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REVIEW ARTICLE

A systematic scoping review of teaching and evaluating communications in the intensive care unit

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Abstract

Introduction: Whilst the importance of effective communications in facilitating good clinical decision-making and ensuring effective patient and family-centred outcomes in Intensive Care Units (ICU)s has been underscored amidst the global COVID-19 pandemic, training and assessment of communication skills for healthcare professionals (HCPs) in ICUs remain unstructured.

Methods: To enhance the transparency and reproducibility, Krishna's Systematic Evidenced Based Approach (SEBA) guided Systematic Scoping Review (SSR), is employed to scrutinise what is known about teaching and evaluating communication training programmes for HCPs in the ICU setting. SEBA sees use of a structured search strategy involving eight bibliographic databases, the employ of a team of researchers to tabulate and summarise the included articles and two other teams to carry out content and thematic analysis the included articles and comparison of these independent findings and construction of a framework for the discussion that is overseen by the independent expert team.

Results: 9532 abstracts were identified, 239 articles were reviewed, and 63 articles were included and analysed. Four similar themes and categories were identified. These were strategies employed to teach communication, factors affecting communication training, strategies employed to evaluate communication and outcomes of communication training.

Conclusion: This SEBA guided SSR suggests that ICU communications training must involve a structured, multimodal approach to training. This must be accompanied by robust methods of assessment and personalised timely feedback and support for the trainees. Such an approach will equip HCPs with greater confidence and prepare them for a variety of settings, including that of the evolving COVID-19 pandemic.

Keywords: *Communication, Intensive Care Unit, Assessment, Skills Training, Evaluation, COVID-19, Medical Education*

I. INTRODUCTION

The COVID-19 pandemic has placed immense strain on intensive care units (ICU)s with healthcare teams and resources stretched to meet the sudden increased healthcare demands of critically ill patients. To further complicate the situation, ICU teams are called to not only communicate closely with colleagues in a bid to support them but also counsel families confronting acute distress and uneasy waits separated from their loved ones due to restrictions to visiting in an effort to limit the spread of this pandemic (Ministry of Health, 2020; World Health, 2020). From breaking bad news (Blackhall, Erickson, Brashers, Owen, & Thomas, 2014; J. Yuen & Carrington Reid, 2011), to conveying the need for sedation and intubation (Carrillo Izquierdo, Diaz Agea, Jimenez Rodriguez , Leal Costa, & Sanchez Exposito, 2018) and providing progress reports on critically ill patients (Curtis et al., 2005; Curtis, White, Curtis, & White, 2008; Yang et al., 2020), communication skills amongst ICU healthcare professionals (HCPs) are pivotal in reassuring anxious, emotional and stressed patients and families (Ahrens, Yancey, & Kollef, 2003; Foa et al., 2016; Kirchhoff et al., 2002). Good communication in the ICU has also been shown to improve patient-physician relationships (K. G. Anderson & Milic, 2017), patient and family-centred outcomes, quality of care, and patient and family satisfaction (Bloomer, Endacott, Ranse, & Coombs, 2017; Cao et al., 2018; Currey, Oldland, Considine, Glanville, & Story, 2015). Effective communications between HCPs in ICU also enhances clinical decision-making (Kleinpell, 2014), reduces medication and treatment errors (Clark, Squire, Heyme, Mickle, & Petrie, 2009; Happ et al., 2014; Sandahl et al., 2013), decreases physician burnout (Rachwal et al., 2018), and improves staff retention and satisfaction (Hope et al., 2015).

With evidence suggesting that poor communication skills (Downar, Knickle, Granton, & Hawryluck, 2012; Foa et al., 2016) and training (Smith, O'Sullivan, Lo, & Chen, 2013) are likely to increase patients' (Dithole, Sibanda, Moleki, & Thupayagale - Tshweneagae, 2016) and families' (Curtis et al., 2008) stress, adversely affect care and recovery (Dithole et al., 2016), and increase healthcare costs (Kalocsai et al., 2018), some authors have suggested that effective communication skills are at least as important (Adams, Mannix, & Harrington, 2017; Cicekci et al., 2017; Van Mol, Boeter, Verharen, &

Nijkamp, 2014) to good patient care as clinical acumen (Curtis et al., 2001a). Yet despite evidence of the importance of communication skills in ICU, communication skills training remains inconsistent, variable and not evidence-based in most ICU settings (Adams et al., 2017; Berlacher, Arnold, Reitschuler-Cross, Teuteberg, & Teuteberg, 2017; Bloomer et al., 2017; D. A. Boyle et al., 2017; Miller et al., 2018; Sanchez Exposito et al., 2018).

With this in mind, a systematic scoping review (SSR) is proposed to map current approaches to communications skills training in ICUs (Munn et al., 2018) and potentially guide design of a communications training programme. An SSR allows for systematic extraction and synthesis of actionable and applicable information whilst summarising available literature across a wide range of pedagogies and practice settings employed to understand what is known about teaching and evaluating communication training programmes for HCPs in the ICU setting (Munn et al., 2018).

II. METHODS

To overcome concerns about the transparency and reproducibility of SSR, a novel approach called Krishna's Systematic Evidenced Based Approach (henceforth SEBA) is proposed (Kow et al., 2020; Krishna et al., 2020; Ngiam et al., 2020). This SEBA guided SSR (henceforth SSRs in SEBA) adopts a constructivist perspective to map this complex topic from multiple angles (Popay et al., 2006) whilst a relativist lens helps account for variability in communication skills training (Crotty, 1998; Ford, Downey, Engelberg, Back, & Curtis, 2012; Pring, 2000; Schick-Makaroff, MacDonald, Plummer, Burgess, & Neander, 2016).

To provide a balanced review, the research team was supported by the medical librarians from the National University of Singapore's (NUS) Yong Loo Lin School of Medicine (YLLSoM), the National Cancer Centre Singapore (NCCS) and local educational experts and clinicians at the NCCS, the Palliative Care Institute Liverpool, YLLSoM and Duke-NUS Medical School (henceforth the expert team). The research and expert teams adopted an interpretivist approach as they proceeded through the five stages of SEBA (Figure 1).
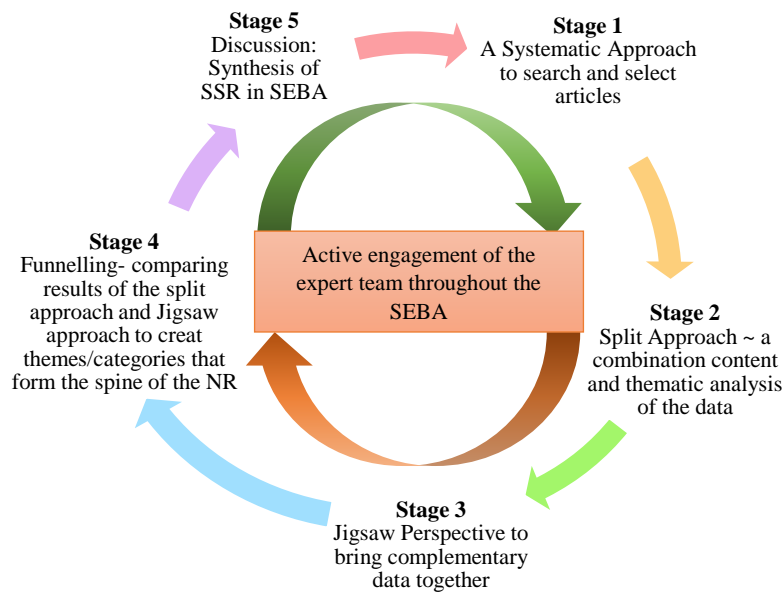
Figure 1. The SEBA Process

A. Stage 1: Systematic Approach

1) Determining the title and research question: The research and expert teams agreed upon the goals, population, context and concept to be evaluated in this SSR. The two teams then agreed that the primary research question should be "What is known about teaching and evaluating communication training programs for HCPs in the ICU setting?" The secondary research questions were "How are communication skills taught and assessed in the ICU setting?" and "How effective have such interventions been as described in the published literature?"

2) Inclusion criteria: A Population, Intervention, Comparison, Outcome, Study Design (PICOS) format was adopted to guide the research process (Peters, Godfrey, Khalil, et al., 2015a; Peters, Godfrey, McInerney, et al., 2015b) (Table 1).

PICOS	Inclusion Criteria	Exclusion Criteria
Population	• Undergraduate and postgraduate healthcare providers (e.g. doctors, medical students, nurses, social workers) within ICU setting • ICU settings including medical, surgical, cardiology and neurology ICU • Communication between healthcare providers and patients in the ICU, or between healthcare providers in the ICU and patients' families • Communication between or within healthcare providers' teams in the ICU	• Articles focusing solely on neonatal/ paediatric ICU setting • Articles focusing solely on speech therapy/ physical therapy/ occupational therapy • Non-ICU settings (e.g. general wards, emergency department) • Non-medical professions (e.g. Science, Veterinary, Dentistry) • Communication carried out over technological platforms
Intervention	• Need for/ importance of interventions to teach communication in ICU setting • Facilitators and barriers to teaching communication in ICU setting • Recommendations, interventions, methods (e.g. tools, simulations, videos), curriculum content and assessments used for teaching communication in ICU setting	
Comparison	• Comparisons of various interventions, methods, curricula and evaluation methods used to teach or assess communication in ICU setting and its impact upon patients, healthcare providers, healthcare, and society	
Outcome	• Impact of interventions on patients, healthcare providers, healthcare, and society • Evaluation methods to assess interventions, methods, or curriculum used to teach communication	
Study design	• Articles in English or translated to English • All study designs including: o Mixed methods research, meta-analyses, systematic reviews, randomised controlled trials, cohort	

studies, case-control studies, cross-sectional studies,
and descriptive papers
  o Case reports and series, ideas, editorials, and
     perspectives
• Publication dates: 1st January 2000 – 31st December 2019
• Databases: PubMed, ERIC, JSTOR, Embase, CinaHL,
  Scopus, PsycINFO, Google Scholar

Table 1. PICOS

Nine members of the research team carried out independent searches for articles published between 1st January 2000 - 31st December 2019 in eight bibliographic databases (PubMed, ERIC, JSTOR, Embase, CINAHL, Scopus, Psycinfo and Google Scholar). The searches were carried out between 27th January 2020 and 14th February 2020. The PubMed search strategy can be found in Supplementary Material A. An independent hand search was done to identify key articles.

3) Extracting and charting: Nine members of the research team independently reviewed the titles and abstracts identified and created individual lists of titles to be included which were discussed online. Consensus was achieved on the final list of articles to be included using (Sambunjak, Straus, & Marusic, 2010)'s "negotiated consensual validation" approach through collaborative discussion and negotiation on points of disagreement on online meetings.

B. Stage 2. Split Approach
Working in three independent groups, the reviewers analysed the included articles using the 'split approach' (Ng et al., 2020). In one group, four researchers independently reviewed and summarised all the included articles in keeping with according recommendations set out by Wong, Greenhalgh, Westhorp, Buckingham, and Pawson (2013)'s "RAMESES publication standards: meta-narrative reviews" and Popay et al. (2006)'s "Guidance on the conduct of narrative synthesis in systematic reviews". The four research team members then discussed their individual findings at online meetings and employed 'negotiated consensual validation' to achieve consensus on the tabulated summaries (Sambunjak et al., 2010). The tabulated summaries served to highlight key points from the included articles.

The four members of the research team also employed the Medical Education Research Study Quality Instrument (MERSQI) (Reed et al., 2008) and the Consolidated Criteria for Reporting Qualitative Studies (COREQ) (Tong, Sainsbury, & Craig, 2007) also evaluated the quality of qualitative and quantitative studies included in this review.

Concurrently, the second group of five researchers analysed all the included articles using (Braun & Clarke, 2006)'s approach to thematic analysis then discussed their individual findings at online meetings and employed 'negotiated consensual validation' to achieve consensus on the final themes (Sambunjak et al., 2010). The third group of four researchers employed Hsieh and Shannon (2005)'s approach to directed content analysis to independently analyse all the included articles, discussed their independent findings online and employed 'negotiated consensual validation' to achieve consensus on the final themes (Sambunjak et al., 2010). This split approach consisting of the tabulated summaries and concurrent thematic analysis and content analysis enhances the reliability of the analyses. The tabulated summaries also help ensure that important themes are not lost.

1) Thematic analysis: Phase 1 of Braun and Clarke (2006)'s approach saw the team 'actively' reading the included articles to find meaning and patterns in the data. In phase 2, 'codes' were constructed from the 'surface' meaning (Braun & Clarke, 2006; Sawatsky, Parekh, Muula, Mbata, & Bui, 2016; Voloch, Judd, & Sakamoto, 2007) and collated into a code book to code and analyse the rest of the articles using an iterative step-by-step process. As new codes emerged, these were associated with previous codes and concepts (Price & Schofield, 2015). In phase 3, the categories were organised into themes that best depict the data. In phase 4, the themes were refined to best represent the whole data set and discussed. In phase 5, the research team discussed the results of their independent analysis online and at reviewer meetings. "Negotiated consensual validation" was used to determine a final list of themes (Sambunjak et al., 2010).

2) Directed content analysis: Hsieh and Shannon (2005)'s approach to directed content analysis (Hsieh & Shannon, 2005) was employed in three stages.

Using deductive category application (Elo & Kyngäs, 2008; Wagner-Menghin, de Bruin, & van Merriënboer, 2016), the first stage (Mayring, 2004; Wagner-Menghin et al., 2016) saw codes drawn from the article "Enhancing collaborative communication of nurse and physician leadership into two intensive care units" (D. K. Boyle & Kochinda, 2004). Drawing upon Mayring

(2004)'s account, each code was defined in the code book that contained "explicit examples, definitions and rules" drawn from the data. The code book served to guide the subsequent coding process.

Stage 2 saw the four reviewers using the 'code book' to independently extract and code the relevant data from the included articles. Any relevant data not captured by these codes were assigned a new code that was also described in the code book. In keeping with deductive category application (Wagner-Menghin et al., 2016), coding categories and their definitions were revised. The final codes were compared and discussed with the final author to enhance the reliability of the process (Wagner-Menghin et al., 2016). The final author checked the primary data sources to ensure that the codes made sense and were consistently employed. The reviewers and the final author used "negotiated consensual validation" to resolve any differences in the coding (Sambunjak et al., 2010). The final categories were selected (Neal, Neal, Lawlor, Mills, & McAlindon, 2018) based on whether they appeared in more than 70% of the articles reviewed (Curtis et al., 2001b; Humble, 2009).

The narrative produced was guided by the Best Evidence Medical Education (BEME) Collaboration guide (Haig & Dozier, 2003) and the STORIES (Structured approach to the Reporting In healthcare education of Evidence Synthesis) statement (Gordon & Gibbs, 2014).

III. RESULTS

9532 abstracts were identified from ten databases, 239 articles reviewed, and 63 articles were included as shown in Figure 2 (Moher, Liberati, Tetzlaff, & Altman, 2009).

Database search: 1st January 2000 to 31st December 2019
- PubMed: 2050
- ERIC: 12
- JSTOR: 173
- Embase: 4906
- CINAHL: 1475
- Scopus: 30
- Psycinfo: 596
- Google Scholar: 290

Total: 9.532 results

Excluded duplicates and non-relevant articles based on title and abstract: **9,345**

187 to full text review

Independent hand search of key articles: **52**

239 to full text review

Excluded articles which met exclusion criteria and which fail to meet the inclusion criteria: **176**
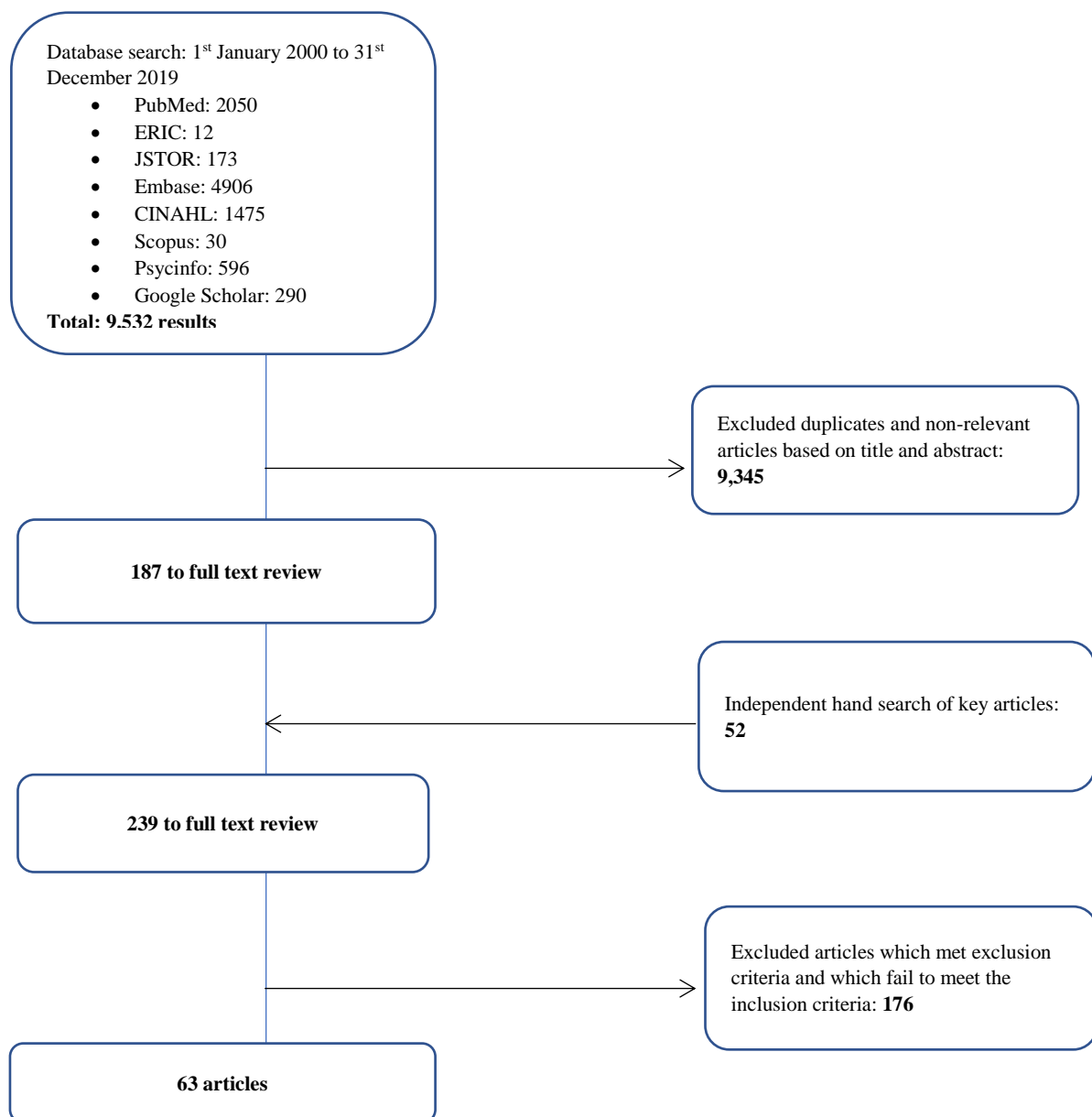
63 articles

Figure 2. PRISMA Flowchart

1) Comparisons between summaries of the included articles, thematic analysis and directed content analysis:
In keeping with SEBA approach the findings of each arm of the split approach was discussed amongst the research and expert teams. The themes identified using Braun and Clarke (2006)'s approach to thematic analysis were how to teach and evaluate communication training in ICU and the factors affecting training.

The categories identified using Hsieh and Shannon (2005)'s approach to directed content analysis were 1) strategies employed to teach communication, 2) factors affecting communication training, 3) strategies employed to evaluate communication, and 4) outcomes of communication training. These categories reflected the major issues identified in the tabulated summaries.

These findings were reviewed with the expert team who agreed that given that the themes identified could be encapsulated by the categories identified, the categories and the themes will be presented together.

a) Strategies employed to teach communication in ICU:
61 articles described various interventions used to teach communication in the ICU. 19 involved ICU physicians, 18 involved ICU nurses, 4 saw participation of ICU physicians and nurses, 13 included the multidisciplinary team in the ICU, 1 was aimed at medical interns, 2 at medical students, 2 at nursing students, and 2 at both medical and nursing students. Given the overlap between teaching strategies, topics taught, and assessment methods employed in ICU communication training for nurses, doctors, nursing and medical students and HCPs in the literature, we discuss and generalise the results across HCPs.

In curriculum design, seven studies (D. K. Boyle & Kochinda, 2004; Hope et al., 2015; Krimshtein et al., 2011; Lorin, Rho, Wisnivesky, & Nierman, 2006; McCallister, Gustin, Wells-Di Gregorio, Way, & Mastronarde, 2015; Miller et al., 2018; Sullivan, Rock, Gadmer, Norwich, & Schwartzstein, 2016) designed a curriculum based on extensive reviews of literature on teaching communication. Brunette and Thibodeau-Jarry (2017) used Kern's 6-step approach to curriculum development to design a structured curriculum targeted at meeting the needs identified whilst Sullivan et al. (2016) and Lorin et al. (2006) used the authors' own experiences in tandem with existing literature to guide curriculum design. W. G. Anderson et al. (2017) designed a communication training workshop based on behaviour theories whilst McCallister et al. (2015) based their curriculum on principles of shared decision-making and patient-centred communication. Northam, Hercelinskyj, Grealish, and Mak (2015) conducted a pilot study before implementing their intervention.

Topics included in the curriculum were categorised into "core topics", or topics essential to the curriculum, and "advanced" which may be useful to incorporate into the curriculum. Core topics were deemed as topics that were most frequently cited in the literature or are crucial across a variety of interactions in the ICU setting such as history taking, relationship skills as well as on common scenarios in the ICU such as breaking bad news and communicating difficult decisions. "Advanced' topics, though important, are not mentioned as frequently and appeared to be more site specific and sociocultural and ethical issues. These topics are outlined in Table 2 (full table with references found in Supplementary Material B). The methods employed are outlined in Table 3 (full table with references found in Supplementary Material C).

	Curriculum
Core curriculum content	Communication skills
	- With families (n=25)
	- With patients (n=5)
	- With HCPs (n=12)
	- General principles
	Breaking bad news
	Understanding/defining goals of care, building therapeutic relationships with families, setting goals and expectations, shared decision making
	Eliciting understanding and providing information about a patient's clinical status
	Relationship skills
	- Recognising and dealing with strong emotions
	- Empathy
	Relationship skills include the "key principles" of esteem, empathy, involvement, sharing, and support
	Problem solving/conflict management/facing challenges
	Frameworks for good communication
	- Ask-Tell-Ask
	- "Tell Me More"
	- "SBAR" – Situation, Background, Assessment, Recommendation: to share information obtained in discussions with patients or family members with other HCPs
	- "3Ws" – What I see, What I'm concerned about, and What I want
	- Four-Step Assertive Communication Tool - get attention, state the concern (eg, "I'm concerned about…" or "I'm uncomfortable with…"), offer a solution, and get resolution by ending with a question (eg, "Do you agree?")

- "4 C's" palliative communication model:
  a. Convening – ensuring necessary communication occurs between the patient, family, and interprofessional team;
  b. Checking – for understanding;
  c. Caring – conveying empathy and responding to emotion; and
  d. Continuing – following up with patients and families after discussions to provide support and clarify information.
- ''Communication Strategy of the Week'' using teaching posters
- PACIENTE Interview (Introduce yourself, Listen carefully, Tell you the diagnosis, Advises treatment, Exposes the prognosis, Appoints the bad news introductory phrases, Takes time to comfort empathic, Explains a plan of action involving the family)
- Stages of communication (open, clarify, develop, agree, close)
- Processes of communication (procedural suggestions, check for understanding)
- Explain illness in clear, simple terms
- Using a reference manual and pocket reference cards
- How HCPs should introduce himself to patients/family members/other HCPs

ICU decision making
- Survival after CPR
- DNR discussions
- Prognostication
- Legal and ethical issues surrounding life-sustaining treatment decisions
  - Withdrawing therapies

Advanced Topics	Ethics - Eg. Offering organ donation Cultural/spirituality/religious issues Leadership Roles and responsibilities in communication with patients and families Discussing patient safety incidents Integration of 5 common behaviour theories: health belief model, theory of planned behaviour, social cognitive theory, an ecological perspective, and transtheoretical model Law

Table 2. Topics taught

Methods Employed	Number of Studies
Didactic Teaching, which may be employed in conjunction with other methods in a structured programme	20
Simulated scenarios with family members/ standardised patients	17
Role-play	12
Use of simulation technology such as with mannequins	6
Group discussions, group reflections and team-based learning	7
Case presentations, case discussions and patient care conferences	4
Online videos	3
Online Powerpoint slides	3
Did not specify	9

Table 3. Pedagogy

b) Factors affecting communication training: Identifying facilitators and barriers are critical to the success of communication programmes. Facilitators and barriers to training may be found in Table 4 (full table with references may be found in Supplementary Material D).

Facilitators	Barriers
Longitudinal, structured process with horizontal and vertical integration	Lack of time
Safe learning environment	Resource constraints
Clear programme objectives and programme content	Poor design and a lack of longitudinal support
Funding for training	Insecurity and awkwardness during simulations
Simulated patients	Disrupted training
Protected time for training	Programmes that were not pitched at the right level
Faculty experts helping to plan and review curricula and implement interventions	Training that is not learner centered
Stakeholders' engagement to facilitate interprofessional collaboration, as well as debriefing and program feedback	Training that lacked feedback or debrief sessions
Reflective practice	Lack of a longitudinal aspect to training
Timely and appropriate feedback	A lack of a supportive environment in which HCPs can apply the skills learnt
Multidisciplinary learning	Discordance between physicians' and nurses' communication with families
Role modeling	
Peer support	

Table 4. Facilitators and barriers to training

c) Strategies employed to evaluate communication training: Thirty-nine articles discussed evaluation methods of communication training. The assessment methods are described as follows in Table 5 (full table with references may be found in Supplementary Material E).

Method
Self-assessment
1   Quantitative and qualitative surveys were administered to learners to assess their knowledge, experience in the programme, and perceived preparedness, comfort and confidence in communicating
1.1   Some programmes only used post-intervention assessments
1.2   Others used a combination of pre- and post-intervention assessments of learners
1.3   Some programmes adapted existing tools to conduct post-intervention surveys to evaluate learners' experiences and skills learnt
Feedback from Others
2   patients, family members, peers and simulated patients was obtained through a combination of surveys and interviews that assessed their level of satisfaction with learners' communication skills
Observation
3   Direct observation of HCPs' communication skills to ascertain the frequency, quality, success and ease of communication post-intervention. This was done through the use of modified communication tools and feedback forms
Debriefing Sessions
4   One study used debriefing sessions to understand shared experiences of learners.

Table 5. Assessment Methods

d) Outcomes of communication training: The outcomes of communication training may be mapped to 5 levels of the Adapted Kirkpatrick's Hierarchy (Jamieson, Palermo, Hay, & Gibson, 2019; Littlewood et al., 2005; Roland, 2015) allowing outcome measures used were also identified. Majority of the programmes achieved Level 2a and Level 2b outcomes as shown in Table 6 (full table with references may be found in Supplementary Material F). 40 articles described successes and three articles described variable outcomes of teaching communications.

Adapted Kirkpatrick's Hierarchy	Items evaluated
Level 1 (participation)	Experience in the programme
	Assessment of programme's effectiveness
	Trainee satisfaction
	Programme completion
Level 2a (attitudes and perception)	Attitudes towards/ experience with communication
	Self-rated confidence/ preparedness in communication
	Colleagues' satisfaction with communication
	Trainees' views on training programme (e.g. satisfaction, perceived effectiveness)
	Self-perceived job stress/ job satisfaction
Level 2b (knowledge and skills)	Self-rated skill level using Likert scales
	Form asking trainees to list/ indicates skills they learnt during the programme
	Self-rated knowledge level using Likert scales
	Self-evaluation of communication skills using validated tools
	Evaluation of trainees' knowledge by faculty/ experts
	Evaluation of trainees' communication skills by faculty/ experts
Level 3 (behavioural change)	Feedback from peers and facilitators on interactions with actors
	Records of ICU rounds
	Notes from colleagues documenting supportive environment and involvement in communication
	Frequency of usage of communication skills taught
	Workplace observations
	Evaluation of trainees' communication skills in clinical setting by patients and colleagues
Level 4a (increased interprofessional collaboration)	Workplace observations
Level 4b (patient benefits)	Self-perceived quality of care
	Patient and family satisfaction with communication
	Family satisfaction with communication

Table 6. Outcome Measures mapped onto Adapted Kirkpatrick's Hierarchy

Three studies compared outcomes with non-intervention arms and reported improved patient satisfaction and self-rated and third party reported improvements in communication (Awdish et al., 2017; Happ et al., 2014; McCallister et al., 2015).

C. Stage 3: Jigsaw Perspective

The jigsaw perspective builds upon Moss and Haertel's (2016) concept of methodological pluralism and sees data from different methodological approaches as pieces of a jigsaw providing a partial picture of the area of interest. The Jigsaw perspective brings data from

complementary pieces of the training process in order to paint a cohesive picture of ICU communication training. As a result, related aspects of the training structure and the working culture were studied together so as to better understand the influences each of the aforementioned have on the other.

D. Stage 4. An Iterative Process

Whilst there was consensus on the themes/categories identified, the expert team and stakeholders raised concerns that data from grey literature which is neither quality assessed nor necessarily evidenced based could bias the discussion. To address this concern, the research team thematically analysed the data from grey literature and non-research-based pieces such as letters, opinion and perspective pieces, commentaries and editorials drawn from the bibliographic databases separately and compared these themes against themes drawn from peer reviewed evidenced based data. This analysis revealed the same themes with an additional tool (PACIENTE tool) identified in the grey literature to enhance communication with patients' families (Pabon et al., 2014).

IV. DISCUSSION

E. Stage 5. Synthesis of Systematic Scoping Review in SEBA

This SSR in SEBA reaffirms the importance of communications training in ICU and suggests that a combination of training techniques is required (Akgun & Siegel, 2012; Chiarchiaro et al., 2015; Happ et al., 2010; Happ et al., 2015; Hope et al., 2015; Lorin et al., 2006; Miller et al., 2018; Roze des Ordons, Doig, Couillard, & Lord, 2017; Sandahl, et al., 2013; D. J. Shaw, Davidson, Smilde, Sondoozi, & Agan, 2014).

A framework for the design of a competency-based approach to ICU communications training (W. G. Anderson et al., 2017; Berkenstadt et al., 2013; D. Boyle et al., 2016; Brown, Durve, Singh, Park, & Clark, 2017; Chiarchiaro et al., 2015; Fins & Solomon, 2001; Happ et al., 2010; Hope et al., 2015; Karlsen, Gabrielsen, Falch, & Stubberud, 2017; Pabon et al., 2014; Roze des Ordons et al., 2017; Tamerius, 2013; J. Yuen & Carrington Reid, 2011) may be found in Figure 3 below.
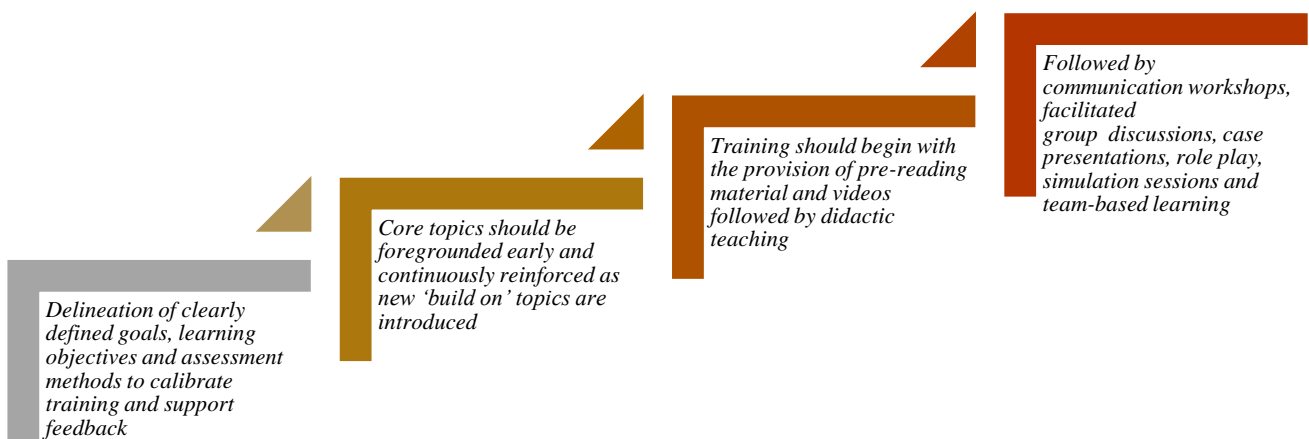

Figure 3. Framework for Competency-based Approach to ICU Communication Skills Training

Delineation of clearly defined goals, learning objectives and assessment methods to calibrate training and support feedback

Core topics should be foregrounded early and continuously reinforced as new 'build on' topics are introduced

Training should begin with the provision of pre-reading material and videos followed by didactic teaching

Followed by communication workshops, facilitated group discussions, case presentations, role play, simulation sessions and team-based learning

These findings resonate with Kirkpatrick's Hierarchy (Jamieson et al., 2019; Littlewood et al., 2005; Roland, 2015) where each level builds upon the next and the learner moves from "peripheral participation" to active "doing and internalising" in real clinical practice.

Such a competency-based programme necessitates a structured approach to holistic and longitudinal assessments of the learner's progress. Such a structured approach must be horizontally and vertically integrated into other forms of clinical training as cogent communication is a fundamental skillset across all

practice and specialties (Akgun & Siegel, 2012; Roze des Ordons et al., 2017).

Whilst Kirkpatrick's Hierarchy offers a viable framework for assessing trainees' progress (Boothby, Gropelli, & Succheralli, 2018; Roze des Ordons et al., 2017), ICU training programmes may also keep in mind the various outcomes measures listed previously in Table 3 when designing assessment tools. These tools should conscientiously account for perspectives offered by trainers, standardised patients and family members involved in the evaluation process and should consider benefits and repercussions of their communication

abilities to patients, families and the ICU multidisciplinary team(Aslakson, Randall Curtis, & Nelson, 2014; Awdish et al., 2017; Blackhall et al., 2014; D. A. Boyle et al., 2017; DeMartino, Kelm, Srivali, & Ramar, 2016; Happ et al., 2014; Happ et al., 2015; Hope et al., 2015; Miller et al., 2018; Sanchez Exposito et al., 2018; Sullivan et al., 2016; Turkelson, Aebersold, Redman, & Tschannen, 2017).

With flexibility within training programmes highlighted as essential (Ernecoff et al., 2016), this flexibility should also extend to cover remediation and provision of additional support in areas jointly identified and agreed upon by trainees and trainers to be paramount for targeted improvement. As it is worrying that no studies have focused on the effects of remediation on ICU communication skills training thus far, this should be a critical area for future research considering its importance (Steinert, 2013).

Likewise, it is pivotal that trainers should undergo rigorous training (Berlacher et al., 2017; Roze des Ordons et al., 2017) and are granted protected time for this undertaking (Boothby et al., 2018; Happ et al., 2010; Roze des Ordons et al., 2017). In order to ensure that quality and up-to-date skills and knowledge are transferred down the line, it is posited that trainers should also be holistically and longitudinally assessed alongside their charges (Roze des Ordons et al., 2017). Whilst trainers should ideally nurture a safe, collaborative, learning environment for all (Hales & Hawryluck, 2008; Milic et al., 2015; Roze des Ordons et al., 2017; Sandahl, et al., 2013), it is clear that this can only be achieved through sustained administrative and financial support, according learners and trainers sufficient time and resources to foster cordial relationships open to mutual and honest feedback (Akgun & Siegel, 2012; Miller et al., 2018).

V. LIMITATIONS

The SSR in SEBA approach is robust, reproducible and transparent addressing many of the concerns about inconsistencies in SSR methodology and structure arising from diverse epistemological lenses and lack of cogency in weaving together context-sensitive medical education programmes. Through a reiterative step-by-step process, the hallmark 'Split Approach' which saw concurrent and independent analyses and tabulated summaries by separate teams of researchers allowed for a holistic picture of prevailing ICU communications training programmes without loss of any conflicting data. Consultations with experts every step of the way also significantly curtailed researcher bias and enhanced the accountability and coherency of the data.

Yet it must be acknowledged that this SSR focused on articles published in English or with English translations. Hence, much of the data comes from North American and European countries, potentially skewing perspectives and raising questions as to the applicability of these findings in the setting of other cultures. Moreover, whilst databases used were selected by the expert team and the team utilised independent selection processes, critical papers may still have been unintentionally omitted. Whilst use of thematic analysis to review the impact of the grey literature greatly improves transparency of the review, inclusion of grey literature-based themes may nonetheless bias results and provide these opinion-based views with a 'veneer of respectability' despite a lack of evidence to support it.

VI. CONCLUSION

In the absence of a standardised evidence-based communication training programme for HCPs in ICUs, many HCPs are left in the hope that clinical experience alone will be sufficient to ensure their proficiency in communication. This SSR provides guidance on how to effectively develop and structure a communications training programme for HCPs in ICUs and suggests that communications training in ICU must involve a structured multimodal approach to training carried out in a supportive learning environment. This must be accompanied by robust methods of assessment and personalised and timely feedback and support of the trainees. Such an approach will equip HCPs with greater confidence and preparedness in a variety of situations, including that of the evolving COVID-19 pandemic.

To effectively institute change in communication training within ICUs, further studies should look into the desired characteristics of trainers and trainees, the context and settings as well as the case scenarios used. The design of an effective tool to evaluate learners' communication skills longitudinally, holistically, and in different settings should be amongst the primary concerns for future research.

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Ethical Approval

This is a systematic scoping review study which does not require ethical approval.

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Declaration of Interest

The authors declare that they have no competing interests.

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Supplementary Table A: PubMed Search

((((("Students, Medical"[Mesh] OR "Students, Nursing"[Mesh] OR (("Students"[Mesh] OR student[tiab] OR students[tiab]) AND ("Social Work Department, Hospital"[Mesh] OR "Physical Therapists"[Mesh] OR "Occupational Therapists"[Mesh] OR "Nurses"[Mesh] OR "Nursing Staff"[Mesh] OR "Physicians"[Mesh] OR doctor[tiab] OR doctors[tiab] OR physician[tiab] OR physicians[tiab] OR nurse[tiab] OR nurses[tiab] OR nursing[tiab] OR physiotherapist[tiab] OR physiotherapists[tiab] OR "occupational therapist"[tiab] OR "occupational therapists"[tiab] OR "allied health"[tiab] OR (("social worker"[tiab] OR "social workers"[tiab]) AND (clinical[tiab] OR medical[tiab] OR hospital[tiab]))))) OR ("Social Work Department, Hospital"[Mesh] OR "Physical Therapists"[Mesh] OR "Occupational Therapists"[Mesh] OR "Nurses"[Mesh] OR "Nursing Staff"[Mesh] OR "Physicians"[Mesh] OR doctor[tiab] OR doctors[tiab] OR physician[tiab] OR physicians[tiab] OR nurse[tiab] OR nurses[tiab] OR nursing[tiab] OR physiotherapist[tiab] OR physiotherapists[tiab] OR "occupational therapist"[tiab] OR "occupational therapists"[tiab] OR "allied health"[tiab] OR (("social worker"[tiab] OR "social workers"[tiab]) AND (clinical[tiab] OR medical[tiab] OR hospital[tiab]))))) AND ((("Communication"[Mesh] OR Communication[tiab] OR Communications[tiab] OR Communicating[tiab] OR Communicate[tiab]) AND ("Delivery of Health Care"[Mesh] OR health[tiab] OR healthcare[tiab] OR medical[tiab] OR clinical[tiab] OR medicine[tiab]) AND ("Education"[Mesh] OR educate[tiab] OR education[tiab] OR educating[tiab] OR educations[tiab] OR curricula[tiab] OR curriculum[tiab] OR teaching[tiab] OR teachings[tiab] OR teach[tiab] OR learn[tiab] OR learning[tiab] OR competence[tiab] OR competency[tiab] OR competencies[tiab])))) AND ((Terminally Ill [Mesh] OR Critical Illness [Mesh] OR Catastrophic Illness [Mesh] OR Clinical Deterioration [Mesh] OR Life Support Care [Mesh] OR Critical Care [Mesh] OR Terminal Care [Mesh] OR Palliative Care [Mesh] OR Hospice Care [Mesh] OR Intensive Care Units [Mesh] OR Dying [tiab] OR terminal care [tiab] OR terminal illness [tiab] OR critical care [tiab] OR critical illness [tiab] OR intensive care [tiab] OR life threatening [tiab] OR palliative [tiab] OR end of life [tiab] OR end-of-life [tiab] OR intensive treatment [tiab] OR hospice care [tiab]))

Supplementary Material B: Table 2 with References

	Curriculum	References
Core curriculum content	Communication skills - General principles	(Akgun & Siegel, 2012; W. G. Anderson et al., 2017; Anstey, 2013; Aslakson et al., 2014; Awdish et al., 2017; Barbour, Puntillo, Cimino, & Anderson, 2016; Berkenstadt et al., 2013; Berlacher et al., 2017; Blackhall et al., 2014; Boothby et al., 2018; D. A. Boyle & Anderson, 2015; D. A. Boyle et al., 2017; D. K. Boyle & Kochinda, 2004; Brunette & Thibodeau-Jarry, 2017; DeMartino et al., 2016; Dorner et al., 2015; Downar et al., 2012; Fins & Solomon, 2001; Hales & Hawryluck, 2008; Happ et al., 2010; Happ et al., 2014; Happ et al., 2015; Hope et al., 2015; Lorin et al., 2006; McCallister et al., 2015; Milic et al., 2015; Miller et al., 2018; Northam et al., 2015; Roze des Ordons et al., 2017; Sanchez Exposito et al., 2018; Sandahl et al., 2013; Shannon, Long-Sutehall, & Coombs, 2011; D. J. Shaw et al., 2014; Smith et al., 2013; Sullivan et al., 2016; Turkelson et al., 2017; J. K. Yuen, Mehta, Roberts, Cooke, & Reid, 2013)
	- With families (n=25)	(Akgun & Siegel, 2012; W. G. Anderson et al., 2017; Anstey, 2013; Aslakson et al., 2014; Awdish et al., 2017; Berkenstadt et al., 2013; Berlacher et al., 2017; Blackhall et al., 2014; D. A. Boyle & Anderson, 2015; D. A. Boyle et al., 2017; D. K. Boyle & Kochinda, 2004; Brunette & Thibodeau-Jarry, 2017; DeMartino et al., 2016; Dorner et al., 2015; Downar et al., 2012; Hales & Hawryluck, 2008; Lorin et al., 2006; Milic et al., 2015; Miller et al., 2018; Roze des Ordons et al., 2017; Shannon et al., 2011; D. J. Shaw et al., 2014; Smith et al., 2013; Sullivan et al., 2016; J. K. Yuen et al., 2013)
	- With HCPs (n=12)	(W. G. Anderson et al., 2017; Aslakson et al., 2014; Awdish et al., 2017; Barbour et al., 2016; Blackhall et al., 2014; D. A. Boyle et al., 2017; D. K. Boyle & Kochinda, 2004; Hales & Hawryluck, 2008; Milic et al., 2015; Sandahl et al., 2013; Shannon et al., 2011; Turkelson et al., 2017)
	- With patients (n=5)	(Akgun & Siegel, 2012; D. A. Boyle et al., 2017; Sanchez Exposito et al., 2018; Smith et al., 2013; J. K. Yuen et al., 2013).
	Breaking bad news	(Berlacher et al., 2017; Miller et al., 2018; Pabon et al., 2014; Roze des Ordons et al., 2017; D. Shaw, Davidson, Smilde, & Sondoozi, 2012; D. J. Shaw et al., 2014)
	Understanding/defining goals of care, building therapeutic relationships with families, setting goals and expectations, shared decision making	(Akgun & Siegel, 2012; W. G. Anderson et al., 2017; Barth et al., 2013; Berlacher et al., 2017; Blackhall et al., 2014; D. A. Boyle et al., 2017; Dorner et al., 2015; Lorin et al., 2006; McCallister et al., 2015; D. J. Shaw et al., 2014; Sullivan et al., 2016; J. K. Yuen et al., 2013)
	Eliciting understanding and providing information about a patient's clinical status	(W. G. Anderson et al., 2017; D. A. Boyle et al., 2017; D. K. Boyle & Kochinda, 2004; D. J. Shaw et al., 2014; Sullivan et al., 2016; J. K. Yuen et al., 2013)
	Relationship skills - Recognising and dealing with strong emotions - Empathy Relationship skills include the "key principles" of esteem, empathy, involvement, sharing, and support	(Berlacher et al., 2017; D. A. Boyle et al., 2017; D. K. Boyle & Kochinda, 2004; Dorner et al., 2015; Krimshtein et al., 2011; Smith et al., 2013; Sullivan et al., 2016)

	Problem solving/conflict management/facing challenges	(Berlacher et al., 2017; Blackhall et al., 2014; Boothby et al., 2018; D. K. Boyle & Kochinda, 2004; Krimshtein et al., 2011; Milic et al., 2015; Miller et al., 2018; Roze des Ordons et al., 2017; Smith et al., 2013)

	Frameworks for good communication
	
	- Ask-Tell-Ask
	- "Tell Me More"
	- "SBAR" – Situation, Background, Assessment, Recommendation: to share information obtained in discussions with patients or family members with other HCPs
	- "3Ws" – What I see, What I'm concerned about, and What I want
	- Four-Step Assertive Communication Tool - get attention, state the concern (eg, "I'm concerned about…" or "I'm uncomfortable with…"), offer a solution, and get resolution by ending with a question (eg, "Do you agree?")
	- "4 C's" palliative communication model:
	   a. Convening – ensuring necessary communication occurs between the patient, family, and interprofessional team;
	   b. Checking – for understanding;
	   c. Caring – conveying empathy and responding to emotion; and
	   d. Continuing – following up with patients and families after discussions to provide support and clarify information.
	- ''Communication Strategy of the Week'' using teaching posters
	- PACIENTE Interview (Introduce yourself, Listen carefully, Tell you the diagnosis, Advises treatment, Exposes the prognosis, Appoints the bad news introductory phrases, Takes time to comfort empathic, Explains a plan of action involving the family)
	- Stages of communication (open, clarify, develop, agree, close)
	- Processes of communication (procedural suggestions, check for understanding)
		(Blackhall et al., 2014; D. A. Boyle et al., 2017; D. K. Boyle & Kochinda, 2004; Happ et al., 2010; Happ et al., 2015; Lorin et al., 2006; Pabon et al., 2014; Shannon et al., 2011; Sullivan et al., 2016; Turkelson et al., 2017)

	- Explain illness in clear, simple terms - Using a reference manual and pocket reference cards - How HCPs should introduce himself to patients/family members/other HCPs	
	ICU decision making - Survival after CPR - DNR discussions - Prognostication - Legal and ethical issues surrounding life-sustaining treatment decisions - Withdrawing therapies	(Berlacher et al., 2017; Blackhall et al., 2014; J. K. Yuen et al., 2013)
Build-on Topics	Ethics - Eg. Offering organ donation	(Akgun & Siegel, 2012; DeMartino et al., 2016; Hope et al., 2015; Roze des Ordons et al., 2017; J. K. Yuen et al., 2013)
	Cultural/spirituality/religious issues	(Berlacher et al., 2017; Boothby et al., 2018; Hope et al., 2015; Northam et al., 2015)
	Leadership	(D. A. Boyle et al., 2017; D. K. Boyle & Kochinda, 2004)
	Roles and responsibilities in communication with patients and families	(Krimshtein et al., 2011; Milic et al., 2015)
	Discussing patient safety incidents	(Roze des Ordons et al., 2017)
	Integration of 5 common behaviour theories: health belief model, theory of planned behaviour, social cognitive theory, an ecological perspective, and transtheoretical model	(W. G. Anderson et al., 2017)
	Law	(Akgun & Siegel, 2012)

Supplementary Material C: Table 3 with References

Methods Employed	References
Didactic Teaching, which may be employed in conjunction with other methods in a structured programme (n=20)	(Akgun & Siegel, 2012; W. G. Anderson et al., 2017; Berkenstadt et al., 2013; Berlacher et al., 2017; DeMartino et al., 2016; Downar et al., 2012; Hope et al., 2015; Krimshtein et al., 2011; Lorin et al., 2006; McCallister et al., 2015; Milic et al., 2015; Miller et al., 2018; Roze des Ordons et al., 2017; Sandahl et al., 2013; Shannon et al., 2011; D. J. Shaw et al., 2014; Smith et al., 2013; Sullivan et al., 2016; Turkelson et al., 2017; J. K. Yuen et al., 2013)
Simulated scenarios with family members/standardised patients (n=17)	(Akgun & Siegel, 2012; Awdish et al., 2017; Berkenstadt et al., 2013; Berlacher et al., 2017; Blackhall et al., 2014; Brown et al., 2017; Downar et al., 2012; Hales & Hawryluck, 2008; Havrilla-Smithburger, Kane-Gill, & Seybert, 2012; Hope et al., 2015; Lorin et al., 2006; Miller et al., 2018; Pabon et al., 2014; Roze des Ordons et al., 2017; D. J. Shaw et al., 2014; J. Yuen & Carrington Reid, 2011; J. K. Yuen et al., 2013)
Role-play (n=12)	(W. G. Anderson et al., 2017; Barbour et al., 2016; D. Boyle et al., 2016; D. A. Boyle & Anderson, 2015; DeMartino et al., 2016; Krimshtein et al., 2011; McCallister et al., 2015; Milic et al., 2015; Shannon et al., 2011; Smith et al., 2013; Sullivan et al., 2016; Tamerius, 2013)
Use of simulation technology such as with mannequins (n=6)	(Boothby et al., 2018; Brunette & Thibodeau-Jarry, 2017; Karlsen et al., 2017; Sanchez Exposito et al., 2018; Sandahl et al., 2013; Turkelson et al., 2017)
Group discussions, group reflections and team-based learning (n=7)	(Awdish et al., 2017; D. K. Boyle & Kochinda, 2004; Fins & Solomon, 2001; Krimshtein et al., 2011; Lorin et al., 2006; Milic et al., 2015; Smith et al., 2013)
Case presentations, case discussions and patient care conferences (n=4)	(Fins & Solomon, 2001; Happ et al., 2010; Happ et al., 2015; Hope et al., 2015)
Online videos (n=3)	(Happ et al., 2010; Happ et al., 2015; Turkelson et al., 2017)
Online PowerPoint slides (n=3)	(Happ et al., 2010; Happ et al., 2015; J. Yuen & Carrington Reid, 2011)
Did not specify (n=9)	(Aslakson et al., 2014; D. A. Boyle et al., 2017; Dorner et al., 2015; Happ et al., 2014; Motta, Ryder, Blaber, Bautista, & Lim-Hing, 2018; Northam et al., 2015; Pantilat, Anderson, Puntillo, & Cimino, 2014; D. Shaw et al., 2012; Thomson, Tan, Hellings, & Frys, 2016)

Supplementary Material D: Table 4 with References

Facilitators	
Longitudinal, structured process with horizontal and vertical integration	(Roze des Ordons et al., 2017)
Safe learning environment	(Hales & Hawryluck, 2008; Milic et al., 2015; Roze des Ordons et al., 2017; Sandahl et al., 2013)
Clear programme objectives and programme content	(Berlacher et al., 2017) (Sandahl et al., 2013)
Funding for training	(Berlacher et al., 2017; Roze des Ordons et al., 2017)
Simulated patients	(Roze des Ordons et al., 2017)
Protected time for training	(Boothby et al., 2018; Happ et al., 2010; Roze des Ordons et al., 2017)
Faculty experts helping to plan and review curricula and implement interventions	(Boothby et al., 2018; Roze des Ordons et al., 2017)
Stakeholders' engagement to facilitate interprofessional collaboration, as well as debriefing and programme feedback	(Sandahl et al., 2013), (W. G. Anderson et al., 2017) (D. A. Boyle et al., 2017)
Reflective practice	(Sandahl et al., 2013)
Timely and appropriate feedback	(Hales & Hawryluck, 2008; Milic et al., 2015; Roze des Ordons et al., 2017)
Multidisciplinary learning	(Hales & Hawryluck, 2008; Milic et al., 2015)
Role modelling	(Berlacher et al., 2017)
Peer support	(Milic et al., 2015)
Barriers	
Administrative Issues	
Lack of time	(Akgun & Siegel, 2012; Hales & Hawryluck, 2008; Miller et al., 2018; Sandahl et al., 2013; Sullivan et al., 2016)
Resource constraints	(Akgun & Siegel, 2012; Miller et al., 2018; Sandahl et al., 2013)
Poor design and a lack of longitudinal support	(Karlsen, et al., 2017)
Learner Specific Issues	
Insecurity and awkwardness during simulations	(Boothby et al., 2018; Karlsen et al., 2017)
Disrupted training	(Hope et al., 2015)
Programmes that were not pitched at the right level	(Awdish et al., 2017; Boothby et al., 2018; Happ et al., 2015)
Training that is not learner centred	(Happ et al., 2010)
Training that lacked feedback or debrief sessions	(Karlsen et al., 2017; Roze des Ordons et al., 2017)
Lack of a longitudinal aspect to training	(Awdish et al., 2017; Sandahl et al., 2013; Turkelson et al., 2017)
A lack of a supportive environment in which HCPs can apply the skills learnt	(Cameron, 2017; Hughes, 2010; Roze des Ordons et al., 2017; Sandahl et al., 2013)
Discordance between physicians' and nurses' communication with families	(W. G. Anderson et al., 2017; Lorin et al., 2006)

Supplementary Material E: Table 5 with References

Method		References
Self-assessment		
1	Quantitative and qualitative surveys were administered to learners to assess their knowledge, experience in the programme, and perceived preparedness, comfort and confidence in communicating	(W. G. Anderson et al., 2017; Aslakson et al., 2014; Awdish et al., 2017; Barbour et al., 2016; Barth et al., 2013; Berkenstadt et al., 2013; Berlacher et al., 2017; D. A. Boyle et al., 2017; D. K. Boyle & Kochinda, 2004; Brown et al., 2017; DeMartino et al., 2016; Dorner et al., 2015; Downar et al., 2012; Hales & Hawryluck, 2008; Havrilla-Smithburger et al., 2012; Krimshtein et al., 2011; Milic et al., 2015; Pabon et al., 2014; D. Shaw et al., 2012; D. J. Shaw et al., 2014; Smith et al., 2013; Sullivan et al., 2016; Turkelson et al., 2017; J. Yuen & Carrington Reid, 2011; J. K. Yuen et al., 2013).
1.1	Some programmes only used post-intervention assessments	(Blackhall et al., 2014; D. A. Boyle & Anderson, 2015; Downar et al., 2012; Hales & Hawryluck, 2008; Hope et al., 2015; Pantilat et al., 2014; Sanchez Exposito et al., 2018; Turkelson et al., 2017)
1.2	Others used a combination of pre- and post-intervention assessments of learners	(Berkenstadt et al., 2013; D. K. Boyle & Kochinda, 2004; DeMartino et al., 2016; Happ et al., 2015)
1.3	Some programmes adapted existing tools to conduct post-intervention surveys to evaluate learners' experiences and skills learnt	(Downar et al., 2012; McCallister et al., 2015; Miller et al., 2018; Northam et al., 2015; Shannon et al., 2011; J. K. Yuen et al., 2013).
Feedback from Others		
2	patients, family members, peers and simulated patients was obtained through a combination of surveys and interviews that assessed their level of satisfaction with learners' communication skills	(Aslakson et al., 2014; Awdish et al., 2017; D. J. Shaw et al., 2014; Sullivan et al., 2016; J. Yuen & Carrington Reid, 2011).
Observation		
3	Direct observation of HCPs' communication skills to ascertain the frequency, quality, success and ease of communication post-intervention. This was done through the use of modified communication tools and feedback forms	(DeMartino et al., 2016; Dorner et al., 2015; Happ et al., 2014; Havrilla-Smithburger et al., 2012; Lorin et al., 2006; Sandahl et al., 2013; Sullivan et al., 2016)
Debriefing Sessions		
4	One study used debriefing sessions to understand shared experiences of learners.	(Krimshtein et al., 2011)

Supplementary Material F: Table 6 with References

Adapted Kirkpatrick's Hierarchy	Items evaluated	Articles
Level 1 (participation)	Experience in the programme	(Hales & Hawryluck, 2008; Krimshtein et al., 2011; Rachwal et al., 2018; Sandahl et al., 2013; Smith et al., 2013; Sullivan et al., 2016)
	Assessment of programme's effectiveness	(Downar et al., 2012; Milic et al., 2015)
	Trainee satisfaction	(Roze des Ordons et al., 2017; Turkelson et al., 2017; J. K. Yuen et al., 2013)
	Programme completion	(Happ et al., 2015)
Level 2a (attitudes and perception)	Attitudes towards/ experience with communication	(Hales & Hawryluck, 2008; McCallister et al., 2015; Smith et al., 2013; Sullivan et al., 2016; Turkelson et al., 2017)
	Self-rated confidence/ preparedness in communication	(Aslakson et al., 2014; Awdish et al., 2017; Berlacher et al., 2017; Hales & Hawryluck, 2008; Happ et al., 2015; Hope et al., 2015; McCallister et al., 2015; Milic et al., 2015; Miller et al., 2018; Northam et al., 2015; D. J. Shaw et al., 2014; Smith et al., 2013; Turkelson et al., 2017; J. K. Yuen et al., 2013)
	Colleagues' satisfaction with communication	(D. K. Boyle & Kochinda, 2004)
	Trainees' views on training programme (e.g. satisfaction, perceived effectiveness)	(Berlacher et al., 2017; D. A. Boyle et al., 2017; Downar et al., 2012)
	Self-perceived job stress/ job satisfaction	(D. K. Boyle & Kochinda, 2004)
Level 2b (knowledge and skills)	Self-rated skill level using Likert scales	(W. G. Anderson et al., 2017; Aslakson et al., 2014; D. A. Boyle et al., 2017; Krimshtein et al., 2011; Milic et al., 2015; Sullivan et al., 2016)
	Form asking trainees to list/ indicates skills they learnt during the programme	(Shannon et al., 2011; J. K. Yuen et al., 2013)
	Self-rated knowledge level using Likert scales	(Hales & Hawryluck, 2008; Turkelson et al., 2017)
	Self-evaluation of communication skills using validated tools	(D. K. Boyle & Kochinda, 2004; DeMartino et al., 2016; Downar et al., 2012; McCallister et al., 2015)
	Evaluation of trainees' knowledge by faculty/ experts	(Hales & Hawryluck, 2008; Happ et al., 2015)
	Evaluation of trainees' communication skills by faculty/ experts	(Blackhall et al., 2014; DeMartino et al., 2016; Downar et al., 2012; Hales & Hawryluck, 2008; Happ et al., 2014; Hope et al., 2015; Lorin et al., 2006; Sanchez Exposito et al., 2018; Turkelson et al., 2017)
Level 3 (behavioural change)	Feedback from peers and facilitators on interactions with actors	(Roze des Ordons et al., 2017)
	Records of ICU rounds	(D. A. Boyle et al., 2017)
	Notes from colleagues documenting supportive environment and involvement in communication	(D. A. Boyle et al., 2017)
	Frequency of usage of communication skills taught	(Miller et al., 2018)
	Workplace observations	(Roze des Ordons et al., 2017; Roze Des Ordons, Lockyer, Hartwick, Sarti, & Ajjawi, 2016; Sandahl et al., 2013; Sullivan et al., 2016)
	Evaluation of trainees' communication skills in	(Roze des Ordons et al., 2017; Roze Des Ordons et al., 2016)

	clinical setting by patients and colleagues	
Level 4a (increased interprofessional collaboration)	Workplace observations	(Boothby et al., 2018; Centofanti et al., 2015; Centofanti, Duan, Hoad, Waugh, & Perri, 2012; Happ et al., 2010; Krimshtein et al., 2011; Sandahl et al., 2013; Thomson et al., 2016)
Level 4b (patient benefits)	Self-perceived quality of care	(D. K. Boyle & Kochinda, 2004)
	Patient and family satisfaction with communication	(Awdish et al., 2017)
	Family satisfaction with communication	(Aslakson et al., 2014; D. J. Shaw et al., 2014; Sullivan et al., 2016)

Supplementary Material G: PRISMA-ScR Checklist

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	2-3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	4-5
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	6
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	5
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	Table 1
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	8, and Table 1
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Supplementary Material A
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	8
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	8-10
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	NIL
Critical appraisal of individual sources of evidence	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	8-9
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	8-10
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Figure 2
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	12-18
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Supplementary Material B
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	12-18

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Supplementary Material B
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	18-20
Limitations	20	Discuss the limitations of the scoping review process.	21
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	21-22
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	23

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473.