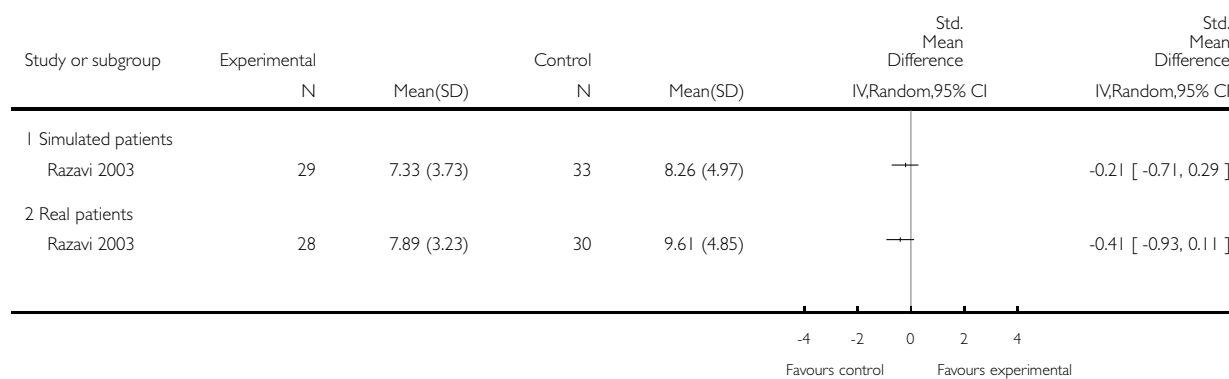
Favours control   Favours experimental

Analysis 7.2. Comparison 7 Follow-up CST vs no follow-up CST: HCP communication skills, Outcome 2 Clarified and/or summarised.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 7 Follow-up CST vs no follow-up CST: HCP communication skills

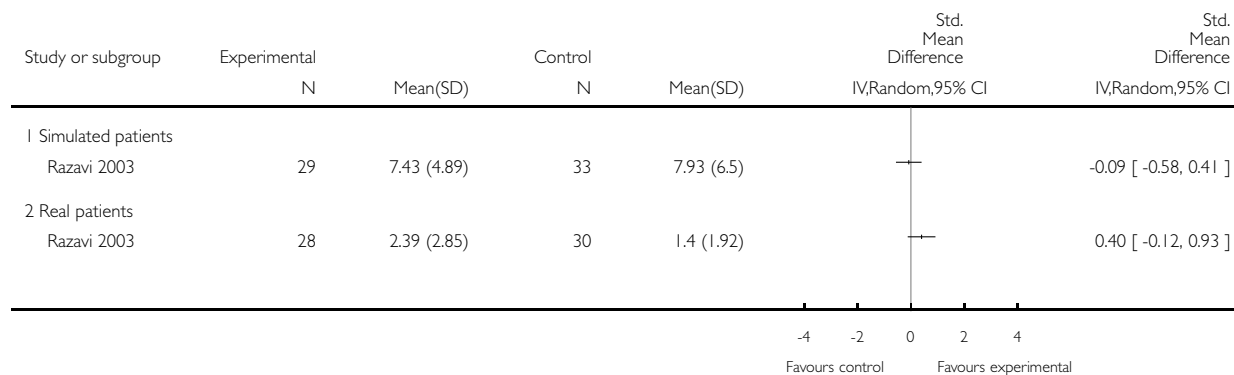Outcome: 2 Clarified and/or summarised

Study or subgroup	Experimental		Control		Std. Mean Difference	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI	IV,Random,95% CI
1 Simulated patients						
Razavi 2003	29	7.33 (3.73)	33	8.26 (4.97)		-0.21 [-0.71, 0.29]
2 Real patients						
Razavi 2003	28	7.89 (3.23)	30	9.61 (4.85)		-0.41 [-0.93, 0.11]

-4 -2 0 2 4

Favours control   Favours experimental

Analysis 7.3. Comparison 7 Follow-up CST vs no follow-up CST: HCP communication skills, Outcome 3 Elicited concerns.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 7 Follow-up CST vs no follow-up CST: HCP communication skills

Outcome: 3 Elicited concerns

Study or subgroup	Experimental		Control		Std. Mean Difference	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI	IV,Random,95% CI
1 Simulated patients						
Razavi 2003	29	7.43 (4.89)	33	7.93 (6.5)		-0.09 [-0.58, 0.41]
2 Real patients						
Razavi 2003	28	2.39 (2.85)	30	1.4 (1.92)		0.40 [-0.12, 0.93]

-4   -2   0   2   4
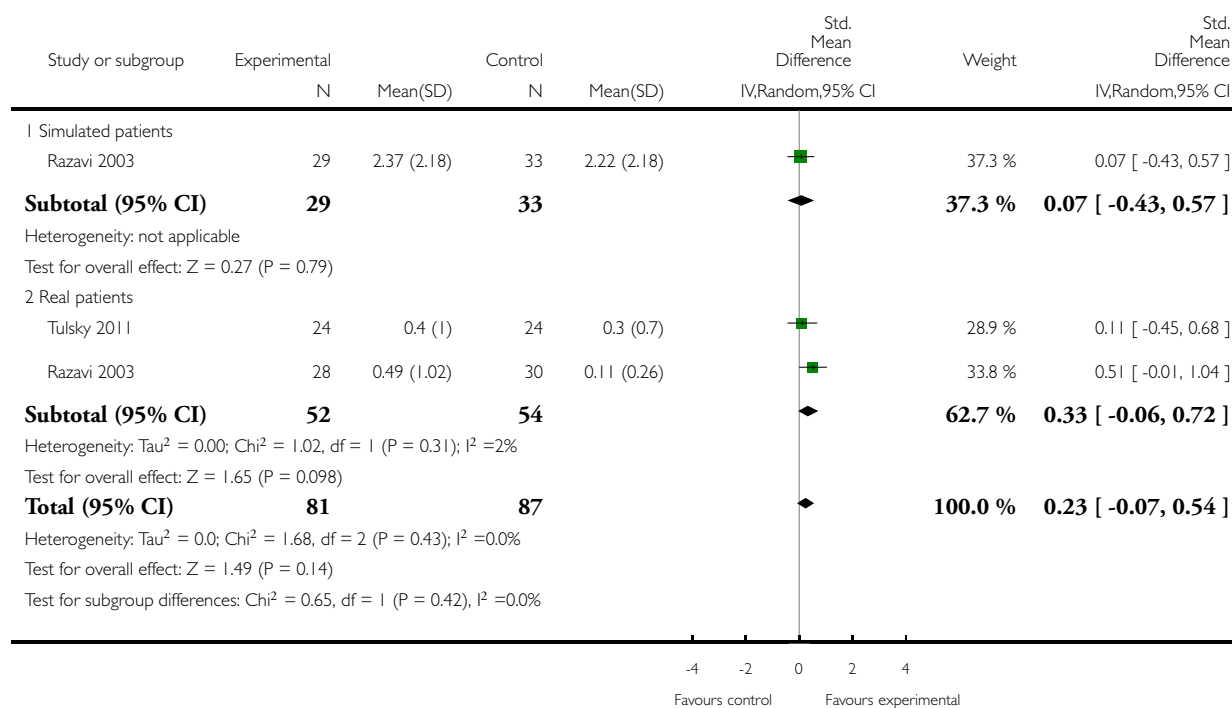
Favours control   Favours experimental

Analysis 7.4. Comparison 7 Follow-up CST vs no follow-up CST: HCP communication skills, Outcome 4 Showed empathy.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 7 Follow-up CST vs no follow-up CST: HCP communication skills

Outcome: 4 Showed empathy

Study or subgroup	Experimental N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
1 Simulated patients							
Razavi 2003	29	2.37 (2.18)	33	2.22 (2.18)		37.3 %	0.07 [-0.43, 0.57]
Subtotal (95% CI)	**29**		**33**			**37.3 %**	**0.07 [-0.43, 0.57]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.27 (P = 0.79)							
2 Real patients							
Tulsky 2011	24	0.4 (1)	24	0.3 (0.7)		28.9 %	0.11 [-0.45, 0.68]
Razavi 2003	28	0.49 (1.02)	30	0.11 (0.26)		33.8 %	0.51 [-0.01, 1.04]
Subtotal (95% CI)	**52**		**54**			**62.7 %**	**0.33 [-0.06, 0.72]**
Heterogeneity: Tau² = 0.00; Chi² = 1.02, df = 1 (P = 0.31); I² =2%							
Test for overall effect: Z = 1.65 (P = 0.098)							
Total (95% CI)	**81**		**87**			**100.0 %**	**0.23 [-0.07, 0.54]**
Heterogeneity: Tau² = 0.0; Chi² = 1.68, df = 2 (P = 0.43); I² =0.0%							
Test for overall effect: Z = 1.49 (P = 0.14)							
Test for subgroup differences: Chi² = 0.65, df = 1 (P = 0.42), I² =0.0%							

```
        -4    -2     0     2     4
      Favours control    Favours experimental
```
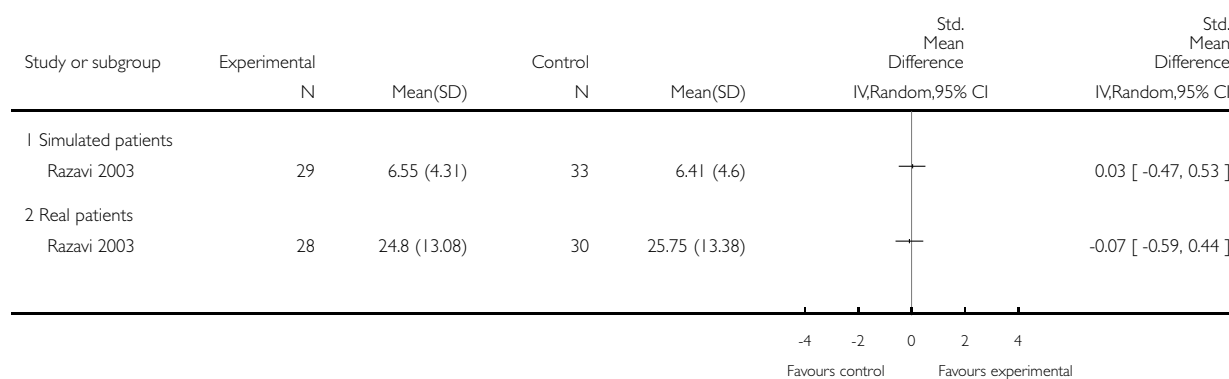
Analysis 7.5. Comparison 7 Follow-up CST vs no follow-up CST: HCP communication skills, Outcome 5 Gave appropriate information.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 7 Follow-up CST vs no follow-up CST: HCP communication skills

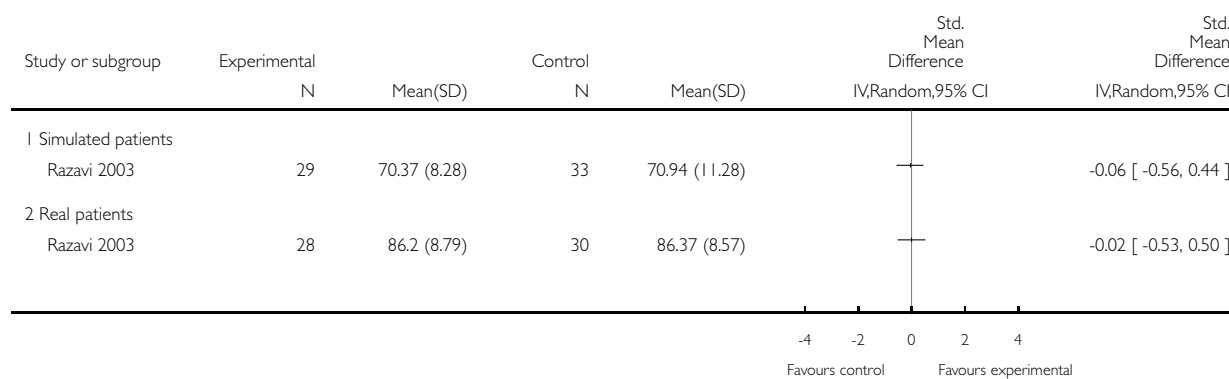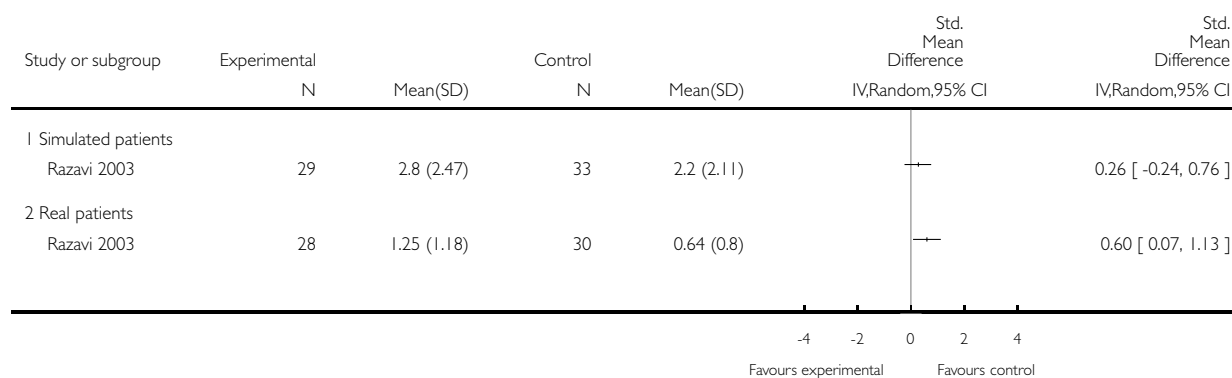Outcome: 5 Gave appropriate information

Study or subgroup	Experimental		Control		Std. Mean Difference	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI	IV,Random,95% CI
1 Simulated patients						
Razavi 2003	29	6.55 (4.31)	33	6.41 (4.6)		0.03 [-0.47, 0.53]
2 Real patients						
Razavi 2003	28	24.8 (13.08)	30	25.75 (13.38)		-0.07 [-0.59, 0.44]

-4 -2 0 2 4

Favours control   Favours experimental

Analysis 7.6. Comparison 7 Follow-up CST vs no follow-up CST: HCP communication skills, Outcome 6 Gave facts only.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 7 Follow-up CST vs no follow-up CST: HCP communication skills

Outcome: 6 Gave facts only

Study or subgroup	Experimental		Control		Std. Mean Difference	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI	IV,Random,95% CI
1 Simulated patients						
Razavi 2003	29	70.37 (8.28)	33	70.94 (11.28)		-0.06 [-0.56, 0.44]
2 Real patients						
Razavi 2003	28	86.2 (8.79)	30	86.37 (8.57)		-0.02 [-0.53, 0.50]

-4 -2 0 2 4

Favours control   Favours experimental

Analysis 7.7. Comparison 7 Follow-up CST vs no follow-up CST: HCP communication skills, Outcome 7 Negotiation.

Review: Communication skills training for healthcare professionals working with people who have cancer

Comparison: 7 Follow-up CST vs no follow-up CST: HCP communication skills

Outcome: 7 Negotiation

Study or subgroup	Experimental N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Std. Mean Difference IV,Random,95% CI
1 Simulated patients						
Razavi 2003	29	2.8 (2.47)	33	2.2 (2.11)		0.26 [-0.24, 0.76]
2 Real patients						
Razavi 2003	28	1.25 (1.18)	30	0.64 (0.8)		0.60 [0.07, 1.13]

-4   -2   0   2   4

Favours experimental   Favours control

ADDITIONAL TABLES

Table 1. Scales used to measure HCP communication skills

Abbreviation	Name of scale	Studies included in review that used scale	Validation reference (if any)
Com-on	**COM**munication challenges in **ON**cology	Goelz 2009	Stubenrauch 2012
CRCWEM	Cancer Research Campaign Workshop Evaluation Manual	Razavi 1993; Razavi 2002; Razavi 2003	Booth 1991
CSRS	Communication Skills Rating Scale	Wilkinson 2008	Wilkinson 1991
HPSD	Harvard Third Psychosociological Dictionary	Razavi 2002	
LaComm	LaComm	Gibon 2011; Lienard 2010; Razavi 2002	Gibon 2010 http://www.lacomm.be/index.php
MIARS	Medical Interview Aural Rating Scale	Heaven 2006	Heaven 2001
MIPS	Medical Interaction Process System	Fallowfield 2002	Ford 2000

Table 1. Scales used to measure HCP communication skills *(Continued)*

MRID	Martindale Regressive Imagery Dictionary	Razavi 2002	
PCCM	Patient Centred Communication Measure	Stewart 2007	Brown 1995
QUOTE	Quality of Care through Patient's Eyes	van Weert 2011	van Weert 2009
RIAS	Roter Interaction Analysis System	Kruijver 2001	http://www.riasworks.com/background.html Roter 2002; Ong 1998

Table 2. Types of HCP communication skills *

Outcome	Definition	Examples
Information gathering skills		
Open questioning techniques	Questions or statements designed to introduce an area of inquiry without unduly shaping or focusing the content of the response	"How are you doing?"; "Tell me how you've been getting on since we last met..."
Half-open questioning techniques	Questions that limit the response to a more precise field.	"What makes your headaches better or worse?"
Closed questioning technique	Questions for which a specific often one-word answer such as yes or no is expected, limiting the response to a narrow field set by the questioner	"Do you have nausea?"; "How many days have you had the headaches for?"
Eliciting concerns	A combination of open and closed questions to make a precise assessment of the patients perspective	"Tell me more about it from the beginning...."; "What worries you the most?"; "What do you think might be happening?"
Clarifying/summarising	Checking out statements that are vague or need amplification and summarising (the deliberate step of making an explicit verbal summary to verify ones understanding of what the patient said)	"Could you explain what you mean by light headed?" "Can I just see if I have got it right? You have had headaches before, but over the last two week you have had a different sort of pain . . . "
Explanation and Planning		

Table 2. Types of HCP communication skills * (*Continued*)

Giving appropriate information	The correct amount and type of information (procedural, medical , psychological) to address patient needs and facilitate understanding	"There are three important things I want to explain today. First I want to tell you what I think is wrong, second what tests we should do, and third what treatment options are available."
Checking understanding	Checking patients understanding by direct questions or asking the patient to restate in own words	"Do you understand what I mean?";
Negotiating	Negotiating procedure or future arrangements by taking into account the patient's concerns	"Do you mind if I examine you today? Would you prefer it if your husband came with you?"
Supportive or relationship building skills		
Acknowledging concerns	Verbalising the thoughts and concerns expressed by the patient, and express acceptance	"I can see that you are worried by all this"; "I sense that you feel uneasy about having to come to see me - that's ok, many people feel that way when they first come here."
Showing empathy	Verbalising the feelings and emotions expressed by the patient	"I can sense how angry you have been feeling about your illness. I can understand that it must be frightening to think the pain will come back."
Reassurance	To reassure appropriately about a potential discomfort or uncertainty without providing false reassurance	"I will do my best to help you."

*Adapted from Silverman 2005 and LaComm.

Table 3. Scales used for other HCP outcomes

Abbreviation	Name of scale	Studies included in review that used scale	Validation reference (if any)
MBI	Masslach Burnout inventory	Butow 2008; Kruijver 2001;Lienard 2010	Schaulell 1993
NSS	Nursing Stress Scale	Razavi 1993; Razavi 2002	Gray-Toft 1981
PPSB	Physician Psychosocial Belief questionnaire;	Fallowfield 2002	Ashworth 1984

Table 3. Scales used for other HCP outcomes *(Continued)*

SDAQ	Semantic Differential Attitude Questionnaire	Razavi 1993; Razavi 2002	Silberfarb 1980

Table 4. Scales for measuring patient outcomes

Abbreviation	Name of scale	Studies included in review that used scale	Validation reference (if any)
BSI	Brief Symptom Inventory	Stewart 2007	Derogatis 1977
CDIS	Cancer Diagnostic Interview Scale	Stewart 2007	Roberts 1994
EORTC QLQ-C30:	European Organisation for Research and Treatment of Cancer, Quality of Life Questionnaire-Core 30; (hjemster) Aaronson 1993	Butow 2008; Kruijver 2001	Aaronson 1993; Hjermstad 1995
GHQ-12	General health Questionnaire	Wilkinson 2008	Williams 1988
HADS	Hospital Anxiety and Depression Scale	Butow 2008; Razavi 2003	Snaith 1986; Julian 2011
PIQ	Perception of Interview Questionnaire	Razavi 2003	
PPPC	Patients perception of patient centeredness	Stewart 2007	Henbest 1990
PSCQ	Patient Satisfaction with Communication Questionnaire	Fallowfield 2002; Wilkinson 2008	Ware 1983
PSIAQ	Patient Satisfaction with Interview Assessment Questionnaire	Razavi 2002	
PSQ-C	Patient Satisfaction Questionnaire (PSQ-C)	Kruijver 2001	Blanchard 1986
SCNS	Supportive Care needs survey (Boyes)	Butow 2008	Samson-Fisher 2000
STAI-S	State Trait Anxiety Inventory-State	Razavi 2003; Wilkinson 2008	Speilberger 1983 http://www.theaaceonline.com/stai.pdf Julian 2011
	Single item (Feel better?)	Stewart 2007	Henbest 1990

APPENDICES

Appendix 1. Definition of a simulated patient

A simulated patient (SP) in health education is an individual who is trained to act as a real patient in order to simulate a set of symptoms or problems. An individual SP is typically selected on the basis of gender, body habitus, previous surgeries, past medical history and sometimes level of education and/or language. She/he is matched to a case requirement and trained to reliably portray (and often to accurately recall) details of what was said and done in a medical encounter. SPs may also be trained to provide accurate, written and objective reports by means of checklists. In addition, SPs can be trained to provide patient-centered, subjective rating and descriptive evaluation of examinee behavior. This can provide a basis for constructive verbal or written post-encounter feedback to the student by the SP (Adamo 2003).

Appendix 2. CENTRAL search strategy

CENTRAL
#1 MeSH descriptor Medical Oncology explode all trees
#2 MeSH descriptor Oncologic Nursing, this term only
#3 MeSH descriptor Neoplasms explode all trees
#4 MeSH descriptor Palliative Care, this term only
#5 (terminal* or palliat* or cancer* or oncol* or hospice*)
#6 (#1 OR #2 OR #3 OR #4 OR #5)
#7 MeSH descriptor Education, Medical, Continuing, this term only
#8 MeSH descriptor Education, Nursing, Continuing, this term only
#9 MeSH descriptor Programmed Instruction as Topic explode all trees
#10 (train* or educat* or workshop* or module* or teach* or curricul* or learn*)
#11 (#7 OR #8 OR #9 OR #10)
#12 MeSH descriptor Communication explode all trees
#13 communicat* or interview*
#14 (#12 OR #13)
#15 evaluat* or assess* or critique* or measure* or outcome* or effect* or change* or result* or trial* or prospective* or followup or follow-up
#16 (#6 AND #11 AND #14 AND #15)

Appendix 3. MEDLINE search strategy

MEDLINE Ovid
1 exp Medical Oncology/
2 Oncologic Nursing/
3 exp Neoplasms/
4 Palliative Care/
5 (terminal* or palliat* or cancer* or oncol* or hospice*).mp.
6 1 or 2 or 3 or 4 or 5
7 Education, Medical, Continuing/
8 Education, Nursing, Continuing/
9 exp Programmed Instruction as Topic/
10 (train* or educat* or workshop* or module* or teach* or curricul* or learn*).mp.
11 7 or 8 or 9 or 10
12 exp Communication/
13 (communicat* or interview*).mp.
14 12 or 13
15 (evaluat* or assess* or critique* or measure* or outcome* or effect* or change* or result* or trial* or prospective* or followup or follow-up).mp.

16 6 and 11 and 14 and 15

17 randomized controlled trial.pt.

18 controlled clinical trial.pt.

19 randomized.ab.

20 placebo.ab.

21 clinical trials as topic.sh.

22 randomly.ab.

23 trial.ti.

24 17 or 18 or 19 or 20 or 21 or 22 or 23

25 16 and 24

key: mp=title, original title, abstract, name of substance word, subject heading word, unique identifier

Appendix 4. EMBASE search strategy

EMBASE Ovid

 1   exp oncology/

2   exp oncology nursing/

3   exp neoplasm/

4   exp palliative therapy/

5   (terminal* or palliat* or cancer* or oncol* or hospice*).mp.

6   1 or 2 or 3 or 4 or 5

7   exp medical education/

8   exp nursing education/

9   exp continuing education/

10 (train* or educat* or workshop* or module* or teach* or curricul* or learn*).mp.

11 7 or 8 or 9 or 10

12 exp interpersonal communication/

13 (communicat* or interview*).mp.

14 12 or 13

15 (evaluat* or assess* or critique* or measure* or outcome* or effect* or change* or result* or trial* or prospective* or followup or follow-up).mp.

16 6 and 11 and 14 and 15

17 crossover procedure/

18 double blind procedure/

19 randomized controlled trial/

20 single blind procedure/

21 random*.mp.

22 factorial*.mp.

23 (crossover* or cross over* or cross-over*).mp.

24 placebo*.mp.

25 (doubl* adj blind*).mp.

26 (singl* adj blind*).mp.

27 assign*.mp.

28 allocat*.mp.

29 volunteer*.mp.

30 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29

31 16 and 30

key: mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer

Appendix 5. Assessment of the Risk of Bias for Included studies

We assessed the risk of bias as follows:

(1) Method of randomisation

Methodological quality of randomisation was classified as follows:
- Low risk of bias(any truly random process, e.g. random number table;computer random number generator),
- High risk of bias (any non-random process, e.g. odd or even date of birth;hospital or clinic record number) or,
- Unclear risk of bias (no details provided).

(2) Allocation concealment

- Low risk of bias e.g. telephone or central randomisation; consecutively numbered sealed opaque envelopes);
- High risk of bias (open random allocation; unsealed or non-opaque envelopes, alternation; date of birth);
- Unclear risk of bias.

(3) Blinding

In studies of communication skills training, both the participants and the providers of the training would be aware of study arm allocation, therefore it was not possible to assess 'performance bias'. However, the outcome assessment could be blinded, therefore we assessed blinding of outcome assessment (Protection against 'detection bias') as:
- low, high or unclear risk of bias.

(4) Incomplete outcome data

We described for each included study, and for each outcome or class of outcomes, the completeness of data including attrition and exclusions from the analysis. We stated whether attrition and exclusions were reported and the numbers included in the analysis at each stage (compared with the total randomised participants), reasons for attrition or exclusion where reported, and whether missing data were balanced across groups or were related to outcomes.
We assessed methods as:
- low risk of bias (e.g. less than 20% missing outcome data; missing outcome data balanced across groups);
- high risk of bias (e.g. numbers or reasons for missing data imbalanced across groups; 'as treated' analysis done with substantial departure of intervention received from that assigned at randomisation);
- unclear risk of bias.

5) Selective reporting

We described for each included study how we investigated the possibility of selective outcome reporting bias and what we found. We assessed the methods as:
- low risk of bias (where it was clear that all of the study's pre-specified outcomes and all expected outcomes of interest to the review had been reported);
- high risk of bias (where not all the study's pre-specified outcomes were reported; one or more reported primary outcomes were not prespecified; outcomes of interest were reported incompletely and so could not be used; study failed to include results of a key outcome that would have been expected to have been reported);
- unclear risk of bias.

(6) Other bias (checking for bias due to problems not covered by 1 to 5 above)
We described for each included study any important concerns we had about other possible sources of bias. We assessed whether each study was free of other problems that could put it at risk of bias, as follows:
- low risk of other bias;
- high risk of other bias;
- unclear whether there is risk of other bias.

Appendix 6. Search results for the original review

For the original 2001 review, 48 studies identified by the search were classified as follows:

- Included (2)
- Excluded (46)

The included studies were Fallowfield 2002 and Razavi 1993.

The 46 excluded studies that had warranted further consideration were excluded for methodological reasons. Most (27) were excluded as they measured changes in attitudes and/or knowledge, rather than skills (Anderson 1982; Baile 1997; Baile 1999; Berman 1983; Bird 1993; Cantwell 1997; Cowan 1997; Craytor 1978; Delvaux 1997; Dixon 2001; Durgahee 1997; Fallowfield 1998; Fallowfield 2001; Ferrell 1998a; Girgis 1997; Gordon 1995; Hainsworth 1996; Hall 1999; Hallenbeck 1999; Hulsman 1997; Linder 1999; Lloyd-Williams 1996; Parle 1997; Razavi 1991; Smith 1991; Von Gunten 1998; Wong 2001). Many of these studies would also have been excluded for not having a separate control group. A further 14 studies were excluded as they had no separate control group, although they were longitudinal (Booth 1996; Charlton 1993; Faulkner 1984; Faulkner 1992; Glimelius 1995; Heaven 1996; Heaven 1996b; Maguire 1996a; Maguire 1996b; Matrone 1990; Razavi 2000; Rutter 1996; Wilkinson 1998; Wilkinson 1999). Five were excluded due to the subjective nature of their evaluation of communication skills (largely based on perceived improvement by the participant) (Andrew 1998; de Rond 2000; Ferrell 1998b; La Monica 1987; Shorr 2000) Only one of this latter group included a separate control group of non-trained staff (de Rond 2000).

In November 2003, three further studies were added to the review; one was included (Razavi 2002) and the remaining two were excluded (Finset 2003; Libert 2003). Therefore, in total, three studies were included and 48 were excluded.

WHAT'S NEW

Last assessed as up-to-date: 19 February 2013.

Date	Event	Description
21 September 2016	Amended	Contact details updated.

HISTORY

Protocol first published: Issue 3, 2002

Review first published: Issue 2, 2003

Date	Event	Description
1 April 2015	Amended	Contact details updated.
11 February 2015	Amended	Contact details updated.
27 March 2014	Amended	Contact details updated.
19 February 2013	New search has been performed	Review updated to include 15 RCTs.

18 February 2013	New citation required but conclusions have not changed	We found more evidence to show that CSTs may be helpful in improving some HCP outcomes
6 August 2012	New search has been performed	Out of 119 potentially eligible records identified by the updated searches, we included 12 additional studies (Butow 2008, Gibon 2011, Goelz 2009, Heaven 2006, Kruijver 2001, Razavi 2002, Razavi 2003, Stewart 2007, Lienard 2010, Tulsky 2011, Wilkinson 2008; Fujimori 2011) (33 records) and we identified six records relating to the three previously included studies. Therefore, from the updated search, we included 39 new records relating to 15 studies. We excluded 80 newly identified records (70 studies)
24 February 2012	New search has been performed	Search updated producing 358 records.
9 September 2011	New search has been performed	Search updated producing 411 records including 37 duplicates. Three potentially eligible studies identified
21 January 2011	New search has been performed	Search updated producing 2,508 records including 43 du plicates .T hirty potentially eligible s tudies/reports identified
6 May 2008	Amended	Converted to new review format.
7 December 2003	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

PM and SR sifted and screened the retrieved titles/abstracts. At least two review authors (PM, SR, MA) classified the studies and extracted data from included studies. The original review was written by DF. PM and TL wrote the first draft of the updated review. All four current review authors read and agreed the final version.

DECLARATIONS OF INTEREST

None.

SOURCES OF SUPPORT

Internal sources

- No sources of support supplied

External sources

- National Institute for Health Research (NIHR), UK.

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DIFFERENCES BETWEEN PROTOCOL AND REVIEW

The original review was a narrative review that included three studies (Fallowfield 2002; Razavi 1993; Razavi 2002). Whereas the protocol and original review included pre-test/post-test study designs in the Types of studies for consideration, for the updated review we included only RCTs.

For the protocol and original 2002 review, we defined Types of outcome measures as follows: 'Outcomes were changes in behaviour or skills measured using objective and validated scales.' For the update, we attempted to specify Types of outcome measures more clearly, in accordance with the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011).

INDEX TERMS

Medical Subject Headings (MeSH)

*Communication; Caregivers [*education; psychology]; Health Personnel [*education]; Medical Oncology [*education]; Neoplasms [psychology; *therapy]; Oncology Nursing [education]; Professional-Patient Relations; Randomized Controlled Trials as Topic; Stress, Psychological [*prevention & control]

MeSH check words

Humans