Appendix 4: Systematic review themes and subthemes

Themes	Subthemes	Explanatory Narrative
Theme 1: **Motivating factors that trigger learning in end-of-life care**	Disposition to provide palliative care	Positive attitude towards helping palliative patients(**Slort et al, 2011 [42]))Rhee et al, 2018 [45]) (Jhonston et al, 2001 [55]**, **Rhee et al., 2018 [45]**), Comfort in providing palliative care (**Rhee et al., 2018 [45]**), Being humane to patient's concern(**O'Connor et al, 2014 [38]**), improve quality of life of palliative patients (**O'Connor et al, 2006 [37]), m**ore experience and higher clientele (**Barcley et al, 2003 [49]**) (**Rhee et al, 2008 [44]**) (**Junger et al, 2010 [47]**), **o**lder GPs are able to focus on their interest areas have more older and sicker patients(**Barcley et al, 2003 [49]**), GPs with experience in home care would prefer learning palliative care(**Barcley et al, 2003 [49]**) (**Jhonston et al, 2001 [55]**) (**Slort et al, 2011 [42]**)
	Self-actualization	Palliative care as valuable part of their care(**Meijler er al, 2005 [46]**)(**Lloyd-William et al, 2006 [54]**) (**Hermann et al, 2019 [36]**) (**Junger et al, 2010 [47]), i**ntuition that they will be able to help the dying patient(**Junger et al, 2010 [47]**), Need for an attitudinal shift from "cure to care" in order to look beyond the usual framework of a diagnosis, a therapy and making somebody better (**Pype et al, 2014 (a) [23]**), training in palliative care helps become a good physician(**Meijler et al, 2005 [46]**), Recourse to guilt from previous failures to alleviate symptoms(**O'Connor et al, 2006 [37]), F**eeling and understanding that personal loss helps empathize with patients better(O'**Connor et al, 2014 [38]**), need for coping with powerlessness, helplessness and emotional burden of caring(**Selman et al, 2017 [22] (Hermann et al, 2019 [36]) (Meijler et al, 2005 [46]**
	Relevance to clinical practice	GPs trained with specialists if they felt the specialists had the skills and preference relevant to their practice(**Shipman et al, 2002 [52]**) (Ability to deal with)Complexity of end of life care(**Selman et al, 2017 [22]**) Deficiency in knowledge and skills(**Barcley et al, 2003 [49]**) Fear of treading unknown territory(**Taubert et al, 2011 [43]**) Confidence in prescribing analgesia triggers more learning(**Shipman et al, 2001 [51]**) Attrition of skills over time(**Selman et al, 2017 [22]**)(**Pype et al, 2014 (b) [24]**) due to lack of ongoing exposure to palliative care patients or due to referral to specialists or GP colleague with interest(**Selman et al, 2017 [22]**) Lack of expertise in addressing specific aspects such as spiritual and religious concerns (**Assing Hvidt et al. 2016 [39]**)
	Feeling responsible	Generalist must be specialists in EOLC(**Selman et al, 2017 [22]**) Central to coordinating palliative care for patients in the community (**Lloyd-William et al, 2006 [54]**) Feel committed to caring for their patients as a trusted key person who accompanies the family for many years (**Junger et al, 2010 [47]**) Feeling palliative care as their core responsibility (**Pype et al, 2014 (a) [23]**) (**O'Connor et al, 2006 [37]**)

		Responsible for keeping patients free of pain and discomfort(**Pype et al, 2014 (b) [24]**)
		Sense of responsibility to support bereaved family (O'**Connor et al, 2014 [38]**)
	Therapeutic bond	Providing care for a prolonged period for patients (**Barcley et al, 2003 [49]**) (**Shipman et al, 2001 [51]**) (**Rhee et al, 2018 [45]**) from birth to end-of-life (**Junger et al, 2010 [47]**) or from diagnosis to end-of-life(O'**Connor et al, 2006 [37]**) and for patients known to them in the past(**Rhee et al, 2018 [45]**) (**O'Connor et al, 2006 [37]**) eases palliative care provision(**Rhee et al, 2018 [45]**)
		Strong bond that developed with long standing patient-GP relationship(**Slort et al, 2011 [42]**) (**Shipman et al, 2001 [51]**) (**O'Connor et al, 2014 [38]**) (**Rhee et al, 2008 [44]**) (**Rhee et al, 2018 [45]**) (**Pype et al, 2014 (a)[23]**) (**Lloyd-William et al, 2006 [54]**) (**Hermann et al, 2019 [36]**) leads to better awareness of palliative care needs of the patients(**Shipman et al, 2001 [51]**)
		Awareness of social and family background helps address patient's needs better(O'**Connor et al, 2006 [37]**, **Connor et al, 2014[38]**)
		They believed in helping a patient as a whole person and not as a disease entity (**Junger et al., 2010 [47]**) and felt the need to address the complex sufferings of patients while honoring their dignity, expectations, and wishes (**Slort et al., 2011 [42]**) (**Assing Hvidt et al., 2016 [39]**).

Themes	Subthemes	Explanatory Narratives
Theme 2: **End-of-life care learning needs**	**Accessing palliative care**	Needs for identification and referral for palliative care(**Selman et al., 2017 [22]**)
		Need for awareness about local specialist services and resources(**Selman et al., 2017 [22], Hermann et al., 2019 [36]**) (**Junger et al., 2010 [47]**), local systems and frameworks for navigation(**Selman et al., 2017 [22]**)
		Clarity in roles, responsibilities and teamwork (**Selman et al., 2017 [22]**)
		Guidelines on out-of-hours care(**Selman et al., 2017[22]**)
		Guidelines for effective planning and provision of EOLC(**Rhee et al., 2018 [45]**)
		Guidelines on when to refer to specialists or other resources(O'**Connor et al., 2014 [38]**)
		Importance of and how to build a multidisciplinary team(O'**Connor et al., 2006 [37]**)

	Pain and symptom management	Need for training in other symptoms management(**Barcley et al., 2003 [49]**) (**Becker et al., 2010 [40]**) (**Straatman et al., 2013 [41]**) (**Shipman et al., 2002 [52]**, (**Pype et al., 2014(b) [24]**) (**Connor et al., 2006 [37]**) (**Lloyd-Williams et al., 2006[37]**) Palliative care emergencies(**Magee & Koffman, 2016 [48]**) Preference for treating symptoms that they could treat with drugs(**Jhonston et al., 2001 [55]**) Symptom control in non-malignant conditions(**Shipman et al., 2001 [51]**) (**Magee and Koffman, 2016 [48]**) Management of nausea/vomiting(**Shipman et al., 2001 [51]**) (**Meijler et al., 2005 [46]**) Management of agitated delirium and complications, dyspnoea(**Samaroo et al., 1993 [53]**) (**Rhee et al., 2008 [44]**), **Magee and Koffman, 2016 [48]**, (**Meijler et al., 2005 [46]**) Management of hypoxia and insomnia(**Wakefield et al., 1993 [50]**, **Meijler et al., 2005 [46]**) Psychosocial issues of terminally ill patients(**Wakefield et al., 1993 [50]**) (**Rhee et al., 2008 [44]**) (**Pype et al., 2014(b) [24]**) (**O'Connor et al., 2006 [37]**) (**Lloyd-Williams et al., 2006 [54]**) and withdrawal symptoms(**Samaroo et al, 1993 [53]**) Distinguishing adjustment disorder from sadness (**Meijler et al., 2005 [46]**) Challenges in distinguishing delirium, fear of dying or anxiety(**Meijler et al., 2005[46]**, **Jhonston et al., 2001 [55]**) Handling the emotional distress of patients such as fear(**Slort et al., 2011 [42]**) (**Connor et al., 2006 [37]**) anger, demanding behavior (**Samaroo et al., 1993 [53]**) Need for assessment and provision of nutrition support(**Straatman et al., 2013 [41]**, **Meijler et al., 2005 [46]**), parenteral/PEG feeding(**Meijler et al., 2005 [46]**) Other symptoms such as anorexia, fatigue, incontinence, unpleasant smell (**Jhonston et al., 2001 [55]**) Need for training in addressing spiritual needs of patients(**Straatman et al., 2013 [41]**, **Pype et al., 2014(b) [24]**, **Jhonston et al., 2001 [55]**) and religion(**Pype et al., 2014(b)[24]**)
	Communication skills and compassionate care	How to facilitate decision making in life limiting conditions(**Junger et al., 2010 [47]**) Training in breaking bad news to patients/family(**Shipman et al., 2001 [51]**) (**Pype et al., 2014(a) [23]**) (**O'Connor et al., 2006 [37]**) (**Meijler et al., 2005 [46]**) Communication skills in counselling patients transitioning from curative to palliative care(**Meijler et al., 2005 [46]**) (**Magee & Koffman, 2016 [48]**) Skill building in handling difficult conversation especially in time constraints(**Selman et al., 2017 [22]**)

		Challenges of handling troublesome relationship with patients(**Slort et al., 2011 [42]**)
		Challenges of handling patient-relative conflicts(**Slort et al., 2011 [42]) (O'Connor et al., 2006 [37]) (Meijler et al., 2005 [46]**)
		Training to deal with resistant patient/family (**Selman et al., 2017 [22]**) in denial/ bargaining(**O'Connor et al., 2006 [37]) (Meijler et al., 2005 [46]) (Hermann et al., 2019 [36]**)
		To learn how to use right attitude, diplomacy, skills/tactics to deal with difficult situation with family(O'**Connor et al., 2006 [37]), Meijler et al., 2005 [46]**)
		Need to understand how to tailor information conveyed to family(O'**Connor et al., 2006 [37]**)
		To tackle vulnerability and apprehensions related to communication around death and dying (**Junger et al., 2010 [47]**)
	Address caregiver needs	Handling the emotional distress of the relatives(**Wakefield et al., 1993 [50]) (Meijler et al., 2005 [46]**)
		Bereavement support of caregivers(**Wakefield et al., 1993 [50] (Lloyd-William et al., 2006 [54]) (Jhonston et al., 2001 [55]) (Junger et al., 2010 [47]**)
		Need of differentiation between grief reaction and depression(O'**Connor et al., 2014 [38]**)
		Resolving family's anticipatory grief when in denial(O'**Connor et al., 2006 [37]**)
	Ethical and Medico-legal aspects	To provide care in patient's best interest(**Selman et al., 2017 [22]**) respecting patient's wishes and expectations(**Slort et al., 2011 [42]**)
		To understand the ethical norms and values(**Meijler et al., 2005 [46]**)
		How to discuss ethical aspects of care to patients/family and colleagues(**Meijler et al., 2005 [46]**)
		Need for training in medicolegal aspects of palliative care(**Rhee et al., 2018 [45]**)
	Teamwork	Sharing of responsibility (**Straatman et al., 2013 [41]**)
		Debriefing with colleagues(**Straatman et al., 2013 [41]) (Junger et al., 2010 [47]**) in an emotionally draining situation in practice(**Hermann et al., 2019 [36]**)
		To develop coping strategies(**Becker et al., 2010 [40]) (Junger et al., 2010 [47]**)
		To deal with coping in special situation such as loss of children cared for(O'**Connor et al., 2006 [37]**) or with children of similar age as theirs (O'**Connor et al., 2006 [37]**)
		For younger GPs who may be still developing their personal views on death and dying(O'**Connor et al., 2006 [37]**)
		Need for mutual support from multidisciplinary team/specialists(**Junger et al., 2010 [47]**)

Theme	Subtheme	Explanatory Narratives

Theme 3: Preference for a learning style	Learning from experience and Experiential learning	Expertise grows with years of experience(**Assing Hvidt et al., 2016 [39]**) (**Selman et al, 2017 [22]** (**Pype et al., 2014(a) [23]**) (**O'Connor et al., 2006 [37]**) (**Lloyd-Williams et al., 2006 [54]**)
		Expertise grows through patient-GP relationship(**Assing Hvidt et al., 2016 [39]**) (**Pype et al., 2014(a) [23]**)
		Real time exposure in the workplace to palliative care helps gain confidence(**Rhee et al., 2018 [45]**) (**Pype et al., 2014(b) [24]**) (**O'Connor et al, 2014 [37]**), **Hermann et al., 2019 [36]**)
		Intuition and gut feelings helps address certain areas such as spirituality(**Assing Hvidt et al., 2016 [39]**)
		Need for learning through experience in a mentored environment(**Selman et al., 2017 [22]**) and from experienced general practitioners (**Selman et al, 2017 [22]**) (**Rhee et al, 2018 [45]**) (**Meijler et al, 2005 [46]**) (**Magee and Koffman, 2016 [48]**)
		Providing shared care with specialist palliative care team(**Selman et al., 2017 [22]**) (**Rhee et al., 2018 [45]**) helps shifts to more proactive style of treating (**Pype et al., 2014(a) [23]**)
		Attending planning meetings with specialists(**Pype et al, 2014 (a)[23]**)
		Palliative care needs to be integrated into primary care(**Rhee et al., 2018 [45]**) (**Hermann et al., 2019 [36]**)
		Learning from peer from different disciplines (**Becker et al., 2010 [40]**) (**Selman et al., 2017 [22]**) (**Lloyd-Williams et al., 2006 [54]**) (**Magee and Koffman, 2016 [48]**)
		Learning from relatives who have gone through caring for palliative patients(**Selman et al.,2017 [22]**) (**Pype et al., 2014(a)[23]**)
	Pragmatic learning style	Reflection on one's practice under the guidance of specialists(**Pype et al. 2014(a) [23]**) (**Pype et al. 2014(b) [24]**)
		Applying the principles of palliative care in practice and getting feed-back(O'**Connor et al., 2014 [38]**)
		Learn from one's mistakes and non-success(**Taubert et al., 2011 [43]**) (**Pype et al, 2014(b) [24]**)
		Reflection on one's practice of communication with specialists (**Pype et al., 2014 (b) [24]**)
		Hands-on interactional training under a mentor (**Selman et al, 2017 [22]**) (**Hermann et al., 2019 [36]**) (**Rhee et al , 2018, [45]**)
		Problem-based learning through follow up (**Taubert et al., 2011 [43]**) (**Meijler et al., 2005 [46]**)
		Case-based learning(**Junger et al.,2010 [47]**) (**Pype et al., 2014 (a) [23]**)(**Magee and Koffman, 2016 [48]**) through telephonic or face-face contact(**Shipman et al., 2002 [52]**), **Selman et al.,2017 [22]**) sometimes also calls for instant discussion considering variability in patient needs (**Pype et al., 2014(a) [23]**)
		Cased based discussion with specialists by patient's bedside(**Samaroo et al., 1993 [53]**) (**Rhee et al., 2018 [45]**) (**Jhonston et al., 2001 [55]**)
		Learning by auditing data(**Jhonston et al., 2001 [55]**)
	Self-learning	Internet based/text book based learning (**O'Connor et al., 2006 [37]**) (**Hermann et al., 2019 [36]**) (**Straatman et al., 2013 [41]**) (**Taubert et al., 2011 [43]**) (**Rhee et al., 2008 [45]**) (**Magee and Koffman, 2016 [48]**)

		Computer based learning(**Jhonston et al., 2001 [55]**)
		Correspondence learning(**Straatman et al., 2013 [41]**)
		Reference to guidelines(**Shipman et al., 2002 [52]**) (**Samaroo et al., 1993 [53]**)
		E-learning as cost effective and flexible(**Selman et al., 2017 [22]**)
		Self-learning modules(**Samaroo et al., 1993 [53]**) (**Rhee et al., 2008 [44]**) (**Pype et al., 2014(b) [24]**) (**O'Connor et al., 2014 [38]**) (**Junger et al., 2010 [47]**)
		Learning by researching(**Jhonston et al., 2001 [55]**)
	Didactic learning	Learning by listening (**Junger et al., 2010 [47]**) (**Lloyd-William et al., 2006 [54]**) (**Jhonston et al., 2001 [55]**) and observing(for topics like team building, religious and psychological topics)(**Pype et al., 2014(a) [23]**), (**O'Connor et al., 2014[38]**)

Theme	Subtheme	Explanatory Narratives
Theme 4: Perceived facilitators of learning	Amicable learning environment	Learning in a respectful environment that will be non-intimidating or non-judgemental (**Pype et al, 2014(a) [23]**) Learning that happens in a safe and trusted environment(**Pype et al, 2014(b) [24]**) where mentors are not be reprimanding (**Pype et al, 2014 (a) [23]**) (**Pype et al, 2014 (b)[24]**) Learning that does not expose their deficiency to their patients(**Pype et al, 2014(a) [23]**)
	Preference for mentor and peer group	Multidisciplinary mentors(**Pype et al., 2014(a) [23]**) (**Lloyd-William et al., 2006 [54]**) (**Magee and Koffman, 2016 [48]**) including GP colleagues(**Meijler et al., 2005 [46]**) (**Magee & Koffman, 2016 [48]**) palliative physicians and palliative care nurse(**Magee and Koffman, 2016 [48]**) Small multidisciplinary peer group(**Becker et al., 2010 [40]**) (**Magee and Koffman, 2016 [48]**) (**Pype et al., 2014(a) [23]**) (**Hermann et al., 2019 [36]**)
	Preference for timing of training	Evening courses(**Becker et al., 2010 [40]**) Weekend courses(**Becker et al., 2010 [40]** (**Straatman et al., 2013 [41]**) Half day workshop(**Samaroo et al., 1993 [53]**) Quarterly topical in-service training(**Samaroo et al., 1993 [53]**) One day on-site training(**Samaroo et al., 1993 [53]**) Quarterly case rounds(**Samaroo et al., 1993 [53]**) Learning as being ongoing and lifelong(**Pype et al., 2014(a) [23]**) (**Hermann et al., 2019 [36]**) Out of business hours(**Hermann et al., 2019 [36]**)
	Preference for feedback	Patient and family feedback was most preferred but if done sensitively (**Selman et al., 2017 [22]**) (**O'Connor et al., 2014 [38]**) Timing of the feedback was important and wanted it filled by familiar face as otherwise they feared low return rates(through posts) (**Selman et al., 2017 [22]**) Apprehension of negative feedback from patient and family (**Selman et al., 2017 [22]**) Preferred to avoid feedback from dying patient or a family as it would cause discomfort to them (**Selman et al., 2017 [22]**) Preferred feedback from specialists (**Pype et al. 2014(a) [23]**) Feedback from members in the team in a trusted environment(**Pype et al., 2014(b) [24]**)

		Behavioural assessment using videotaping or simulation(**Selman et al., 2017 [22]**) (**Jhonston et al., 2001 [55]**) was questioned as GPs felt this could be rehearsed
		Self-assessment forms were considered of limited use although GPs filled it sincerely (**Selman et al., 2017 [22]**)
		Self-assessment forms were filled if they were not too lengthy(**Selman et al., 2017 [22]**)

Theme 5: Perceived Barriers of Learning	Subtheme	Explanatory Narratives
Dispositional barriers	Diffidence to discuss end of life care	Guilt or hopelessness of not having confidence in caring for dying patient(**Junger et al., 2010 [47]**) Taboo about discussion around death and dying(**Assing Hvidt et al, 2016 [39]**) (**Junger et al 2010 [47]**) Fear of causing discomfort to patient and family about aspects such as spirituality and religion(**Assing Hvidt et al, 2016 [39]**) Fear of invading the private space- spiritual space is private to patient/family(**Assing Hvidt et al, 2016 [39]**) Fear of blame or medico-legal recrimination for wrong doing (**Taubert et al, 2011 [43]**) (**Meijler et al, 2005 [46]**))
Situational barriers	Challenges at an individual level	Younger GPs with less years of experience have less autonomy to focus on specific specialty (**Assing Hvidt et al.,2016 [39]**) (**Barcley et al, 2013 [49]**) (**Rhee et al, 2008 [44]**) Insecurity to broach their deficiency in knowledge can inhibit their inclination to learn(**Taubert et al, 2011 [43]**) Lower incidence of palliative care patients results in less motivation of GPs to learn(**Shipman et al, 2002 [52]**) (**Selman et al, 2017 [22]**) Less sick patients had less palliative care needed(**Rhee et al, 2018 [45]**) Perception of having sufficient knowledge(**Shipman et al, 2002 [52]**) and no new developments in the field of palliative care(O'**Connor et al, 2006 [37]**) (**O'Connor et al, 2014 [38]**) Personal/family commitment gives less time to training(**Rhee et al, 2008 [44]**) Care as being emotionally draining(O'**Connor et al, 2006 [37]**)
	Resource constraints	General practitioners felt that there was a lack of systematic or standardised guidelines to help address palliative care needs (**Assing Hvidt et al, 2016 [39]**) (**Hermann et al, 2019 [36]**) or knowledge of resources where their patients could be referred for specialised care (**Assing Hvidt et al, 2016 [39]**). Rural general practitioners or general practitioners who had solo or small practice had less support system that limited their access to training (O'**Connor et al, 2006 [37]** (**Shipman et al, 2001 [51]**) (**Junger et al, 2010 [47]**) (**Barcley et al, 2003 [49]**)
Professional barriers	Challenges at professional level	Excess work pressure with resultant lack of time as a constraint to learning(**Shipman et al, 2002 [52]**) (**Assing Hvidt et al, 2016 [39]**) (**Rhee et al, 2008 [44]**) (**Pype et al, 2014(a) [23]**) (**Jhonston et al, 2001 [55]**) (**Hermann, et al, 2019 [36]**) (**Selman et al, 2017 [22]**) (**O'Connor et al, 2006 [37]**) (**Meijler et al, 2005 [46]**)

		Remuneration incommensurate with the work done(**Rhee et al, 2008 [44])** (**Hermann et al, 2019 [45]**) Having to self-fund their course(**Jhonston et al, 2001 [55]**) Self-expense for organizing locum in their absenteeism from work(**Jhonston et al, 2001 [55]**) Temporary job or temporary time/shift patterns at work gives less opportunity to learning on job or reflective learning (O'**Connor et al, 2006 [37]**) (**Taubert et al, 2011 [43]**)
	Disempowerment of General practitioners	Referral to specialists or experienced GPs(**Selman et al, 2017 [22]**) and when specialists take over the care (**Rhee et al, 2008 [44]**) (**Pype et al, 2014 (a)[23]**) leads to loss of control (**O'Connor et al, 2006 [37]**) Lack of trust in GPs by specialists(**Selman et al, 2017 [22]**) Do not consider GPs as doing a worthwhile job in EOLC(**Selman et al, 2017 [22]**) GPs do not feel recognized for their job(**Hermann et al, 2019 [36]**) (**Meijler et al, 2005 [46]**) or appreciated for their work(**Hermann et al, 2019 [36]**) Patients lack trust in general practitioner's ability to care(**Hermann et al, 2019 [36]**) Inability to address patient's needs instilled a fear of strain in doctor-patient relationship(**Meijler et al, 2005 [46]**)
	Conflict in care provision	Lack of clarity in roles and responsibilities (**Pype et al, 2014 (a)[23]**) (**O'Connor et al, 2014 [38]**) (**Shipman et al, 2002[52]**) Fear of confronting specialists in a conflict in treatment(**Shipman et al, 2002 [52]**) Fear of being reprimanded/accused by specialists(**Shipman et al, 2002 [52]**) Delay in response from specialists (**Shipman et al, 2002 [52]**) Past bitter experience with specialists can inhibit future interaction with specialists(**Shipman et al, 2002 [52]**)
Academic barrier	**Training not aligned with clinical practice**	Most trainings being oncology focused gives them less opportunity to learn non malignant palliative care which comprises major part of their practice(**Shipman et al, 2001 [51]**) Lack of locally based training resources(**Jhonston et al, 2001 [55]**) (**Hermann et al, 2019 [36]**) or counseling support(**O'Connor et al, 2014 [38]**) Lack of consistency in training due to poor communication and documentation by specialists(O'**Connor et al, 2014 [38]**) Most trainings are in-hour to which GPs have less exposure (**Taubert et al, 2011 [43]**) Lack of same structure and resources in the community as in the hospital leads to inability to replicate the training acquired in the hospital back in the community (**Pype et al, 2014 (a) [23]**) Lack of accreditation of palliative care(**Hermann et al, 2019 [36]**) Lack of exposure to community during training period(**Selman et al, 2017 [22]**) Training also depends on trainer's inclination to palliative care(**Selman et al, 2017 [22]**)