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Addressing palliative care and end-of-life issues in patients with advanced cancer: a systematic review of communication interventions for physicians not specialised in palliative care

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ABSTRACT

Objective To identify and summarise evaluated interventions aiming to improve the communication of palliative care (PC) and end-of-life (EoL) issues in physicians caring for cancer patients. Such interventions are needed with regard to the aim of an earlier communication of those issues in oncology daily practice, which is associated with a range of benefits for patients and caregivers but is often impeded by physicians' communication insecurities.

Design Systematic review based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.

Data sources Relevant publications were systematically searched in MEDLINE, PsycINFO, CINAHL and Web of Science databases in September 2020 with an update in July 2021.

Eligibility criteria We included publications reporting a quantitative evaluation of a communication intervention on one or more PC/EoL issues with a communication-related main outcome. Target group had to be physicians caring for cancer patients non-specialist in PC.

Data extraction and synthesis Two independent raters extracted intervention characteristics, publication characteristics and publication quality. Results were narratively synthesised.

Results 24 publications reporting 22 interventions were included. 13 publications reported randomised controlled trials. A majority of the interventions addressed one specific PC/EoL issue, most often breaking bad news. Teaching strategies mostly involved role-plays. Target group were mainly oncologists. In addition to self-reported outcome measurements for evaluation, most publications also reported the use of external rating data. All but one publication reported significant intervention effects on at least one outcome parameter. Publication quality was overall moderate.

Conclusions The empirically tested communication interventions on PC/EoL issues seem to effectively improve physicians' communication. Future interventions should focus on other issues than breaking bad news, such as preparing for the future. Target group should also be

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This systematic review was built on a comprehensive database search.
⇒ Intervention and publication characteristics were narratively summarised and concisely displayed based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.
⇒ We used the Effective Public Health Practice Project Quality Assessment Tool to assess risk of bias of the included publications.
⇒ Due to heterogeneity of the publications, a quantitative meta-analysis was not possible.
⇒ A publication bias in favour of significant results is possible and some unpublished studies might have been missed.

organ-specific oncologists, as all primary caring physicians are responsible for timely communication. Our risk-of-bias assessment revealed some weaknesses, indicating that more high-quality studies for evaluation are needed.

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INTRODUCTION

Physicians caring for patients with advanced cancer should communicate early about issues related to palliative care (PC) and the end of life (EoL). Important components include, for example, talking about goals of care, advance care planning, eliciting personal values, preparing for the future or involving caregivers.[1]

Several studies indicate that an early communication about these issues brings a range of benefits to patients, caregivers and the healthcare system,[2–7] as this is associated with improved symptom control, increased quality of life, better acceptance of their incurable illness leading to premature dying and a decrease of caregivers' burden. Besides, EoL

conversations are associated with less aggressive medical care at the very EoL, less admissions to the intensive care unit as well as earlier hospice referrals.[6 7]

Also patients themselves often prefer an early and clear communication and consider this as essential for their personal EoL care.[8] The majority prefers an early and honest conversation about their prognosis and EoL issues.[9–12] A timely communication enables them to participate more actively in treatment decisions, to avoid inadequate treatments, to set own individual priorities and to prepare themselves for death.[13] It also enables them access to specialised PC services, which is essential with regard to the high PC needs of oncological patients.[14]

Previous studies demonstrated that conversation about PC/EoL issues usually occur too late, that is, when patients are no longer able to decide for themselves or already are in crisis.[15] Although according to different guidelines—such as the ones from the American Society of Clinical Oncology Clinical Practice—the primary caring oncologist is responsible for addressing these issues,[16 17] they often fail to do so in daily clinical practice.[15]

Major barriers to timely discussion of the aspects are communication insecurities of the caring physicians, who seem to avoid these conversations.[18 19] Indeed, addressing the EoL is considered the most stressful and uncomfortable part of oncological care.[20] Physicians report, for example, the fear of causing stress or destroying hope when addressing these issues.[10 20–22] Additionally, previous personal traumatic experiences might be responsible,[18] as well as own attitudes and fears towards death.[23 24] Besides those personal and individual reasons, a lack of physicians' knowledge about early communication of PC/EoL issues represents a barrier. A systematic scoping review on advance care planning in practice, for example, found that advance care planning often fails due to the absence of professionals' awareness about initiating it at an early stage.[25] Lastly, also a deficiency of physicians' training in EoL communication seems to be crucial for those rare conversations.[26]

Hence, evidence-based interventions to reduce communication barriers regarding PC/EoL issues are needed. As in cancer care the primary caring (organ-specific) oncologist is supposed to provide primary PC and to communicate these aspects, those interventions should target non-palliative-care specialists.

A range of communication skills trainings in oncological settings already exist and previous reviews have summarised and evaluated their effectiveness.[27 28] Two existing systematic reviews including studies published up to December 2015 already focused on EoL communication interventions for generalist PC providers, but without restriction to trainings explicitly targeting physicians.[29 30] In fact, in these reviews only 30% of the interventions were designed for physicians[29 30] and those and other reviews on such interventions do not focus on the oncological setting.[29–33]

So far, there is little evidence on PC/EoL communication interventions specifically designed for the oncology physicians' perspective. With regard to the aim of an earlier communication of PC/EoL issues in oncology daily practice, which is the main responsibility of the primary caring physician, an overview on those interventions is essential. This will enable conclusions for the need, the design and the evaluation of future interventions on strengthening physicians in early communication, which will then in turn lead to a significant improvement of advanced cancer care. Against this background, the objective of this study is to systematically review the evidence on communication interventions for oncologists or organ-specific physicians who are not specialised in PC that focus one or more communication issues relevant to PC and the EoL.

METHODS

In order to provide a complete and transparent reporting, our systematic review was developed based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (online supplemental material S1).[34 35] The review protocol published in the International Prospective Register of Systematic Reviews (PROSPERO) is presented in online supplemental material S2.

The research questions of this systematic review were developed based on the PICO criteria ('Participants', 'Interventions', 'Comparison', 'Outcome').[36] As we included publications independent of the presence or absence of a comparison group, we specified all but the criterion comparison (C). This resulted in the following research questions that this article addresses:

1. Which communication interventions on PC/EoL issues for physicians caring for cancer patients were evaluated and published?
2. What are the aims of the interventions, how are they structured and how is the content conveyed?
3. Which specific PC/EoL issues do they address?
4. Which communication-related outcome measurements are used?
5. What effects of the interventions are reported?

Eligibility criteria

The inclusion criteria regarding the publication characteristics were: (1) German or English language, (2) accessibility of full text, (3) published in a peer-reviewed journal, (4) primary research (eg, no intervention descriptions, study protocols or review articles), (5) studies that provide a (partly) quantitative evaluation of an intervention and (6) studies with a communication-related main outcome.

With regard to the study participants, the following criteria had to be met: (1) physicians caring for cancer patients (oncologists or organ-specific specialists such as gynaecologists or urologists), (2) not more than 20% PC specialists unless specialists and non-specialists were reported separately (defined according to procedures in the systematic reviews of Brighton *et al* and Selman *et al*[29 30]), (3) no medical students or healthcare professionals other

than physicians unless they were reported separately, (4) no joint interventions for physicians and patients unless the results of the physicians were reported separately. The inclusion in case of a separate reporting of the physicians in the above cases was considered acceptable, as the effect of the intervention on the target group of this review could then be extracted separately.

Finally, the inclusion criteria regarding the intervention were: (1) main focus on improving communication, (2) intervention on one or more PC/EoL issues, (3) designed for oncological setting and (4) no paediatric context. Inspired by Back, who summarised central patient-clinician communication issues in PC[1] from different systematic reviews and guidelines such as the ones from the American Society of Clinical Oncology,[37] we defined the following PC/EoL issues:

▶ Preparing for the future.
▶ Talking about death and dying.
▶ Talking about transition to PC/introducing PC.
▶ Talking about prognosis
▶ Discussing goals of care.
▶ Supporting or involving family caregivers
▶ Preparing for the future.
▶ Eliciting values.
▶ Dealing with emotions/giving emotional support.
▶ Breaking bad news/discussing serious news.
▶ Advance care planning.
▶ Talking about advance directives.
▶ Shared decision making (in an oncological context).

Search
We conducted our search in MEDLINE (via OVID), PsycINFO (via OVID), CINAHL (Cumulative Index to Nursing and Allied Health Literature) and Web of Science up to September 2020. An update of the search was conducted in July 2021. There were no restrictions on year of publication or geographical location. The search strategy is displayed in online supplemental material S3. We conducted additional hand searches in reference lists of relevant papers and earlier reviews to identify further suitable articles.

Study selection
In a first step, the first author (NH) removed duplicates and screened the titles and abstracts identified within the searches. Second, the first author (NH) and another member of the research team (HMR) independently screened the full texts with a screening form according to the predefined inclusion and exclusion criteria. Disagreements were resolved by consensus after discussion. Excluded papers were listed and reasons for exclusion were documented.

Data extraction and quality assessment
Data of the selected publications were independently extracted by two authors (NH and HMR) using a data extraction form. The form included the following information, which was sought from all articles: publication characteristics (authors, year, title, language, country), methods (study design, sample size, participants, communication-related outcome parameters), the investigated intervention (name of intervention, target group, setting, aim, content/learning activities) as well as the reported effect of the intervention. After a comparison of the two independently completed data extraction forms and a discussion of disagreements, all the above information was tabulated for each publication.

Above that, the two raters (NH and HMR) independently assessed the quality of the included articles by means of the Effective Public Health Practice Project Quality Assessment Tool (EPHPP).[38 39] The instrument assesses information on six aspects: selection bias, design, confounders, blinding, data collection methods as well as withdrawals and drop-outs. Based on the rating of these components (strong, moderate or weak), the findings were summed up to a final grade (strong, moderate or weak). Disagreements between the raters were resolved by consensus after discussion.

Information regarding study characteristics as well as intervention characteristics was tabulated.

Data synthesis
We conducted a narrative synthesis of the results, as the methodological and statistical heterogeneity of the publications allowed no quantitative synthesis.[40] In doing so, the recommendations of the Cochrane Consumers and Communication Review Group were respected.[41]

Patient and public involvement
No patient involved.

RESULTS
Publication selection
The initial database searches yielded a total of 957 records. An additional 17 publications were identified through handsearch (via reference lists, etc). After removal of duplicates, a total of 462 abstracts and titles were screened. The screening process retrieved 105 potentially relevant papers, which were subsequently full-text assessed for eligibility. This resulted in 22 articles that were initially included in this review. The reasons for exclusion of all full-text screened papers are displayed in figure 1. Five publications appeared to meet the inclusion criteria but were excluded because the reported interventions targeted more general communication skills of physicians working in oncology rather than having a focus on PC/EoL issues.[42–46]

Two more articles were identified through a rerun of database searches in July 2021. Thus, a total of 24 articles were included in the qualitative synthesis. An overview of the publication selection process is illustrated in the PRISMA flow diagram (figure 1).

Identification of studies via databases and registers

Identification

Records identified from:
Databases (n = 957)
Registers (n = 17)

→ Duplicate records removed *before screening* (n = 512)

Screening

Records screened (n = 462)

→ Records excluded (n = 357)

Reports sought for retrieval (n = 105)

→ Reports not retrieved (n = 6)

Reports assessed for eligibility (n = 99)

→ Reports excluded (n = 75):
- Interventions (also) for other professionals than physicians (n = 18)
- Study protocols/intervention descriptions (n = 11)
- No quantitative evaluation of an intervention (n = 11)
- Interventions only for patients and/or caregivers (n = 9)
- Intervention on no PC or EoL issue (n = 8)
- No communication-related main outcome (n = 8)
- Intervention with no focus on communication (n = 4)
- Intervention not in oncological setting (n = 3)
- Not published in a peer-reviewed journal (n = 2)
- Intervention for medical students (n = 1)

Included

Studies included in review (n = 24)
- Database searching (September 2020: n = 17; July 2021: n = 2)
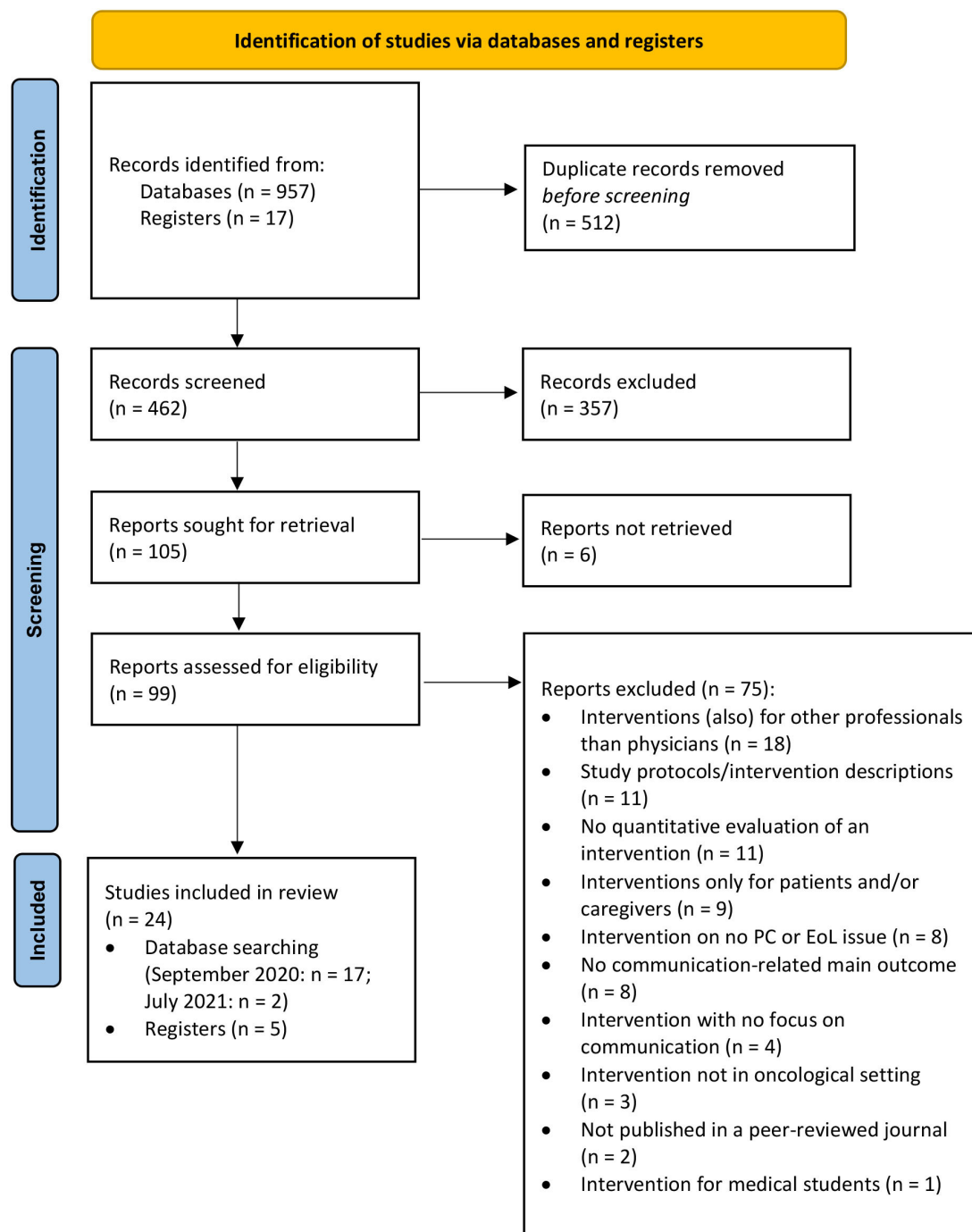- Registers (n = 5)

Figure 1 PRISMA 2020 flow diagram of the systematic literature search. EoL, end-of-life; PC, palliative care; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Publication and intervention characteristics

Across the 24 included publications, 22 different interventions were evaluated. Two interventions were evaluated in two publications each.[47–50] Two times, an adapted version in form of one submodule or one workshop of an intervention reported in another publication was investigated.[51 52]

Publication characteristics

An overview of the relevant publication characteristics is provided in table 1. The included articles were published

between 1999[53] and 2021.[50] Half of them are from North America (n=12), followed by Europe (n=6), Asia (n=5) and Australia (n=1). Thirteen publications reported randomised controlled trials (RCTs).[47–50 54–62] The remaining 11 papers reported uncontrolled intervention studies with at least two measurement time points (pre and post).[51–53 63–70] The sample size ranges from n=10[61 63] to n=383[70] studied physicians. However, the majority (n=20 articles) reported sample sizes of less than 70 participating physicians. In the majority of the publications

Table 1 Overview of publication characteristics in N=24 publications on N=22 communication interventions for physicians

Name of the intervention	Publication (country)	Study design (groups; measurement time points); sample size	Target group
An Illness-Trajectory Communication Curriculum	Cannone et al 2019 (USA)[66]	Uncontrolled intervention study (IG; pre, post—2 weeks after the last module)); N=22	Multispecialty oncology residents and fellows
Avatar-mediated training in a virtual world	Andrade et al 2010 (USA)[63]	Uncontrolled intervention study (IG; pre, post—directly after the intervention); N=10	Geriatric and internal medicine fellows
Belgian Interuniversity Curriculum-communication skills training (BIC-CST)	Liénard et al 2010 (Belgium)[60]	Randomised controlled trial (IG, CG; pre, post—after 8 months); N=98	Medical residents working with cancer patients
Brief Breaking Bad News (BBN) CST module	Gorniewicz et al 2017 (USA)[58]	Randomised controlled trial (IG, CG; pre, post—within 1 month after pre); n=38 (plus n=28 separately reported students)	Residents of family medicine and internal medicine and medical, nursing or pharmacy students (reported separately)
CST	Butow et al 2008 (Australia)[54]	Randomised controlled trial (IG, CG; pre, post -shortly after the intervention, follow-up—12 months after pre); N=30	Medical and radiation oncologists
CST	Baile et al 1999, (USA)[53]	Uncontrolled intervention study (IG; pre, post—directly after the workshop); N=29 (thereof n=17 in workshop one and n=12 in workshop 2)	Oncologists and oncology fellows
CST[53]-adapted version (workshop on BBN)	Fujimori et al 2003 (Japan)[51]	Uncontrolled intervention study (IG; pre, post—directly after the workshop, follow-up—3 months later); N=58	Oncologists
CST based on patients preferences	Fujimori et al 2014 (Japan)[56]	Randomised controlled trial (IG, CG; pre, post—2 weeks after pre); N=30	Oncologists
CST workshop	Yamada et al 2018; (Japan)[70]	Uncontrolled intervention study (IG; pre, post—directly after the workshop, follow-up—after 3 months); N=383	Oncologists with three or more years of clinical experience in oncology
Communication training in oncology	Lenzi et al 2011 (USA)[68]	Uncontrolled intervention study (IG; pre, post—directly after the training); N=57	Senior oncologists
COM-ON-p (communication in oncology-transition to palliative care)	Goelz et al 2011 (Germany)[57]	Randomised controlled trial (IG, CG; pre, post—5 weeks after pre); N=41	Oncologists (haematology, oncology, gynaecology, surgery)
Comskil Training Curriculum	Bylund et al 2010 (USA)[65]	Uncontrolled intervention study (IG; pre, post—not stated when); N=36	Physicians and surgeons being future facilitators of the training (train-the-trainer)
Comskil Training Curriculum[65]—adapted version (module on discussing prognosis)	Brown et al 2010 (USA)[52]	Uncontrolled intervention study (IG; pre, post—directly at the end of the intervention); N=142	Multispecialty fellows and physicians working in oncology setting
Goals-of-Care communication skills and coaching intervention (INT)	Annadurai et al 2021 (USA)[50]	Randomised controlled trial (IG, usual care; pre, post—after 6 months); N=22	Solid tumour oncologists
	Bickell et al 2020 (USA)[49]	Randomised controlled trial (IG, usual care; pre, post—after 6 months); N=22 physicians, N=265 patients	Solid tumour oncologists and patients with a <2 years life expectancy
Interact-Cancer (computer-assisted instruction programme)	Hulsman et al 2002 (Netherlands)[67]	Uncontrolled intervention study (IG; participants divided into implementers vs non-implementers based on self-reported motivation; four measurement time points at intervals of 4 weeks: T1 (pre), T2, T3, T4 (intervention between T2 and T3); N=21	Medical oncologists
Integrating simulation model with art-based teaching strategies	Yakhforoshha et al 2018 (Iran)[69]	Uncontrolled intervention study (IG; 3 pre and three post measurements within 2 weeks intervals); N=19	Medical oncology fellows
Oncotalk	Back et al 2007 (USA)[64]	Uncontrolled intervention study (IG; pre, post—directly after the 4-day intervention); N=115	Oncology fellows

Continued

Table 1 Continued

Name of the intervention	Publication (country)	Study design (groups; measurement time points); sample size	Target group
Patient-Centred Communication Intervention (VOICE)	Epstein et al 2017 (USA)[55]	Randomised controlled trial (IG, CG; pre, post—not stated when); N=38 physicians, N=265 patients	Medical oncologists and their patients
Posttraining Consolidation Workshops after a basic training programme	Delvaux et al 2005 (Belgium)[48]	Randomised controlled trial (IG receiving basic programme and consolidation workshop, waitlist CG receiving only basic programme; baseline—before basic programme, post—after consolidation workshops of IG, 5 months after baseline); N=62	Multispecialty physicians working with cancer patients
	Razavi et al 2003 (Belgium)[47]	Randomised controlled trial (IG receiving basic programme and consolidation workshop, waitlist CG receiving only basic programme; baseline—before basic programme, post—after consolidation workshops of IG, 5 months after baseline); N=62	Multi-specialty physicians working with cancer patients (oncology, radiotherapy, gynaecology, etc)
SCOPE (Studying Communication in Oncologist-Patient Encounters) CD-ROM	Tulsky et al 2011 (USA)[62]	Randomised controlled trial (IG, CG; pre, post—within 1 month after the intervention); N=48	Medical, gynecologic and radiation oncologists
Training Oncologists and Empowering Patients in Effective Communication During Medical Consultations in Singapore	Malhotra et al 2019 (Singapore)[61]	Randomised controlled trial (IG, CG; pre, post—not stated when); N=10 physicians, N=60 patients	Oncologists and their patients
Training on Shared Decision-Making About Palliative Chemotherapy	Henselmans et al 2019 (Netherlands)[59]	Randomised controlled trial (IG, CG; pre, post—after 4 months); N=31	Medical oncologists and oncologists-in-training

CG, control group; IG, intervention group; n. s., not significant; SP, simulated patients.

(n=14), the target group were oncologists (medical, surgical and radiation oncologists).[49 50 53–56 59 61 64 66–70] In eight publications, the study participants were multi-specialty physicians working in oncology (oncologists and organ-specific physicians)[47 48 51 52 57 60 62 65] and two exclusively targeted physicians other than oncologists.[58 63] Bylund et al reported a train-the-trainer intervention, thus the target group were future facilitators of the training.[65]

Intervention characteristics

The interventions were conducted in very different settings. While four interventions were carried out only virtual,[58 61 63 67] a majority (n=18) was carried out at least partly in person[47–57 59 60 62 64–66 68–70] (table 2; detailed description in online supplemental material S4). The length ranged from short and individual computer-assisted trainings or videos[58 61 63 67] to multiple hour[51–53] or multiple day workshops.[56 64 68] Some interventions (n=6) consisted of basic group sessions plus follow-up appointments such as individual coaching sessions, consolidation workshops, video conferences or phone calls.[47–50 54 55 57 59] Half of the reported interventions (n=10) lasted more than 1 day or consisted of several hours spread over a longer period of time, that is, weeks or months.[47 48 54 56 57 60 64–66 68 70] Two interventions included also a patients' coaching or a communication aid for them.[55 61] Delvaux et al and Razavi et al—reporting on the same study—tested explicitly the efficacy of consolidation workshops following a basic training programme.[47 48]

The interventions focused on communication about a variety of PC/EoL issues. While 10 interventions targeted more than one PC/EoL issue,[47 48 53 55 61 64–68 70] 12 interventions focused on just one issue.[49–52 54 56–60 62 63 69] The most frequently addressed PC/EoL issue was breaking bad news (n=14),[47 48 51 53 56 58 60 63–70] followed by dealing with emotions (including subtopics such as showing empathy, managing reactions to illness, dealing with denial, anger; n=10).[47 48 53–55 61 62 65 67 68 70] Talking about prognosis was addressed four times[52 55 61 65] and other issues, such as goals of care discussions[49 50 61] or interacting with relatives,[47 48 66] were targeted in three or less interventions.

The didactic approach and the content of the described interventions vary widely. The largest overlap regarding the theoretical basis of the curriculum represented the SPIKES protocol, a protocol suggesting a six-step approach to deliver bad news.[71] SPIKES stands for (1) 'Setting up the interview', (2) 'assessing the patient's Perception', (3) 'making an Invitation to disclose the news', (4) 'sharing the Knowledge about the news', (5) 'responding to patient's Emotion', (6) 'Summarise the plan'.[71] In six interventions, the communication skills were taught based on this approach.[49–51 53 63 66 69] With regard to learning activities, the most frequently used training method was the conduction of practical role-plays, which were part of 16 of the reviewed interventions.[47–54 56 57 59 60 64–66 68–70] Those were carried out with simulated patients in eleven

Table 2 Overview of intervention characteristics (N=22 interventions evaluated in N=24 publications)

Name of the intervention	Setting		Duration			Addressed PC/EoL issue				Learning activities/didactics			
	Virtual	In person	Up to 1 day	More than 1 day	Spread over weeks/months	Breaking Bad News (BBN)	Dealing with emotions/managing reaction	Prognosis	Other	Role play	Didactic lecture (by staff or computer-based)	Example videos	Other
No of trainings fulfilling the criteria (n)	5	18	10	11	9	14	10	4	9	16	19	7	16
An Illness-Trajectory Communication Curriculum[66]		x	x		x	x			x	x	x		x
Avatar-mediated training in a virtual world[63]	x		x			x					x		x
Belgian Interuniversity Curriculum–communication skills training (CST)[60]		x		x	x	x				x	x		x
Brief BBN CST module[58]	x		x			x						x	x
CST[54]		x	x	x	x		x			x	x	x	x
CST[53]		x	x			x	x			x	x		
CST[53]-adapted version of the workshop on BBN[51]		x	x			x				x	x		
CST based on patients preferences[56]		x		x		x				x	x		
CST workshop[70]		x		x		x	x			x	x		
Communication training in oncology[68]		x		x		x	x			x	x		x
COM-ON-p (communication in oncology-transition to palliative care)[57]		x		x					x	x			x
Comskil Training Curriculum[65]		x		x	x	x	x	x	x	x	x	x	
Comskil Training Curriculum[65] – adapted version (module about discussing prognosis)[52]		x	x					x	x	x	x	x	x
Goals-of-Care communication skills and coaching intervention[49 50]		x	x		x				x	x	x		x
Interact-Cancer (computer-assisted instruction programme)[67]	x		x		x	x	x		x		x	x	x
Integrating simulation model with art-based teaching strategies[69]		x	x			x				x	x		x
Oncotalk[64]		x		x		x			x	x	x	x	x
Patient-Centred Communication Intervention (VOICE)[55]		x	x		x		x	x	x	x		x	x
Posttraining Consolidation Workshops after a basic training programme[47 48]		x		x	x	x	x		x	x	x	x	x
SCOPE (Studying Communication in Oncologist-Patient Encounters) CD-ROM[62]	x		x				x				x		x
Training Oncologists and Empowering Patients in Effective Communication During Medical Consultations in Singapore[61]	x		N/A	N/A	N/A	x	x	x	x	x	x	x	x
Training on Shared Decision-Making About Palliative Chemotherapy[59]		x		x	x				x	x	x	x	x

EoL, end-of-life; N/A, not available; PC, palliative care.

interventions,.[52 54 56 57 59 64–66 68–70] Fifteen interventions included a lecture held by a facilitator,[47–54 59–62 64–66 68 69] whereas in four interventions the theoretical input was computer-based.[56 63 67 70] In about one-third of the interventions (n=7), videos of 'ideal' conversations were presented.[52 54 58 59 61 65 67] In some interventions, the facilitators gave individual feedback on real patient encounters, for example, in form of a coaching or by discussing a taped conversation (n=4).[49 50 59 61 62] Two times the facilitators conducted face-to-face meetings following the intervention to discuss and transfer individual learning goals into daily routine.[57 66]

Outcome measurements and intervention effects
Outcome measurements
The reviewed articles reported different communication-related outcome measurements and methods to evaluate the intervention. Those are displayed in table 3. While six of the included publications describe only self-reported data for evaluation,[51–53 63 68 70] the majority (n=18) also included objective, externally assessed outcome measurements.[47–50 54–62 64–67 69] With one exception,[69] all objective outcome measurements were assessed by an external rating of pre and post videotaped or audiotaped clinical encounters of the participating physicians.[47–50 54–62 64–67] In four articles, the rating was conducted based on transcripts of the audiotapes.[47 48 60 61] Only Yakhforoshha *et al* carried out the rating simultaneously during an outpatient consultation.[69] Gorniewicz *et al* and Cannone *et al* used videotaped objective structured clinical exams for their ratings, a commonly used evaluation tool for physicians.[58 66] The clinical encounters were either conducted with simulated patients (n=9),[24 54 56–58 60 64 66 69] real patients (n=7)[49 50 55 61 62 65 67] or both (n=2).[47 48] Rating was mostly conducted through study staff (n=17).[47–50 54–57 59–62 64–67 69] In six articles, the authors also collected rating data from of the (simulated) patients' perspective[47–49 62 66 69] and in one case only the simulated patients represented the raters.[58]

With regard to the applied measurement instruments and outcome parameters, the publications varied widely. The most frequently assessed outcome parameter was interpersonal empathy or responsiveness to emotions, which was assessed with at least one scale in 21 articles (88 %).[47–51 53–62 64–67 69 70] In four papers, the authors rated empathy based on the NURSE-statement,[72] a commonly used approach to measure empathic expressions ('Naming', 'Understanding', 'Respecting', 'Supporting' and 'Exploring').[49 50 62 64] Over one-third of the articles reported an external rating based on the steps of the SPIKES protocol[49 50 64 66 69] or other protocols on breaking bad news.[56 58 60 69] In five publications, the authors used self-developed coding systems on specific communication skills such as 'transition to PC'[57] or 'informing about prognosis'.[54 55 57 65 67] The self-assessment data mostly referred to constructs like perceived confidence or comfort level,[51–53 56 66] self-efficacy in communicating

the respective topic[63 68] or a retrospective evaluation of a patient encounter.[47 48 59]

Taken together, in less than half of the publications (n=10), the authors made use of existing, valid and reliable measurement instruments,[47–50 58 59 63 67 69 70] which were then in most cases combined with further self-developed items or questionnaires.[47–50 58 59 67] In eight papers, the authors created a study-specific rating system and reported acceptable inter-rater reliabilities[54 56 57 64 65 67] or other reliability data.[55 66]

In seven publications, also outcome parameters non-related to communication were assessed.[47 49 51 54–56 61] Those were among others patient-related outcomes such as distress, anxiety or quality of life or physician-related outcomes such as stress or burnout levels. Bickell *et al* also assessed the utilisation of aggressive care at the EoL.[49]

Intervention effects
The reported effects of the interventions are displayed in table 3. With regard to the externally assessed outcome measurements, 11 of the 24 articles reported a significant improvement in externally rated empathy or responsiveness to emotions.[47 55 56 58–62 64 66 70] Eight articles, on the other hand, reported no significant improvement in this regard.[48–50 54 57 65 67 69] Almost half of the publications (n=11) reported a significant improvement in global communication skills (such as question type, assessment skills or engaging patients in consultations).[47 48 55 57–60 65–67 69] The externally rated quality of the breaking bad news process according to different protocols improved in five of eight publications in at least some steps.[56 58 64 66 69]

Also, some papers reported significant effects on specific communication skills related to the PC/EoL issues that the intervention addresses. Two publications on the same intervention, for example, reported a positive impact of their goals-of-care intervention on eliciting patient values.[49 50] Goelz *et al* found a significant positive effect of their intervention targeting the transition to PC on communicating the transition to PC and involving significant others.[57] Two articles reported an increase in the discussion of prognosis after the intervention,[55 61] one of which also reported an increase in discussing treatment choices.[55] Henselmans *et al* reported a positive impact of their intervention targeting shared decision making about palliative chemotherapy on the emergence and the quality of shared decision making within the consultations.[59]

With regard to self-reported outcome measures, significant improvements were reported on empathy,[51 53 69] confidence/comfort level in communication[51 53 56 66] as well as the perceived self-efficacy.[63] One publication reported only trends but no significant effects of their intervention.[54]

The effects on the outcome parameters non-related to communication can only be described exemplarily within this review, as we focus on the communication-related outcomes. Here it is worth mentioning that in the articles reporting physician-related outcomes, the interventions did not succeed in reducing burnout or stress level[51 54] or aggressive care at the EoL.[49]

Table 3 Overview of outcome measurements and intervention effects in N=24 publications

Publication	(1) Communication-related outcome measurements; (2) effects of the intervention
Cannone et al 2019[66]	(1) External rating of 6 domains of communication skills in OSCE-scenarios by faculty members and SP via a self-developed instrument based on SPIKES protocol, self-reported perceived readiness and comfort level; (2) Sign. improvement in global communication skills and positive changes in some subcategories rated by faculty members ('emotion and empathy', 'delivering phase of breaking bad news' (BBN), isolated items of other domains), increased comfort level in all areas.
Andrade et al 2010[63]	(1) Self-reported self-efficacy via the self-efficacy Affective Competency Score;[86] (2) Sign. improvement of self-efficacy.
Liénard et al 2010[60]	(1) Quantitative analyses of physicians' utterances regarding assessment, support and information type in transcripts of audiotaped SP encounters via a communication content analysis software, external rating of 3 phases of the BBN-process; (2) Signficantly more open questions, open directive questions and empathy as well as a sign. decrease in the amount of given information in IG; BBN process: IG allocated more time to the predelivery phase and less time to the delivery phase and delivered bad news more precisely.
Gorniewicz et al 2017[58]	(1) External rating of 5 domains of BBN skills in videotaped SP-OSCE-sessions via a BBN rating form checklist by SP, external rating of 5 general communication skills via the Common Ground Assessment Summary form[83] by SP; (2) Sign. intervention effect on 3 BBN domains: 'BBN', 'communication related to emotions' and 'after BBN, determines patient readiness to proceed and communication preferences', significant intervention effect on four general communication skills ('active listening', 'addressing feelings with patients', 'closing the interview' and 'global interview performance').
Butow et al 2008[54]	(1) External rating of 10 key doctor behaviours and the number of predetermined patient concerns plus the degree to which they were adequately addressed in videotaped SP encounters via a self-developed instrument; (2) Trend of IG to show more creating environment and fewer blocking behaviours than the CG (n.s.).
Baile et al 1999[53]	(1) Self-reported confidence in communication regarding BBN and difficult patient situations via self-developed items; (2) Workshop 1 (BBN): significant improvement of confidence in 18 of 21 items; workshop 2 (managing difficult patient situations): sign. improvement of confidence in 11 of 45 items.
Fujimori et al 2003[51]	(1) Self-reported confidence in communication with patients regarding BBN via items developed by Baile et al;[53] (2) Sign. improvement of confidence in 20 of 21 items at post and follow-up.
Fujimori et al 2014[56]	(1) External rating of 4 communication domains in videotaped SP encounters via a self-developed rating system based on the SHARE protocol on BBN,[85] self-reported confidence in communication via items related to SHARE and the confidence questionnaire by Baile et al,[53] self-reported patients' satisfaction with consultation and trust in oncologist via self-developed items; (2) Sign. intervention effect on 'setting up supportive environment for interview', 'considering how to deliver bad news' and 'providing reassurance/addressing patient's emotions with empathic responses', sign. effect on confidence; no change in satisfaction.
Yamada et al 2018[70]	(1) Self-reported intrapersonal empathy via the Jefferson Scale of Physician Empathy (JSPE)[87] and the Interpersonal Reactivity Index (IRI);[88] (2) Sign. improvement of JSPE total empathy-score and all subscale scores ('perspective taking', 'compassionate care', 'standing in the patient's shoes') at post and follow-up, sign. improvement in 2 of 3 IRI subscales ('perspective taking' and 'personal distress') from pre to follow-up.
Lenzi et al 2011[68]	(1) Self-reported data on self-efficacy, use of BBN and communication skills, knowledge on communication skills as well as attitudes via not specified questionnaires; (2) Sign. improvement in 14 of 15 items on used BBN-skills, most of the communication skills items, knowledge questions, attitudes and self-efficacy.
Goelz et al 2011[57]	(1) External rating of 3 domains of communication behaviour in videotaped SP encounters via a rating system developed for this purpose (COM-ON-Checklist (communication in oncology-transition); (2) Sign. intervention effect on all domains: transition to palliative care, global communication skills and involvement of sign. others.
Bylund et al 2010[65]	(1) External rating of 6 communication domains in videotaped real patient encounters via the self-developed Comskil Coding System; (2) Sign. improvement in two communication domains ('establishing the consultation framework', 'checking skills') and in five individual items; mediated by amount of modules participated in.
Brown et al 2010[52]	(1) Self-reported confidence about discussing prognosis via two self-developed items; (2) Sign. improvement in both items.
Annadurai et al 2021[50]	(1) External rating of 7 core communication skills via an assessment tool based on SPIKES[71] and NURSE[72] statements plus some additional skills in pre and post audio recordings of real clinical encounters; (2) Sign. intervention effect on eliciting patient values, no increase in overall and other communication skills.
Bickell et al 2020[49]	(1) Perception and quality of Goals-of-Care (GoC) discussions rated by patients via two self-developed items, external rating of 7 core communication skills via an assessment tool based on SPIKES[71] and NURSE[72] statements (detailed description by Annadurai et al[50]) and some additional skills in pre and post audio recordings of real clinical encounters; (2) Sign. intervention effect on eliciting patient values, prevalence/quality of GoC communication n.s., overall and other communication skills n.s.

Continued

Table 3 Continued

Publication	(1) Communication-related outcome measurements; (2) effects of the intervention
Hulsman *et al* 2002[67]	(1) External rating of 7 domains of communication behaviour in videotaped real patient encounters via the self-developed Communication Rating System, self-reported patients' satisfaction via the Medical Interview Satisfaction Scale;[89] (2) Sign. intervention effect on observed general communication behaviour only in the group identified as 'implementers' (no change in non-implementers); no change in patients' satisfaction.
Yakhforoshha *et al* 2018[69]	(1) External rating of 7 domains of BBN performance during SP encounters in real outpatient setting via the modified BBN-checklist[90] (Iranian version of the SPIKES-protocol;[71] (2) Sign. level changes in three domains of BBN checklist: strategy, knowledge and invitation; longitudinal effects n.s.
Back *et al* 2007[64]	(1) External rating of quality of BBN (based on SPIKES model,[71] quality of discussing transition to palliative care (based on self-developed 6-step-approach) and empathy (five skills based on NURSE model[72] in 2 pre-SP and two post-SP encounters; (2) Sign. improvement in 4 SPIKES-steps regarding BBN, 4 steps regarding the transition to palliative care and 4-5 empathic skills
Epstein *et al* 2017[55]	(1) External rating of 4 communication domains in audio recorded real physician visits via a self-developed instrument (a combination of scales from different existing instruments), self-reported patient-physician relationship, healthcare climate and perceived efficacy in patient-physician interactions by patients and physicians via standardised questionnaires; (2) Sign. intervention effect on three domains: 'engaging patients in discussions', 'responding to emotions' and 'discussions of prognosis and treatment choices', self-reported outcomes n. s.
Delvaux *et al* 2005[48]	(1) External rating of form, function and emotional level of each utterance in transcripts of simulated and real audiotaped three-person-interviews (with patient and relative) via the adapted Cancer Research Campaign Workshop Evaluation Manual with a new scale to identify the addressee of utterances, self-reported retrospective perception of the interview by patient, relative and physician via the Perception of the Interview Questionnaire (unpublished dissertation); (2) Sign. intervention effect on 2 of 16 communication skills ('openness toward patient's and relative's concerns and needs' and 'open assessment skills'; changes toward relatives more modest in actual than in simulated interviews), difference in the number of utterance-addressees n. s., sign. intervention effect on patients' (but not in relatives') perception of the physician's performance.
Razavi *et al* 2003[47]	(1) External rating of form, function and emotional level of each utterance in transcripts of simulated and real audiotaped patient encounters via the adapted Cancer Research Campaign Workshop Evaluation Manual, retrospective perception of the interview via the Perception of the Interview Questionnaire (unpublished dissertation); (2) Basic training effect mainly observable in simulated interviews; consolidation workshops: sign. intervention effect on 3 of 22 communication skills in simulated interviews ('open and open directive questions', 'utterances alerting patients to reality', decrease in 'premature reassurance') and in 4 of 22 skills in actual interviews ('acknowledgments', 'empathic statements', 'educated guesses', 'negotiations'); patients view: physicians' of IG showed significantly better understanding of disease.
Tulsky *et al* 2011[62]	(1) External rating of number of empathic statements in audiotaped real clinic visits via NURSE statement[72] and responses to empathic opportunities via a model by Suchman *et al*,[91] postmeasurement of patients' trust and perceptions of their oncologist; (2) IG shows significantly more empathic statements and better responding to empathic opportunities; greater trust of patients whose oncologists were in IG.
Malhotra *et al* 2019[61]	(1) External rating of the number of negative emotion expressions via the model of empathic communication by Suchmann *et al*[91] and number of empathic responses via self-developed items in pre and post transcripts of real patient encounters, proportion of consultations discussing prognosis and goals of care; (2) Sign. more empathic responses and more discussions about prognosis in IG.
Henselmans *et al* 2019[59]	(1) External rating of shared desicion making (SDM) in videotaped SP encounters via the Observing Patient Involvement Sclae 12,[84] external rating of SDM per stage via a self-developed instrument, external rating of 2 communication skills via self-developed items, self-reported oncologists' satisfaction with communication via oncologist-version of the 5-item Patient Satisfaction Questionnaire; (2) Sign. intervention effect on amount of SDM, improvement in all SDM stages and improvement in both communication skills ('responsiveness to emotions' and 'information provision skills'), no effect on satisfaction with the consultation.

CG, control group; IG, intervention group; n.s., not significant; OSCE, objective structured clinical exams; sign., significant; SP, simulated patients.

Risk of bias

The quality of the studies reported in the 24 publications was assessed using the EPHPP Quality Assessment Tool.[38 39] Table 4 provides an overview of the ratings according to the seven categories as well as the global ratings. A great majority of the articles achieved the final grade moderate (n=20) and the remaining four articles achieved the final grade weak. The category with the most frequent weak ratings was the selection bias, which is determined by the representativeness and the participation rate of the reported study. With the exception of one strong rating,[70] all articles were rated weak in this regard. In most of those papers, it was the small sample size that was crucial to the poor representability. More than half of the publications received moderate or weak ratings regarding the applied measurement instruments. In eight articles, this was due to unstandardised, self-developed questionnaires or rating systems without evidence on reliability and/or

Table 4 Methodological quality of the included publications (N=24) via the effective public health practice project quality assessment tool

Publication	Selection bias	Design	Confounders*	Blinding*	Data collection methods	Withdrawals and drop-outs†	Global rating
Andrade *et al* 2010[63]	WEAK	MODERATE	N/A	N/A	STRONG	N/A‡	MODERATE
Annadurai *et al* 2021[50]	WEAK	STRONG	STRONG	MODERATE	STRONG	STRONG	MODERATE
Back *et al* 2007[64]	WEAK	MODERATE	N/A	N/A	STRONG	STRONG	MODERATE
Baile *et al* 1999[53]	WEAK	MODERATE	N/A	N/A	WEAK	STRONG	WEAK
Bickell *et al* 2020[49]	WEAK	STRONG	STRONG	MODERATE	STRONG	STRONG	MODERATE
Brown *et al* 2010[52]	WEAK	MODERATE	N/A	N/A	WEAK	N/A‡	WEAK
Butow *et al* 2008[54]	WEAK	STRONG	STRONG	WEAK	MODERATE	STRONG	MODERATE
Bylund *et al* 2009[65]	WEAK	MODERATE	N/A	N/A	STRONG	MODERATE	MODERATE
Cannone *et al* 2019[66]	WEAK	MODERATE	N/A	N/A	MODERATE	STRONG	MODERATE
Delvaux *et al* 2005[48]	WEAK	STRONG	STRONG	MODERATE	MODERATE	STRONG	MODERATE
Epstein *et al* 2017[55]	WEAK	STRONG	STRONG	MODERATE	STRONG	STRONG	MODERATE
Fujimori *et al* 2003[51]	WEAK	MODERATE	N/A	N/A	WEAK	STRONG	MODERATE
Fujimori *et al* 2014[56]	WEAK	STRONG	STRONG	MODERATE	MODERATE	STRONG	MODERATE
Goelz *et al* 2011[57]	WEAK	STRONG	STRONG	MODERATE	MODERATE	STRONG	MODERATE
Gorniewicz *et al* 2017[58]	WEAK	STRONG	STRONG	MODERATE	MODERATE	STRONG	MODERATE
Henselmans *et al* 2019[59]	WEAK	STRONG	STRONG	MODERATE	STRONG	STRONG	MODERATE
Hulsman *et al* 2002[67]	WEAK	MODERATE	N/A	N/A	STRONG	MODERATE	MODERATE
Lenzi *et al* 2011[68]	WEAK	MODERATE	N/A	N/A	WEAK	STRONG	WEAK
Liénard *et al* 2010[60]	WEAK	STRONG	STRONG	MODERATE	MODERATE	STRONG	MODERATE
Malhotra *et al* 2019[61]	WEAK	STRONG	STRONG	MODERATE	WEAK	STRONG	WEAK
Razavi *et al* 2003[47]	WEAK	STRONG	STRONG	MODERATE	MODERATE	STRONG	MODERATE
Tulsky *et al* 2011[62]	WEAK	STRONG	STRONG	MODERATE	STRONG	STRONG	MODERATE
Yakhforoshha *et al* 2018[69]	WEAK	MODERATE	N/A	N/A	STRONG	STRONG	MODERATE
Yamada *et al* 2018[70]	STRONG	MODERATE	N/A	N/A	STRONG	MODERATE	MODERATE

*For studies with only one group confounders and blinding was set N/A.
†For studies with only one measurement time point withdrawals and drop-outs was set N/A.
‡No drop-outs possible, as the second measurement point was at the end of the intervention and at the same day as the first measurement point.
N/A, not available; RCT, randomised controlled trial.

validity. In other publications, the authors used existing instruments or items with insufficient information on quality criteria (n=5). None of the papers was rated weak in the category study design, as all of the reported studies were either RCTs (n=11; receiving the rating strong) or cohort studies/interrupted time series (n=11; receiving the rating medium).

The most frequent strong ratings (n=19) were given for withdrawals and drop-outs, a category determined by the follow-up rate. For two articles this rating was set 'N/A', as in their reported study second measurement time point was conducted directly after the intervention on the same day as the first measurement time point, so that a dropout in this case was unlikely.

DISCUSSION

To our knowledge, this is the first systematic review of evaluated communication interventions on PC/EoL issues for physicians caring for cancer patients. We identified the relevant publications and conducted a narrative synthesis with regard to publication characteristics, setting and didactics of the interventions, the addressed PC/EoL issues, the communication-related outcome measurements as well as the reported effectiveness. Further, the methodological quality of the studies was systematically assessed. We focused on interventions explicitly designed for physicians, as there is profound evidence that a timely and adequate communication of PC/EoL issues via the primary caring (organ-specific) oncologist is of great importance.[2–7 13 16 17]

We identified 24 publications evaluating 22 different communication interventions. The results revealed a great variety, but also similarities between the publications regarding the reported interventions and the evaluation methods. We found that in a majority of the articles the target group were oncologists, while only one-third of

the studies included both oncologists and organ-specific specialists. We consider this to be too few, as the primary caring physicians of cancer patients in many cases are not specialised oncologists but physicians with other specialisations. Goulart *et al,* for example, found that in 55% of 28.977 studied lung cancer patients in the USA the primary caring physician was specialised in internal or family medicine.[73]

The most frequently addressed PC/EoL issue in communication interventions is breaking bad news. As guidelines demand for the use of predefined, published frameworks when discussing serious news,[37] the high number of existing interventions teaching those is a positive result. Further, it is favourable that dealing with patients' emotions has also been addressed in several interventions, as dealing with emotions represents an important communication deficiency of physicians and at the same time is considered to be one of the most central components of communication in PC.[1 37] Other crucial PC/EoL communication issues, such as goals of care discussions, eliciting values, involving family caregivers or preparing for the future (including talking about death and dying)[1] have received little attention so far. Notably, none of the evaluated interventions for oncologists addressed the topic of discussing advanced directives. Since important communication guidelines in oncology, such as the consensus guideline from the American Society of Clinical Oncology, strongly recommend to timely discuss those,[37] this lack of training is a clinically relevant finding. Further, a majority of the interventions focused on just one specific topic, while only a few covered a wider range of communication issues in the field of PC. Moreover, the intervention setting as well as the length of the interventions differed considerably. A majority of the interventions was time intensive and lasted more than 1 day and one-third of the studies the training included follow-up sessions or individual coaching for consolidation. There is no consistent evidence on the optimal length of communication interventions in oncology.[27] Nonetheless, Moore *et al* demand to take into account the high time pressure in healthcare professionals and therefore to conduct communication skills trainings in less on-site time.[27]

Despite large differences with regard to the setting, the didactics and learning activities used within the interventions were similar. A very commonly used technique were role-plays, often performed with simulated patients. This is in concordance with guidelines and strong empirical evidence confirming the effectiveness of role-plays as a teaching strategy in communication skills trainings.[74–76] Another commonly applied teaching method was to present example videos of ideal communication behaviour.

With regard to the outcome measurements, 75% of the publications did not only rely on self-reported data, but also used externally assessed, objective outcome measurements for evaluation. This is commendable, since using different sources of data is an important quality criterion

of evaluating complex interventions.[77] The objective data were usually assessed by external ratings of the physicians' communication behaviour in videotaped or audiotaped clinical conversations either with simulated or real patients. The most frequently rated parameter was intrapersonal empathy, which seems reasonable, as this is important for all communication issues due to the high level of emotionality in these consultations.[1]

All but one article reported significant positive effects of the intervention on at least one outcome parameter, which indicates that the reviewed interventions in general seem to be effective, even though the areas of improvement differ. While almost half of the papers reported a positive impact of the intervention on the competence of empathy, eight of them reported no effect in this regard. A possible explanation for these contradictory results is the great variance in the measurement instruments and the lack of standardised instruments reported within the publications. Several articles reported further improvements in general communication behaviour not directly connected to the PC/EoL issue, such as asking open questions or establishing a framework for the consultation. With regard to more specific aspects of communication, the most frequently reported effects referred to the application of a stepwise approach to deliver bad news, such as the SPIKES protocol.[71] This might be due to the high predefined structure of those protocols and thus an easier operationalisation of the outcome measurements. Numerous further specific changes in subscales were reported. Overall, outcomes assessed by self-reported data improved in almost all of the publications, whereas the effects of externally assessed outcomes were not that unequivocal. In most cases, the improvement was only observed in some of the communication domains or subscales. In about one-third of the articles, less than half of the assessed outcomes revealed a significant change. It can be concluded that the interventions may more easily have a positive impact on self-reported outcomes such as confidence or self-efficacy than on externally rated communication behaviour. This finding is in concordance with other systematic reviews.[32 78] However, previous findings indicate that self-assessed confidence data are no reliable indicator for competence.[79] Tulsky *et al* reported a large gap between the self-assessed confidence and the real ability in EoL discussions.[80 81] Hence, self-report questionnaires seem to be a limited outcome measurement.

The methodological quality of the publications was overall moderate. A majority of the included articles reported RCTs, which reflects a high quality and represents the most robust method to evaluate interventions.[77] Due to mostly very small sample sizes and low response rates, a frequent methodological weakness was the representability. This indicates a selection bias, probably in favour of physicians that are already more interested in communication. Another frequent methodological limitation was the quality of the assessment tools. Instead of standardised and validated instruments, many

publications reported the use of self-developed items or rating instruments. These findings are consistent with previous reviews claiming methodological weaknesses of the studies and demanding more RCTs and more valid and reliable instruments when evaluating communication interventions in the setting of EoL care.[27 29–32 78]

Implications

Characteristics and design of future interventions

This systematic review reveals several implications for future communication interventions on PC/EoL issues for physicians. Content wise, those should focus on other aspects than breaking bad news, such as discussing goals of care, preparing for the future or introducing advance directives, because breaking bad news is already sufficiently covered by existing interventions. In addition, interventions need to focus more on strengthening physicians' awareness for the adequate time to communicate the topics. In order to address all primary caring physicians of cancer patients, the target group should be oncologists as well as physicians with other specialisations caring for patients with cancer. Due to the time pressure physicians face, there as well is a need of shorter interventions that are easier to integrate into daily work. Those might include booster sessions for consolidation, as proposed by guidelines on effective communication training strategies in oncology.[76] Also, Razavi *et al* and Delvaux *et al* found consolidation workshops to be effective[47 48] and Niglio de Figueiredo *et al* indicate that a higher amount of individual coaching sessions after a communication workshop positively affects the effectiveness of the intervention.[82]

Characteristics of future studies

Future studies to evaluate the interventions should be designed as methodologically high-quality RCTs. Authors should make use of different sources of data to assess outcomes, but set their focus on the external rating data. Rating data should be assessed via valid, reliable and standardised rating instruments, such as the Common Ground Assessment Summary form[83] for general communication skills or the Observing Patient Involvement scale 12[84] for shared decision making. BBN should be rated via standardised protocols on breaking bad news like SPIKES[71] or SHARE.[85] However, since the observed communication challenges are often very specific, where appropriate, additional study-specific rating systems should be created. Ideally, those should incorporate or adapt existing rating scales or items, like the developed systems of Fujimori *et al*[56] or Back *et al*[64] do. To enhance validity, the study-specific rating systems should be built on an extensive literature research and the development should be presented transparently. An acceptable interrater-reliability can be established through double ratings. Additional self-report questionnaires should be valid, reliable and standardised, such as the self-efficacy Affective Competency Score[86] to assess changes in self-efficacy through the intervention.

Strengths and limitations

Our systematic review has strengths and some limitations. By publishing a review protocol in advance, we provided transparency of the review process. Also, we conducted and reported our review based on the PRISMA guidelines. To increase objectivity, two independent raters carried out the assessment of full texts for eligibility, the data extraction as well as the quality assessments of the included papers.

Since the methodology of the included publications was too heterogeneous, an important limitation is that we could not conduct a quantitative meta-analysis. Further, we conducted our search in four relevant databases and added a few articles via hand searches in reference lists. Thus, it is possible that we might have missed some publications that were not covered by these databases and which we did not find by additional searches. As we restricted our search to articles published in English or German, we might as well have missed studies published in other languages. Besides, a publication bias in favour of significant results is possible. Lastly, by excluding publications with no communication-related main outcome, it might be that some relevant evaluated interventions in this field were not included. However, setting this focus enabled a more detailed view on how existing interventions actually affect the physicians' communication behaviour. Future systematic reviews should separately report communication-related and non-communication-related outcome measurements.

CONCLUSION

This systematic review provides a detailed overview of existing communication interventions on PC/EoL issues for physicians working in oncology. We found several interventions that seem to effectively improve physicians' communication behaviour. Our results are an important resource for researchers and clinicians planning to develop and evaluate further interventions in this area. An important future focus should be to develop feasible interventions on other PC/EoL issues than breaking bad news, such as goals-of-care discussions or preparing for the future. Due to the benefits of an early communication of PC/EoL issues in oncological care, interventions should also emphasise the adequate timing of communicating these aspects. Target group should be oncologists and organ-specific specialists, as all primary caring physicians are responsible for earlier communication and the latter have not been sufficiently considered in existing interventions. It is important that the effectiveness of the interventions is empirically evaluated within high-quality RCTs using validated instruments and different sources of data.

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PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	p. 1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	p. 2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	p. 3-4
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	p. 4
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	p. 5-6
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	p. 6
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	suppl. mat. S3
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	p. 6
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	p. 6-7
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	p. 6-7
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	p. 6-7
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	p. 6-7
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	N/A
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	p. 6-7
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	N/A
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	p. 6-7
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	p. 7
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	N/A
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/A
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	N/A
Certainty	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	N/A

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PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
assessment			
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	p. 7, fig.1
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	p. 7, fig. 1
Study characteristics	17	Cite each included study and present its characteristics.	p. 8, tab. 1, tab. 3
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	tab. 4
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	tab. 1, tab. 2, tab. 3
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	p. 8, 11, 14,17, 19
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	N/A
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	N/A
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/A
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	N/A
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	N/A
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	p. 19-21
	23b	Discuss any limitations of the evidence included in the review.	p. 22-23
	23c	Discuss any limitations of the review processes used.	p. 22-23
	23d	Discuss implications of the results for practice, policy, and future research.	p. 21-22
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	p. 4
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	p. 4
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	p. 23
Competing interests	26	Declare any competing interests of review authors.	p. 23
Availability of data, code and	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included	p. 24

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
other materials		studies; data used for all analyses; analytic code; any other materials used in the review.	

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

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PRISMA 2020 for Abstracts Checklist

Section and Topic	Item #	Checklist item	Reported (Yes/No)
TITLE			
Title	1	Identify the report as a systematic review.	Yes
BACKGROUND			
Objectives	2	Provide an explicit statement of the main objective(s) or question(s) the review addresses.	Yes
METHODS			
Eligibility criteria	3	Specify the inclusion and exclusion criteria for the review.	Yes
Information sources	4	Specify the information sources (e.g. databases, registers) used to identify studies and the date when each was last searched.	Yes
Risk of bias	5	Specify the methods used to assess risk of bias in the included studies.	Yes
Synthesis of results	6	Specify the methods used to present and synthesise results.	Yes
RESULTS			
Included studies	7	Give the total number of included studies and participants and summarise relevant characteristics of studies.	Yes
Synthesis of results	8	Present results for main outcomes, preferably indicating the number of included studies and participants for each. If meta-analysis was done, report the summary estimate and confidence/credible interval. If comparing groups, indicate the direction of the effect (i.e. which group is favoured).	Yes
DISCUSSION			
Limitations of evidence	9	Provide a brief summary of the limitations of the evidence included in the review (e.g. study risk of bias, inconsistency and imprecision).	Yes
Interpretation	10	Provide a general interpretation of the results and important implications.	Yes
OTHER			
Funding	11	Specify the primary source of funding for the review.	N/A
Registration	12	Provide the register name and registration number.	Yes

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

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PROSPERO
International prospective register of systematic reviews

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Addressing palliative care related topics in patients with cancer: a systematic review of communication interventions.
Nele Harnischfeger, Hilke M. Rath, Karin Oechsle, Corinna Bergelt

Citation

Nele Harnischfeger, Hilke M. Rath, Karin Oechsle, Corinna Bergelt. Addressing palliative care related topics in patients with cancer: a systematic review of communication interventions. . PROSPERO 2020 CRD42020191054 Available from:
https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020191054

Review question

1. Which communication interventions on palliative care related topics for physicians caring for cancer patients were evaluated and published?
2. Which contents do the interventions cover and how are they structured?
3. Which outcome measurements are used?
4. Which effects of the interventions are reported?

Searches

We will search the following electronic databases.
- MEDLINE (via OVID)
- PsycINFO (via OVID)
- CINAHL (Cumulative Index to Nursing and Allied Health Literature)
- Web of Science
Additionally, hand searches of reference lists of relevant papers will be conducted. Search dates will be from July 2020 to September 2020. The language of the included studies will be restricted to English and German. We will apply no restrictions on year of publication or geographical location. The search will be re-run before the final analysis so any new studies will be part of the full review. Unpublished studies will not be included.

Types of study to be included

Inclusion:

We will include quantitative studies that test the effectiveness of a training intervention on one or more palliative care related topics. Studies must be published in a peer-reviewed journal and full-text must be accessible.

Exclusion:

We will exclude qualitative studies, conference proceedings and review articles as well as studies that are not published in English or German. No restrictions regarding the year of publication will be made.

Condition or domain being studied

Communication interventions on palliative care related topics for physicians without specialization in palliative care caring for cancer patients.

Participants/population

Inclusion:
We will include communication skills trainings that are addressed to physicians of different specialization

caring for cancer patients, who have no specialization in palliative care. This includes oncologists as well as specialists such as gynaecologists, urologists, dermatologists etc. Interventions must be explicitly designed for physicians. If interventions are designed for both patients and physicians, the intervention and results for the physicians must be reported separately.
Exclusion:
We will exclude trainings that are addressed to palliative care specialists or physicians who are currently obtaining such qualification. Interventions that include both physicians with and without specialization in palliative care will be excluded if the latter accounts for >20% of participants, unless results of the non-palliative care specialists are reported separately. Communication skills trainings for medical students or other healthcare professionals than physicians will be excluded as well. Also, trainings for mixed groups consisting of different healthcare providers (e.g. physicians and nurses) will not be included, as well as trainings for physicians together with patients, if the results of the physicians cannot be extracted separately.

Intervention(s), exposure(s)

Inclusion:
We will include interventions that aim to improve communication skills of physicians caring for cancer patients regarding one or more topics relevant to palliative care. Palliative care related topics of interest are (but not limited to):
- talking about palliative care/end-of-life care/terminal care
- talking about death or dying
- talking about transition to palliative care
- talking about prognosis
- discussing goals of care
- supporting / involving family caregivers
- preparing for the future
- eliciting values
- dealing with emotions / giving emotional support
- discussing serious news
- advance care planning
- talking about advance directives
- shared decision making (in oncological context).
We will include interventions that are evaluated within a quantitative study and have a main focus on communication as well as a communication related main outcome.
Exclusion:
We will exclude interventions that are not evaluated or whose main focus is not communication. Also, interventions designed for other medical settings than oncology or the pediatric context will be excluded.

Comparator(s)/control

Studies with and without a control group will be included in this review.

No exclusions will be made based on the existence of a comparison group.

Main outcome(s)

The main outcomes of this review are:

- overview of existing interventions for physicians caring for cancer patients on addressing palliative care related topics

- description of content, target group and structure of the interventions

- description of the communication related outcome parameters of the interventions

- reported effectiveness of the interventions.

* Measures of effect

Communication related main outcomes of the interventions, such as (but not limited to): confidence, attitude change, satisfaction, objectively observed ratings or skills assessments, patient-reported outcomes, staff-

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reported outcomes

Additional outcome(s)
None.

* Measures of effect

Not applicable

Data extraction (selection and coding)
Study selection:

1. Screening of the titles and (in uncertainty) abstracts of the eligible studies by the first author to identify the potentially relevant papers.

2. Full-text screening for inclusion or exclusion of the studies by the first author and an independent member of the research team. Disagreements will be resolved by consent after discussion. Excluded papers will be listed and reasons for exclusion will be documented.

In the full review, a PRISMA flow diagram will show the process of study selection.

Data extraction:

Data will be extracted independently by two authors of the research team using a data extraction form. Disagreements will be resolved by consent after discussion. The following data will be extracted:

- authors, year, title, language, country

- study design, sample size, participants

- name of intervention, target group, setting

- description of the intervention

- aim/objective of the intervention

- communication related outcome parameters

- effects of the intervention

- risk of bias assessment.

If there is any missing data, any additional data is required or there is uncertainty on specific data, the first author will contact authors of the respective studies via email.

Risk of bias (quality) assessment
To assess the quality of the included studies, we will make use of the Effective Public Health Practice Project Quality Assessment Tool (EPHPP; Armijo-Olivo, Stiles, Hagen, Biondo, & Cummings, 2012; Thomas, Ciliska, Dobbins, & Micucci, 2004). Studies assessed with the EPHPP receive a final grade which can be strong, moderate or weak. The quality will be assessed independently by two raters of the research team. Disagreements between the raters will be resolved by consent after discussion.

Strategy for data synthesis
As we expect a methodological and statistical heterogeneity of the studies as well as of a variety of outcome parameters with different measurements and sources of data, there will be no quantitative data synthesis. A narrative synthesis will be used to summarize results (Dixon-Woods, Agarwal, Jones, Young, & Sutton, 2005).

Analysis of subgroups or subsets

None planned.

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Type and method of review
Systematic review

Anticipated or actual start date
01 July 2020

Anticipated completion date
31 May 2021

Funding sources/sponsors
None.

Grant number(s)
State the funder, grant or award number and the date of award

Conflicts of interest
None known

Language
English

Country
Germany

Stage of review
Review Ongoing

Subject index terms status
Subject indexing assigned by CRD

Subject index terms
MeSH headings have not been applied to this record

Date of registration in PROSPERO
18 July 2020

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Date of first submission
17 June 2020

Stage of review at time of this submission

Stage	Started	Completed
Preliminary searches	Yes	No
Piloting of the study selection process	No	No
Formal screening of search results against eligibility criteria	No	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

The record owner confirms that the information they have supplied for this submission is accurate and complete and they understand that deliberate provision of inaccurate information or omission of data may be construed as scientific misconduct.

The record owner confirms that they will update the status of the review when it is completed and will add publication details in due course.

Versions
18 July 2020

Supplemental material

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Table S3. Search strategy

Number	Search strategy
1	communic* OR convers* OR interpersonal skill* OR bad news OR serious news OR challenging news OR serious news OR advance care plan* OR advance clinical decision* OR psychosocial car* OR living will OR withholding treatment* OR discuss* OR address* OR talk* OR inform*.
2	train* OR educat* OR intervention OR course OR workshop OR program* OR curricul* OR practic* OR teach* OR improv* OR coach* OR project*.
3	palliative care OR end of life OR end-of-life OR end of life care OR end-of-life-care OR hospice car* OR terminal car* OR terminally ill OR supportive care OR respite car* OR advanced dis* OR advanced cancer OR critical ill* OR critically ill* OR critical car* OR imminent death OR dying OR limited life* OR last year of life OR end stage OR end-stage OR life-limiting illness OR shared decision making OR shared decision-making OR involv* family caregivers OR support* family caregivers OR prepare* for the future OR elicit* values OR deal* with emotions OR foster* relationship OR goals-of-care OR goals of care OR advance care plan* OR transition to palliative* OR prognosis OR advance directives OR emotional support* OR bad news OR serious news OR challenging news
4	physician* OR doctor* OR practitioner* OR clinician* OR generalist* OR general practitioner* OR professional* OR fellow* OR junior-doctor* OR oncologist* OR medical*
5	(cancer* OR onco* OR carcinom* OR tumor OR tumour OR malign* OR neoplasm* OR haematol* OR melanoma*
6	1 AND 2 AND 3 AND 4 AND 5

Table S4. Intervention characteristics of N = 22 interventions

Name of the Intervention	Publication (country)	Setting	1. Aim; 2. Content and learning activities; 3. Addressed PC/EoL issue(s)
An Illness-Trajectory Communication Curriculum	Cannone et al., 2019 (USA)	8-module workshop over 8 weeks (weekly 2-hour sessions)	1. Improving communication skills with regard to BBN; 2. Sessions on 8 different pertinent communication challenges each consisting of a didactic lecture and small group role-play sessions with SP plus face-to-face sessions to discuss the learned content (BBN based on SPIKES protocol); 3. BBN, interacting with relatives, communicating in the palliative care setting
Avatar-mediated training in a virtual world	Andrade et al., 2010 (USA)	10-minute video and one encounter with avatar SP (individual training)	1. Educating medical trainees on delivering bad news in a virtual world; 2. Computer-based tutorial on SPIKES protocol and interaction with a SP avatar in a virtual room; 3. BBN
Belgian Interuniversity Curriculum – communication skills training (BIC-CST)	Liénard et al., 2010 (Belgium)	40-h training program spread over an 8-month period bimonthly in small group sessions	1. Improving residents' BBN skills with regard to communication contents and the BBN process; 2. Theoretical information, role plays with some sessions focusing on two-person and some sessions focusing on three-person consultations; 3. BBN
Brief Breaking Bad News (BBN) communication skills training module	Gorniewicz et al., 2017 (USA)	60-minute training module viewed on a CD-ROM or website	1. Improving communication skills in BBN; 2. Video clips of actual patients describing communication situations involving BBN, quiz questions on how to respond to a challenging communication situation, videos of simulated doctor-patient encounters with annotations; 3. BBN
Communication skills training (CST)	Butow et al., 2008 (Australia)	1.5-day workshop with 3-6 participants and four 1.5 h monthly video-conferences	1. Increasing oncologists' skills in eliciting and responding to emotional cues; 2. Previously handed out booklet, presentation of principles, a DVD modelling ideal behavior, monthly video-conferences incorporating role-play of doctor-generated scenarios with SP; 3. Dealing with emotions

Name of the Intervention	Publication (country)	Setting	1. Aim; 2. Content and learning activities; 3. Addressed PC/EoL issue(s)
Communication Skills Training	Baile et al., 1999, (USA)	Two 5-hour-workshops (participants attended only one of them)	1. Improving communication skills and patient management skills of oncologists; 2. Two workshops: one on breaking bad news (based on SPIKES-protocol) and one on managing difficult patient situations (focus on managing stressful patient and family encounters) - each consisting of a didactic lecture, discussions and role-plays in small groups; 3. BBN, managing patient reactions to illness
Communication Skills Training - adapted version of the workshop on BBN	Fujimori, et al., 2003 (Japan)	5-hour workshop imbedded into a 2 or 3-day workshop on palliative care	1. Increasing confidence in communicating with cancer patients; 2. One workshop from Baile et al. consisting of a didactic lecture and role plays on BBN (based on SPIKES protocol); 3. BBN
Communication skills training (CST) based on patients preferences	Fujimori et al., 2014 (Japan)	2-day workshop	1. Improving empathic communication and effective behaviors of oncologists and their confidence in their ability to communicate with patients; 2. Computer-aided didactic lecture with text and video, role plays with SP, discussion on role playing (all based on self-developed SHARE framework on BBN); 3. BBN
Communication Skills Training (CST) workshop	Yamada et al., 2018; (Japan)	2-day workshop	1. Increasing intrapersonal empathy; 2. One-hour computer-aided didactic lecture with text and video (BBN based on the SHARE framework with focus on reassurance and emotional support), 8 hours of role plays with SP, discussions; 3. Empathy/dealing with emotions, BBN
Communication training in oncology	Lenzi et al., 2011 (USA)	3-day course	1. Positively affecting oncologists' attitudes, self-efficacy and knowledge in communication; 2. Formal lectures, small group work, role plays, interviews with SP, reflective exercises; 3. BBN, dealing with denial
COM-ON-p	Goelz et al., 2011 (Germany)	11-hour (1.5 day) workshop in groups of 8-9 participants plus an individual coaching 2 weeks later (half hour)	1. Improving oncologists' communication behavior toward the patient and significant other skills in consultations focusing on the transition to palliative care; 2. Role plays with SP and significant others focusing on individually defined learning goals, coaching sessions to discuss how to transfer individual learning goals into routine consultations with a facilitator;

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Name of the Intervention	Publication (country)	Setting	1. Aim; 2. Content and learning activities; 3. Addressed PC/EoL issue(s)
			3. Transition to palliative care
Comskil Training Curriculum	Bylund et al., 2010 (USA)	Five 3-h modules (participants were free to choose the frequency and amount of modules taking part in)	1. Improving communication skills; 2. Five modules on 5 different PC/EoL topics consisting of a didactic presentation, videos to demonstrate the skills and role-plays with SP in small groups; 3. BBN; shared decision making, responding to patient anger; discussing prognosis; discussing transition to palliative care
Comskil Training Curriculum – adapted version (module about discussing prognosis)	Brown et al., 2010 (USA)	2.5 to 3-hour workshop	1. Teaching five strategies to discuss prognosis in a manner that is a) tailored to the patient's needs, b) honest and realistic and c) provides hope and reassurance; 2. Written material, didactic lecture, presentation of exemplary videos, role plays with SP; 3. Discussing prognosis
Goals-of-Care (GoC) communication skills and coaching intervention (INT)	Annadurai et al., 2021 (USA); Bickell et al., 2020 (USA)	2-hour group communication skills training and 4 coaching visits spread over half a year	1. Teaching oncologists to elicit patient values; 2. All participants: didactic lecture on importance of GoC discussions; additional for intervention group (IG): small group role play session, coaching in practice (joint visit with patient; all based on SPIKES and NURSE protocols); 3. Goals of care discussions
Interact-Cancer (computer-assisted instruction program)	Hulsman et al., 2002 (Netherlands)	4 modules of computer assisted individual training each lasting 1 hour (program can be interrupted and completed anytime)	1. Improving communication behavior; 2. Computer assisted instruction-course with 4 modules: basic communication skills, breaking bad news, providing information effectively, dealing with patients' emotions – each course consisting of video examples of poor and adequate communication, written instructions and multiple-choice practice questions; 3. BBN, dealing with emotions
ISM (integrating simulation model) with art-based teaching strategies	Yakhforoshha et al., 2018 (Iran)	1-day workshop	1. Teaching empathic communication regarding BBN by integrating simulation with art-based teaching strategies; 2. Interactive lectures based on SPIKES-model, presentation of different artworks expressing patient scenarios (e.g. films, music, painting, poetry) with following discussion, role plays with SP, expression of learning activities in a BBN-checklist and a reflective essay; 3. BBN

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Name of the Intervention	Publication (country)	Setting	1. Aim; 2. Content and learning activities; 3. Addressed PC/EoL issue(s)
Oncotalk	Back et al., 2007 (USA)	4-day residential workshop in groups of 20	1. Teaching specific communication tasks linked to the patient's trajectory of illness; 2. Theoretic overviews, reflective discussions, teaching of cognitive road maps for specific communication tasks and role plays with SP; 3. BBN, discussing transitions to palliative care
Patient-Centered Communication Intervention (VOICE-trial)	Epstein et al., 2017 (USA)	Physicians: Two sessions of 105-minute in-office training; patients and caregivers: 1-hour coaching session plus up to 3 follow-up phone calls	1. Promoting patient-centered communication about disease course, prognosis, treatment decisions and end-of-life-care; 2. Physicians' intervention: brief video and feedback from standardized patients including critique on audiotaped patient visits; patients' intervention: coaching session incorporating a question prompt list helping them bring their concerns to oncologist; 3. Dealing with emotions, discussing prognosis, treatment decisions and end-of-life-care
Posttraining Consolidation Workshops after a basic training program	Delvaux et al., 2005 (Belgium); Razavi et al., 2003 (Belgium)	2.5-day basic group-training program and six 3-hour consolidation workshops spread over a 3-months period	1. Improving physicians' communication skills in cancer care (basic program) and maintaining the newly acquired skills, ensure further improvements, and promote the transfer of skills to the clinical practice (consolidation workshops); 2. Basic program: didactic lecture, small-group role play sessions, written material; consolidation workshops: role plays with systematic feedback based on clinical problems brought up by participants; 3. BBN, dealing with emotions, detecting psychopathologic reactions to diagnosis and prognosis, interacting with relatives
SCOPE CD-ROM	Tulsky et al., 2011 (USA)	1-hour communication lecture plus a CD-ROM training program (approx. 1 hour)	1. Improving oncologists' responses to patients' emotional concerns; 2. Didactic lecture on communication skills and a tailored CD-ROM training program with exemplars of their own audio-recorded clinic visits; 3. Dealing with emotions
TEAMS (training Oncologists and Empowering Patients in Effective Communication During Medical Consultations in Singapore)	Malhotra et al., 2019 (Singapore)	Online training program for physicians (completed individually, length not stated) and handing out a prompt sheet to patients	1. Improving oncologists' empathic responses, discussions of prognosis and goals of care and promoting patient/caregiver-questions; 2. Physicians intervention: training on 4 different communication topics (see goals of the intervention) each addressed with a review of the concept, a video on how it could be applied and a review of segments from own audiotaped conversations including feedback; patients' intervention: prompt sheet with possible questions about diagnosis and prognosis; 3. Discussing prognosis, discussing goals of care, responding to emotions

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Name of the Intervention	Publication (country)	Setting	1. Aim; 2. Content and learning activities; 3. Addressed PC/EoL issue(s)
Training on Shared Decision-Making About Palliative Chemotherapy	Henselmans et al., 2019 (Netherlands)	Two 3.5-hour group sessions in groups of 3-6 with approx. 2 weeks in-between and a booster session (1.5 hours) 6 weeks later	1. Training oncologists on shared decision making (SDM) focused on palliative cancer treatment; 2. Instruction, modelling (i.e. videos illustrating SDM) and practice (role plays with SP) plus a follow up session to receive feedback on a video-recorded encounter from actual practice; 3. Shared decision making

BBN = breaking bad news, SP = simulated patients

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