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Review Article

Staff Training Interventions to Improve End-of-Life Care of Nursing Home Residents: A Systematic Review

Pauli J. Lamppu MD[a,b,*], Kaisu H. Pitkala MD, PhD[a,c]

[a] Department of General Practice and Primary Health Care, University of Helsinki, Helsinki, Finland
[b] Department of Social Services and Health Care, Geriatric Clinic, Helsinki Hospital, Helsinki, Finland
[c] Unit of Primary Health Care, Helsinki University Hospital, Helsinki, Finland

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ABSTRACT

Objectives: The aim was to review evidence from all randomized controlled trials (RCTs) using palliative care education or staff training as an intervention to improve nursing home residents' quality of life (QOL) or quality of dying (QOD) or to reduce burdensome hospitalizations.
Design: A systematic review with a narrative summary.
Setting and Participants: Residents in nursing homes and other long-term care facilities.
Methods: We searched MEDLINE, CINAHL, PsycINFO, the Cochrane Library, Scopus, and Google Scholar, references of known articles, previous reviews, and recent volumes of key journals. RCTs were included in the review. Methodologic quality was assessed.
Results: The search yielded 932 articles after removing the duplicates. Of them, 16 cluster RCTs fulfilled inclusion criteria for analysis. There was a great variety in the interventions with respect to learning methods, intensity, complexity, and length of staff training. Most interventions featured other elements besides staff training. In the 6 high-quality trials, only 1 showed a reduction in hospitalizations, whereas among 6 moderate-quality trials 2 suggested a reduction in hospitalizations. None of the high-quality trials showed effects on residents' QOL or QOD. Staff reported an improved QOD in 1 moderate-quality trial.
Conclusions and Implications: Irrespective of the means of staff training, there were surprisingly few effects of education on residents' QOL, QOD, or burdensome hospitalizations. Further studies are needed to explore the reasons behind these findings.

Long-term care facilities take care of a large majority of older people at the end of their life.[1,2] Multimorbidity and functional and cognitive decline are the major challenges in their day-to-day care, whereas the approaching end of life gets less attention.[3] High-turnover nursing home staff have large educational needs.[1,2] The need for quality end-of-life care in this setting has been widely recognized, with various development projects to improve residents' end-of-life care.[4]

Successful end-of-life care in nursing homes requires the staff to have a certain set of practical skills.[5] Active advance care planning (ACP) to guide actions in different scenarios is important.[6] In addition, skills to communicate with the residents and their proxies[7] and the ability to deliver good symptom care are required.[1,2] Previous research has suggested that hospitalizations of nursing home residents may lead to many adverse effects such as delirium, infections, functional decline, falls, pressure ulcers, and decreased comfort without survival benefit.[8,9] Nursing home staff should therefore have the necessary skills and attitudes to prevent all avoidable hospitalizations and organize the required treatments in place without hospitalization.

Previous systematic reviews focusing on improvements in palliative care have been derived from various perspectives.[10–13] Training has an obvious potential to introduce and reinforce practical skills and change in operating culture.[13] Many of the studies examining training interventions evaluate outcomes related to change in staff knowledge or other staff-level outcomes.[14] However, there seems to be a paucity of evidence on how this gained knowledge would transfer into

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* Address correspondence to Pauli J. Lamppu, MD, Department of General Practice and Primary Health Care, University of Helsinki, PO Box 20, 00014, Helsinki, Finland.

E-mail address: pauli.lamppu@helsinki.fi (P.J. Lamppu).

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clinically relevant resident-level outcomes.[15] Previous studies suggest that resident's quality of life (QOL), quality of dying (QOD), symptom management, proxy satisfaction, and the likelihood of burdensome hospitalizations are important resident-level measures to define successful end-of-life care in this population.[11,16,17]

In this systematic review, we wanted to gather the evidence from randomized controlled trials (RCTs) examining the effect of an intervention featuring an element of nursing home staff training on the resident-level outcomes QOL, QOD, symptom management, proxy satisfaction, or residents' risk of hospital use.

Methods

The protocol for this systematic review was devised prior to the final searches and review process. The protocol was published and can be found in PROSPERO (ID 160497).

Study Eligibility Criteria

We aimed for a clinically comprehensive yield with various types of interventions and aims. The following criteria had to be met:

- Study was an RCT or cluster RCT.
- Study patients resided in a nursing home or comparable long-term care facility.
- Intervention included structured education or on-site training in topics related to end of life for a large proportion of staff (eg, lectures, seminars, videos, facilitated small group discussions, case conferences, role-plays, clinical coaching, benchmarking, and feedback). Staff taking care of a comparison group of patients received no training, continued usual care, or were provided with only attention in some way.
- Outcome: resident-related outcomes such as QOL, QOD, hospitalizations or use of hospital days, or proxy satisfaction with care.
- Abstract and full text in English.

Search Strategy

The primary search was performed on March 3, 2020, and repeated before submitting for publication in June 2020. We searched MEDLINE, PsycINFO, CINAHL, Scopus, Cochrane Library, and Google Scholar using the following terms adapted to each database: (nursing home OR assisted living OR long-term care OR residential care OR care home) AND (education OR quality improvement OR training OR train-the-trainer) AND (end-of-life care OR palliative care OR terminal care OR quality of dying OR comfort OR hospitalization OR quality of life OR health-related quality of life OR satisfaction with care OR advance care planning) AND (randomized controlled trial OR cluster randomized OR RANDOMI*).

We also hand-searched reference lists of relevant previous systematic reviews,[5,7,10–14,18–23] known key articles, and recent volumes of key journals. See Figure 1 for the study selection flowchart. When our search identified a trial protocol meeting our criteria, we additionally searched for an additional article presenting the results.

Methodologic Quality

Both authors (P.L. and K.H.P.) independently assessed the methodologic quality of the included articles according to 10 predetermined quality criteria. The list of criteria was composed from a past version of the Cochrane Handbook,[24] a Delphi list,[25] and criteria developed by the Evidence-based Medicine Working Group.[26] For all the criteria, see Table 1. Each criterion was worth 1 point, and each criterion and study were discussed until consensus was reached. A total of 8 to 10 points was considered good methodologic quality, a score of 5 to 7 moderate quality, and a score <5 low quality.

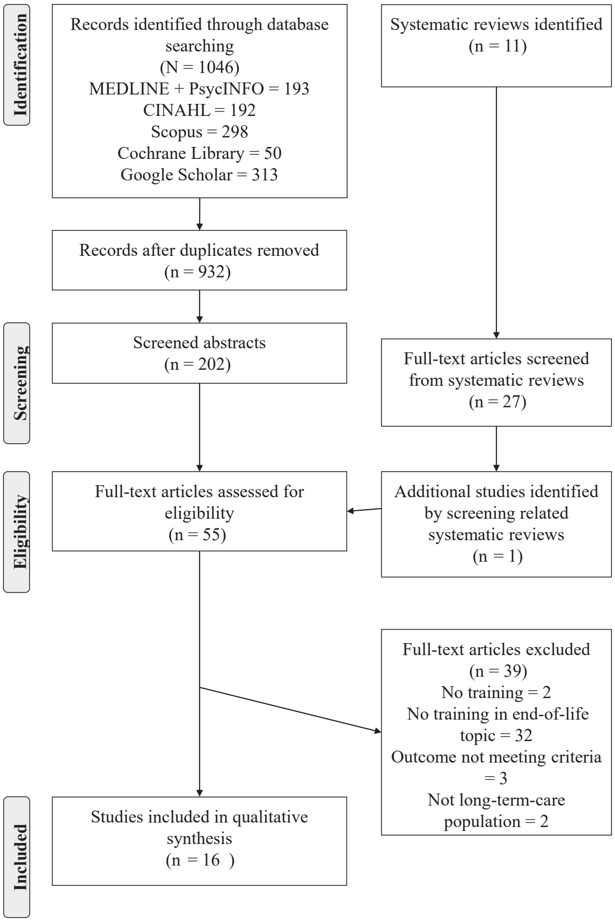

Fig. 1. Study selection flowchart.

Path From Theory to Resident-Related Effects

We explored each trial in terms of what kind of pedagogic methods it used in training the staff and which learning theories it implemented as the basis for intervention. We also noted the length and intensity of the training and the staff training attrition rate. The complexity of the entire intervention and the role of training in its entirety was assessed.

The outcome measures we required for inclusion were patient-related.[15,16] Residents' QOL, QOD, and symptom burden were considered such outcomes. In addition, acute hospitalizations or hospital days were included as patient-related outcomes. We also explored resident and proxy satisfaction with care. These patient-related outcomes were chosen by the authors from previous literature as being the most appropriate.[2,15–17]

Results

Study Selection

The search yielded 1046 studies. After screening the titles of the studies, we first removed duplicates (n = 114) and then those not fulfilling our criteria (n = 730). We screened the abstracts of all the remaining 202 studies for eligibility. Of them, 140 did not fulfill our inclusion criteria. Then all full texts of 62 articles were assessed in

Table 1
Evaluation of Quality Criteria Fulfillment in Randomized Controlled Trials Examining Effects of Training on Nursing Home Residents' End-of-Life Care

Study	Criteria*										Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
Linn et al, 1989[27]	+	−	+	−	?	+	+	−	−	−	4
Kovach et al, 1996[28]	+	+/−	+	+/−	+	+	−	−	−	−	4
Molloy et al, 2000[29]	+	+/−	+	+/−	+	+	−	+	+	+	7
Boyd et al, 2014[30]	+/−	+/−	+	+	+	+	−	−	−	+	5
Connolly et al, 2015[31]	+	+/−	+	+	+	+	+	+	+	+	9
Agar et al, 2017[32]	+	+	+	+	+	+	+	+/−	+/−	+	8
Hanson et al, 2017[33]	+	+	+	+	+	+	+	+	+	+	10
Kane et al, 2017[34]	+	+	+	+	+	+	+/−	+/−	+	+	8
Arendts et al, 2018[35]	+	+	+	+/−	+	+	+	+/−	?	+	7
Boogaard et al, 2018[36]	+	+	+	+/−	+	+	−	−	−	+/−	5
Temkin-Greener et al, 2018[37]	+/−	+/−	+	+	+	+	?	+	?	+	6
Verreault et al, 2018[38]	+	+/−	+	−	+	+	−	−	−	−	4
Husebø et al, 2019[39]	+	+	+	+	+	+	+	+	+	+	10
Sævareid et al, 2019[40]	+	+	+	+/−	+	+/−	+/−	+	+	+	7
Van den Block et al, 2020[41]	+	+	+	+	+	+	+/−	+	+/−	+	8
Liu et al, 2020[42]	+	+	+	+	+	+	−	+/−	−	+	7

High quality: 8-10; moderate quality: 5-7; low quality: 0-4.

*Criteria: (1) The inclusion and exclusion criteria are satisfactorily described. (2) Groups are comparable at baseline. (3) The study has sufficient statistical power to detect an effect ($N \geq 25$/group) or an adequate power calculation is presented. (4) The randomization method is valid (a computerized randomization program or a separate randomization center) and adequately described. (5) The intervention is adequately described. (6) The measurements and outcome measures are valid and well defined. (7) The group allocation is blinded when assessing the outcomes. (8) The dropouts are described and the analyses take them into account. (9) Intention-to-treat analysis is applied. (10) Appropriate statistical analyses are used (a comparison is made in relation to outcome variables between the groups).

detail for eligibility criteria and discussed between authors until consensus on inclusion was reached. Overall, 16 studies met the inclusion criteria. A systematic literature search yielded 15 studies and 1 additional study was identified from a previous systematic review.[10] Reasons for exclusion were mainly related to intervention or outcome not fulfilling our inclusion criteria (see Figure 1).

Characteristics of Studies

Table 2 provides an overview of the included studies. All studies had a cluster randomized trial design and were conducted in nursing homes. One study[42] employed a stepped-wedge design, whereas the rest were conventional parallel-group trials. The number of participants ranged from 72 to 23,478 per study and altogether the trials reported data on 40,712 participants. The participants' mean age was high (mean age range from 82 to 90), and participants were predominantly female. Of the studies, 4 included only patients with dementia.[28,32,33,36] and the oldest study included an atypical nursing home population with mainly patients with cancer.[27] In 5 studies,[32,34,36,37,41] the final analyses included only participants who died during the follow-up.

The education intervention varied greatly between the studies. Although articles described their interventions, in most studies the description was not detailed enough to plan a valid replication of education. None of the trials presented any learning theory to justify their type of education. Furthermore, they rarely discussed how well the staff had complied with education or adopted new competences. A wide variety of learning methods was used in these studies. Few studies used active involvement of staff in incorporating the new approach of palliative care into their units.[28,30,37,40] It seems that lectures or webinars were implied in 9 studies,[28,30,31,33–35,37–39] although in several studies it was not clearly stated how the education was delivered in sessions for a large number of professionals. Seminars or active small group discussions were mentioned in 5 studies[27,29,31,39,40] and case-based learning in 3 studies.[31,32,42] Coaching as a form of supportive assistance and facilitation was used in 10 studies.[29–32,34,35,37,38,41,42] Role-plays for communication training were used in 3 studies.[27,39,40] Feedback information about care outcomes was featured in 4 studies.[30,31,34,36] From the available information, we judged that 9 studies employed some form of train-the-trainer methodology where the study teams trained a group of "facilitators" or "facility champions" who in turn distributed the intervention to the facilities.[28,29,32,34,35,38–41] Two studies trained also nursing home residents' proxies using videos.[29,33]

Training was often used as part of a complex intervention featuring also, for example, tool kits or guides for managing various situations in end-of-life care,[30,34,35] discussion aids,[32,33] or informing proxies via video aids.[29,33] Some interventions even featured major organizational changes such as the formation of new units[28] or systematic multicomponent reviews.[39] The most common other components were organization of ACP sessions or facilitating their formation in other ways,[29,31–34,39–41] medication reviews,[39] and organizing meaningful activities.[28,39]

The intensity of training also varied greatly. Whereas some interventions lasted only hours or days,[27,33,42] others included intensive weekly seminars or other inputs for up to several months[31,37,39,41]; some even consisted of up to 18-24 months of continuous implementation.[32,34]

Methodologic Quality

Of the 16 studies, 6 were considered high-quality whereas 6 were considered moderate-quality and 4 low-quality. The most common methodologic problems were not using blinded assessments, not using intention-to-treat analysis when assessing the outcomes, and not describing the dropouts. Several studies analyzed only deceased participants and did not discuss others who had been recruited. Furthermore, randomization was only briefly mentioned in several studies and the method was not described. In addition, many studies gave very little information on the baseline characteristics of their participants.

Effects of Training Interventions

Quality of life

Of the included studies, 5 included QOL as an outcome.[27,32,35,37,39] In the included trials, QOL [or health-related QOL (HRQOL)] was assessed with depression scaling, presence of pain, and with 5 different validated measures: QUALIDEM (a dementia-specific QOL assessment instrument),[56] Quality of Life in Late-Stage Dementia scale

Table 2
Characteristics of Studies

Study, Year, Country	Design	Participants, Age, Mean Age, Females (F) %	Intervention	Control	Outcomes (Primary Outcome as Stated by Original Study)	Comments	Methodologic Quality
Linn et al, 1989, USA[27,43,44]	cRCT /matched control	10 NHs, N = 306, 2/3 cancer diagnosis, age NA, F=NA	Training covered feelings about death, lack of preparation to deal with dying, palliative vs curative care, common fears, and feelings of dying patients and their families.	Usual care	**QOL:** Patients in trained NHs had less depression (POMS) and greater satisfaction with care. Follow-up 3 mo. Primary outcome not defined.	Only 201 patients were analyzed. Staff turnover was 50%/y.	Low 4
Kovach et al, 1996, USA[28]	RCT	3 LTCFs, N = 72, severe dementia, mean age 88 y, F = 81%	End-stage dementia units were formed. More homelike environment, more activities, and encouragement to treat behavioral symptoms with painkillers. Use of hospice nurse as case manager. Staff had 1-day training for hospice.	Usual care	Behavioral symptoms (BEHAVE-AD) did not differ between the groups post-test. **QOD:** There was a significant difference in discomfort (DS-DAT) between the groups post-test. No difference in physical complications. Primary outcome not defined.	Only 2-mo follow-up. No information on BEHAVE-AD or DS-DAT at baseline. No blinding.	Low 4
Molloy et al, 2000, Canada “Let me decide”[29]	cRCT	6 NHs, N = 1292, 79-85 y, F = 72%	Implementation of “Let me decide” AD program. Three registered nurses from I NH received 2 d training. They trained staff, residents, proxies, and hospital staff about the program in several sessions and helped residents and proxies to complete ADs.	Usual care	**HSP:** Hospitalizations per resident were lower in 18-mo follow-up (0.27 vs 0.48; $P < .001$). Total health care costs were lower in the intervention homes (CAD 3490 vs CAD 5239$P = .01$). **SWC:** Change in satisfaction with care or mortality did not differ between the 2 groups. Satisfaction with health care utilization (primary outcome) did not differ.	In service use, all residents were included. Unclear how nonconsenting participants were otherwise handled in analyses.	Moderate 7
Boyd et al, 2014, New Zealand, “RACIP”[30]	cRCT	54 RACFs with 2553 beds, about 85 y, F=NA	I NHs were trained and coached to avoid hospitalizations, 5-6 standardized educational sessions in each facility each year, clinical support and care coordination forhigh-risk residents.	Usual care	**HSP:** Hospitalization rates increased in both groups, in the intervention group significantly less. Hospitalizations for medical (nonsurgical) causes showed the greatest difference between the groups. Primary outcome not defined.	Unclear how comprehensively residents' data could be used.	Low 5
Connolly et al, 2015, New Zealand, “ARCHUS”[31,45]	cRCT	36 RACFs, N = 1998, 96% >65 y; F = 70%	Three 1-h monthly meetings with cases discussed. Gerontology education including, eg, ACP, nutrition/hydration, end-stage dementia care, communication with families.	Usual care	**HSP:** All hospitalizations (0.68 vs 0.67), avoidable hospitalizations (primary outcome) (0.57 vs 0.53), and days spent in hospital (4.18 vs 4.41) were similar in I and C. Time to first hospital admission, time to death, and mortality were similar.	All residents were included if the facility participated.	High 9
Agar et al, 2017, Australia “IDEAL”[32,46]	cRCT	20 NHs, N = 286, all had advanced dementia, mean age 85 y, F = 60%	Facilitated case conferencing with families to promote ACP. RN was trained in each unit to organize case conference sessions. Staff were trained in person-centered palliative care and to develop ACP.	Usual care	In I NHs, symptoms were better documented. **QOD:** No group differences in family-(primary outcome) or nurse-rated QOD (SM-EOLD, CAD-EOLD, SWC-EOLD) **QOL:** Nurse-rated QUALID did not differ. **HSP:** No difference.	Only 76% of deceasedresidents had evaluations using EOLD scale.	High 8

(*continued on next page*)

Table 2 (*continued*)

Study, Year, Country	Design	Participants, Age, Mean Age, Females (F) %	Intervention	Control	Outcomes (Primary Outcome as Stated by Original Study)	Comments	Methodologic Quality
Hanson et al, 2017, USA "Goals of Care"[33,47]	cRCT	22 NHs, N = 302, advanced dementia, mean age 86-87 y, F = 82%	Goals of care intervention (video and decision aid printed material) to patients' surrogate decision makers to improve palliative care in people with advanced dementia; 1-h training for staff in communication and discussion guide.	Usual care	Family decision makers reported better quality of communication scores (primary outcome) overall and regarding EOL care in I. Treatment consistent with preferences (primary outcome) did not differ. **HSP:** Hospital transfers were significantly lower in I than in C. **QOD:** No difference in SWC-EOLD or SM-EOLD scores or survival.	Intervention was mainly targeted to family decision makers to prepare for ACP. Only 1-h staff training.	High 10
Kane et al, 2017, USA "INTERACT"[34]	cRCT	85 NHs, N = 23,478, mean age 80-82 y, F = 66%-67%	Each I NH selected "champion" and "co-champion" to facilitate INTERACT training and implementation of tool kit (>30 tools) to address the key factors leading to avoidable hospital admissions and ED visits among NH residents.	1. Pure control 2. Attention control	**HSP**: No reductions in hospitalization rates or ED visits without admission (primary outcomes). Intervention NHs exhibited a reduction in potentially avoidable hospitalizations (primary outcome), but this effect was not robust to a Bonferroni correction for multiple comparisons.	Well-designed long-term quality improvement project with very large number of NHs and participants.	High 8
Arendts et al, 2018, Australia[35,48]	cRCT	6 RACFs, N = 200, mean age 89 y, F = 76%	Nurse practitioners acted as care managers for residents. They coordinated care of chronic and acute conditions and arranged acute care if needed. They promoted use of "best practice resource folder" and organized staff training.	Usual care	**HSP:** No significant difference in ED transfers (primary outcome) **QOL measured by EQ-5D:** no significant difference between the groups **QOL by HUI:** I group decreased less in QOL during follow-up.	Nurse practitioner had major role and education minor role in intervention.	Moderate 7
Boogaard et al, 2018, the Netherlands[36,49]	cRCT	18 NHs, N = 423, mean age 86y, F = 69%	SWC-EOLD and CAD-EOLD scale family ratings on quality of EOL care and QOD were used to give feedback to NH staff: I1: generic feedback, I2: patient-specific feedback	Usual care	**QOD:** Generic strategy resulted in lower quality of EOL care (primary outcome) compared with C group. Patient-specific strategy did not affect the quality of EOL care but increased comfort in unadjusted analyses.	High number of dropouts. Mild intervention. The primary outcome of trial was the same as feedback tool.	Moderate 5
Temkin-Greener et al, 2018, USA, "IMPACTT"[37,50]	cRCT	25 NHs, N = 5830 decedents, mean age 86 y, F = 74%	Team development and palliative care training (14 sessions available in both). Online EOL care materials available. Nurse practitioner interventionist accompanied the teams on the rounds for 2 mo.	Usual care	**QOL:** No effect on depression, pain, or being deceased in hospital nor in number of hospital stays during the past 90 d (primary outcomes).	Only deceased were included. Massive efforts to train staff in 14 NHs.	Moderate 6
Verreault et al, 2018, Canada[38]	cRCT, quasi-experimental	4 NHs, N = 193, terminal dementia, mean age at death 89 y, F = 73%	Training staff in PC: physicians (3-h), nurses (7-h), nurse aides (3.5-h). Clinical monitoring of pain. Early and systematic communication with families about EOL care issues. Use of a nurse facilitator to implement and monitor the intervention.	Usual care	**QOD:** Family Perception of Care Score was significantly higher in the intervention group than in the usual care group (157.3 vs 149.1; $P = .04$) (primary outcome). The Comfort Assessment and Symptom Management scores were also significantly higher in the intervention group (primary outcome).	The design and randomization of study wards are unclear. Only deceased patients were analyzed.	Low 4

Husebø et al, 2019, Norway "COSMOS"[39,51]	cRCT	33 NHs with 67 units, N = 545, 94% dementia, mean age 87 y, F = 74%	Staff training and assistance in implementing a multicomponent intervention—communication (including advance planning), systematic pain management, medication review, organization of activities.	Usual care	**QOL:** After decline in QOL in intervention group at 4 mo, there was a significant improvement between 4 and 9 mo (QUALIDEM, EQ-VAS). The difference in changes between 2 groups from baseline to 9 mo was not significant in QUALID, QUALIDEM, or EQ-VAS (primary outcomes).	Drugs were deprescribed more, the ADL function was better sustained, and staff distress improved in the I group.	High 10
Sævareid et al, 2019, Norway[40,52]	cRCT	8 wards, N = 154, mean age 87 y, F = 70%	Training of project teams that trained other facility staff (train-the-trainer) on promoting and communicating about ACP and written templates to make advance care plans.	Usual care	More advance plans and discussions (primary outcome) in I. I residents had better concordance of received treatment with treatment preferences. **HSP:** no difference.	Most of the outcomes were based on unvalidated questionnaire items.	Moderate 7
Van den Block et al, 2019, EU, "PACE"[41,53]	cRCT	78 NHs in 7 countries, decedents N = 551/984 pre/post, mean age 86 y, F = 65%	Implementation of PACE—a 6-step staff training program by facility and country coordinators. Steps: (1) ACP; (2) resident assessment; (3) monthly multidisciplinary palliative care meetings; (4) improving pain and depression management; (5) care in last days of life; (6) care after death.	Usual care	**QOD**: CAD-EOLD: no difference between groups reported by staff or proxy (primary outcome), SWC-EOLD: no difference reported by proxy, QOD-LTC significantly better scores in I than in C (staff reported). No clinically significant improvement in staff knowledge (primary outcome).	No outcomes related to residents who remained alive. Very low response rate in some countries.	High 8
Liu et al, 2020, Forbat et al, 2020, Australia[42,54,55]	cRCT (stepped-wedge design)	12 care homes with 1700 residents, 537 deaths overall, 471 analyzed, 30% dementia, mean age 85 y, F = 64%	Monthly 1-h "palliative care needs rounds," case conferencing, and case-based training of staff focused on anticipatory planning.	Usual care, all I wards served first as controls	**QOD:** reported by staff: QODD (range 0-160) scores increased by 8.1 points during intervention in all facilities. **HSP:** Hospitalizations and hospital days (primary outcome) decreased in I vs C.	Only deceased residents were analyzed. 88% of deceased residents had complete data. No ITT analysis or outcomes related to living residents.	Moderate 7

ACP, advance care planning; AD, advance directive; ADL, activities of daily living; BEHAVE-AD, Behavioral Pathology in Alzheimer's Disease; C, control arm; CAD, Canadian dollar; CAD-EOLD, Comfort Assessment in Dying End-Of-Life in Dementia scale; (c)RCT, (cluster) randomized controlled trial; DS-DAT, Discomfort Scale for Dementia of the Alzheimer's Type; ED, emergency department; EOL, end-of-life; EOLD, End-Of-Life in Dementia scale; EQ-5D, EuroQoL 5D; EQ-VAS, EuroQoL Visual Analogue Scale; FPCS, Family Perception of Care Score; HSP, hospitalizations; HUI, Health Utilities Index; I, intervention arm; ITT, intention-to-treat; LTCF, long-term care facility; NA, not applicable; NH, nursing home; PACE, Palliative Care for Older People; PC, palliative care; PCPC, palliative care planning coordinator; POMS, Psychiatric Outpatient Mood Scale; QOD, quality of dying; QODD, Quality of Death and Dying scale; QOD-LTC, Quality of Dying in Long-Term Care; QOL, quality of life; QUALID, Quality of Life in Late-Stage Dementia; QUALIDEM, a dementia-specific QOL assessment instrument; RACF, residential aged care facility; RN, registered nurse; SM-EOLD, Symptom Management EOLD scale; SWC, satisfaction with care; SWC-EOLD, Satisfaction With Care EOLD scale.

(QUALID),[57] EuroQol 5D (EQ-5D) and its subscale the EuroQol Visual Analogue Scale (EQ-VAS),[58] and the Health Utilities Index.[59] Two studies[32,39] used nurses to assess QOL, 1 study[35] used a research assistant, and in 2 studies[27,37] the outcomes were resident reported. None of the good- and moderate-quality studies[32,35,37,39] reporting QOL produced clear benefits. Arendts et al[35] reported 2 QOL measures, of which the Health Utilities Index instrument in the intervention group showed less lowering of HRQOL.

QOD, symptom management, and proxy satisfaction with care

QOD, symptom management, or proxy satisfaction was assessed in 8 studies.[28,29,32,33,36,38,41,42] End-of-Life in Dementia (EOLD) scales include 3 different QOD measurement scales.[60] Two of these scales—Symptom Management or Comfort Assessment in Dying—were used in 5 studies.[32,33,36,38,41] Only 1 low-quality trial[38] showed effects in these scales, whereas 4 higher-quality trials did not. One moderate-[42] and 1 high-quality[41] trial used Quality of Dying in Long-Term Care,[61] and Quality of Death and Dying[62] scales and both showed modest but statistically significant intervention effects.

Satisfaction with care, rated by proxy or staff member after death using Satisfaction With Care EOLD scale (SWC-EOLD), was used as a proxy for QOD. It was assessed in 4 studies, none of them producing effects.[33,36,41,46] The Family Perception of Care Score evaluates similar aspects of care such as quality of communication with proxies and preparatory tasks for death and palliative care.[63] It was assessed in 1 low-quality trial with intervention showing benefits.[38] One study[29] assessed satisfaction with care in living residents using the Relative and Patient Satisfaction Indexes[64] without intervention effects in this outcome.

The Discomfort Scale for Dementia of the Alzheimer's Type[65] was used to evaluate symptoms in a single low-quality study with positive intervention effects.[28]

Hospital use

Hospitalizations were measured in 10 trials.[29–35,37,40,42] Of the high or moderate quality trials, 3 showed a decreased number of hospitalizations in the intervention group compared with the control group.[29,33,42] The largest high-quality trial with a pragmatic design did not have any effect on hospitalizations.[34] Only 2 trials measured hospital days as an outcome measure.[31,54] One high-quality trial suggested no effect of intervention,[31] whereas one moderate-quality trial[54] showed a reduction in hospital days.

Characteristics of effective training interventions

Table 3 summarizes the characteristics and findings of high- and moderate-quality trials in order to explore what kind of pedagogic interventions and resident target group are needed for effective intervention.

Overall, few trials had effectiveness. There seem to be no particular characteristics in the residents, pedagogic methods, or length or intensity of training related to these effective trials. The effects related to hospital use were seen in trials that provided education to proxies in addition to staff.[29,33] In the third trial showing lower hospital use, an external palliative care nurse rounded with the ward staff discussing selected patients and offering expert consultations when needed.[54] In addition, in the same trial, staff reported better QOD among their residents.[42]

Discussion

Our systematic review identified 16 cluster randomized trials examining various educational interventions aiming to improve end-of-life care in nursing homes: improvements in residents' QOL and QOD, or reducing their burdensome hospitalizations. The effects of interventions were surprisingly mild, with only 1 high-quality trial and 2 moderate-quality trials showing reductions in burdensome hospitalizations. None of the 6 high-quality trials showed improvements in residents' QOL or QOD, whereas in 1 moderate-quality trial the staff reported improved QOD. There has been a high number of participants in these educational trials. The learning methods, intensity, and length have varied greatly.

The quality of the included studies is quite good. The high number of participants allows enough statistical power to evaluate also categorical outcomes such as hospitalizations. For example, about 1000 participants randomized into 2 groups suggests >80% power to detect 30% of differences when mean hospitalizations per participant is 0.7 and standard deviation 1.5. In addition, measures used in studies on QOL and QOD have been well validated. Thus, the lack of effectiveness is not due to problems in statistical power, insensitive outcome measures, or inappropriate statistical methods. The pedagogic approach also used various means. Thus, if education is an effective intervention to improve nursing home residents' end-of-life care, this systematic review of 16 trials should have shown more positive findings. The problem of ineffective complex interventions in primary care cluster RCTs has been discussed in a previous study. This systematic review called for studies with alternative designs but also discussed that cluster RCTs generally give more trustworthy results than observational studies.[66]

In Table 3 summarizing the effectiveness and elements of training interventions in high- and moderate-quality trials, 2 of the trials providing reductions in burdensome hospitalizations had significant intervention elements of proxy education. The residents' proxies received video training to enhance ACP decision making[33] or proxies were trained to complete advance directives.[29] In addition, 1 trial showed a decrease in hospitalizations and hospital days.[54] In this trial, external palliative care nurses were integrated into nursing home teams to enhance ACP. They discussed selected residents on monthly visits and offered external expert consultations when needed. Furthermore, only 1 moderate-quality trial suggested some staff-reported effects on QOD.[42] In this study, the staff assessed the effects of their own work, leading to a risk of bias. Thus, it seems to be difficult to change the culture and attitudes of staff to improve end-of-life care at resident-level outcomes.

A wide variety of training interventions has been used in these trials. They included behavioristic interventions such as lectures and also activating learning methods such as case-based learning or role-play. However, only very small effects were seen in resident outcomes. None of the trials have justified their training with respect to learning theories or an adult pedagogic approach. However, many trials included possibilities for reflection and integration of new competencies into everyday practice. These have been highlighted as an effective means to enhance adult learning.[67–70] In end-of-life care training, it should be essential to tackle professionals' own feelings, for example, related to fear of death, in order to change their attitudes and culture.[43] None of the trials described whether the learning needs or especially the motivation of staff had been assessed before the training. Motivation was found to be an important feature determining the outcome in the INTERACT project.[71] The popular train-the-trainer approach might be efficient in distributing interventions and to engage facilities by making the interventions originate from "inside" the facility, with the ability to adjust the intervention to suit the practices in each facility. On the other hand, nurses or nurse practitioners who were most often recruited to be facilitators did training without any apparent pedagogic training and will be more susceptible to pressure from other staff members or managers than an outside expert might be.

Implementing training elements into practice is a critical element, and tools to do so were used in several trials. Several trials evaluated the use of the new skills or practices after initial training—giving

Table 3
Training Characteristics and Outcome Effects of High- and Moderate-Quality Trials

Study, Year, Country	Resident Characteristics			Outcome Effects				Characteristics of Training Intervention				
	Mean Age, y	Dementia, %	Deceased, %/ Follow-Up Time	QOL	HSP	QOD	SWC	Learning Methods: AI, C, CBL, D/S, e-L, F, L, RP, TT, V, WS	Major Contents, Intensity, and Length	Complexity of Intervention	Role of Training in Intervention	Other Intervention Components
High-quality trials												
Connolly et al, 2015, New Zealand[31,45]	50% ≥75y	na	21%/14 mo	na	NS	na	na	C, CBL, D/S, F L(?)	GNS visited and coached nurses and caregivers in ACP. Meetings: 3×1-h/mo (3 mo); gerontology training: monitoring and benchmarking residents' QOC and giving feedback ×3 over 9 mo.	Moderate	Major	Facility-level assessment of areas of needs and care plans created from baseline data by researchers, GNS, and facility leaders.
Agar et al, 2017, Australia[32,46]	85y	100%	100%[*]/18 mo	NS	NS	NS	NS	C, CBL, TT	Registered nurse was trained 35 h to be a PCPC in each NH. PCPC worked 2 d in each NH; organized training in person-centered care and case conferencing for 18 mo for staff and families.	Moderate	Major	The PCPC identified residents nearing EOL and facilitated implementation of palliative care plans.
Hanson et al, 2017, USA[33,47]	86 y	100%	20%/9 mo	na	+	NS	NS	Video for proxies, L(?) for staff	Videos for family members/proxies to aid ACP decisions. 1-h training for staff members on the structured goals of care discussions (ACP) with proxies. Retraining until fidelity.	Simple	Minor	2-part intervention, 1st part was a video and print copy of decision aid for proxies. Staff training had minor role.
Kane et al, 2017, USA[34]	80-82 y	na	na/26 mo	na	NS	na	na	C, e-L, F, TT	Two facilitators trained from each facility to be a "champion" and to train other staff and implement INTERACT principles. Initial intensive training program for 10 wk and follow-up webinars monthly. Webinars for all staff. Study team had monthly phone calls with NH champions.	Complex	Moderate	Champions promoted complex INTERACT tool kit (30 clinical and educational tools) in their NH. Quality improvement project.
Husebø et al, 2019, Norway[39,51]	87 y	94%	21%/9 mo	NS	na	na	na	D/S, TT, L, RP	2-d seminar for staff. At least 2 nurses from each unit ("ambassadors") were trained in all 4 domains of intervention. Main contents were ACP and pain management. Ambassadors organized lunch meetings several times per week for staff over 4 mo.	Moderate	Major	Medication review and organization of weekly activities for residents.
Van den Block et al, 2019, EU[41,53]	86 y	67-72%	100%[*]/17 mo	na	na	NS	NS	C, TT, WS	Trainers of each country were trained in 1-wk international WS. They trained and supported NH facilitators and staff in implementing monthly PACE steps over 6 mo. Intensity of actual staff training unclear.	Complex	Major	Country trainers visited/contacted NHs every 7-10 d. ACP promoted. Mainly EOL topics, also general pain and depression management.
Moderate-quality trials												
Molloy et al, 2000, Canada[29]	79-85 y	~62%	26%/18 mo	na	+	na	NS	TT, C, D/S(?), V, WS	2-d workshops to 3 facilitators who trained and coached the staff, residents, and proxies to complete ADs. TT approach for staff training, and in-service training, intensity unclear.	Moderate	Moderate	Focus on completing ADs.

(continued on next page)

Table 3 (*continued*)

Study, Year, Country	Resident Characteristics			Outcome Effects				Characteristics of Training Intervention				
	Mean Age, y	Dementia, %	Deceased, %/ Follow-Up Time	QOL	HSP	QOD	SWC	Learning Methods: AI, C, CBL, D/S, e-L, F, L, RP, TT, V, WS	Major Contents, Intensity, and Length	Complexity of Intervention	Role of Training in Intervention	Other Intervention Components
Arendts et al, 2018, Australia[35,48]	90 y	?	?/12-32 mo	NS	NS	na	na	C, L(?), TT	Nurse practitioners acted as care coordinators to residents and provided staff training.	Moderate	Minor	Care coordination as major intervention, intervention team developed and provided a tool kit to be used by all staff.
Boogaard et al, 2018, the Netherlands[36,49]	86y	100%	100%*/10 mo	na	na	NS	NS	F	Feedback was given to facilities based on family ratings of SWC-EOLD and CAD-EOLD. Facilities discussed feedback but no information on how intensive/often these meetings were. Facilities either followed improvement suggestions or made their own.	Simple	Minor	Intervention offered minor support. Level of adherence not measured. Only deceased patients were taken into analyses. Primary outcome was the same as feedback tool.
Temkin-Greener et al, 2018, USA[37,50]	86 y	58%	100%*/12 mo	NS	NS	NS	na	AI, C, L(?), WS	NS palliative care guidelines and tools developed with staff in a Delphi process. Team development (TeamSTEPP), ELNEC, EOL care materials available, geropalliative care nurse accompanied teams on the rounds for 2 mo.	Complex	Major	Multicomponent educational intervention activating and also coaching NH teams + taking into account high staff turnover. Adherence to intervention low.
Sævareid et al, 2019, Norway[40,52]	87 y	73%	25%/9 mo	na	NS	na	na	AI, D/S, RP, TT	ACP guide created in cooperation with project teams selected from each I ward. Project teams received 2-d seminar and trained the rest of the staff. Aim was to guide and document ACP conversations.	Moderate	Moderate	Research team provided supervision of project teams, information to the ward staff, written information to patients and next of kin as well as template to document ACP.
Liu et al, 2020, Forbat et al, 2020, Australia[42,54,55]	85 y	30%	32%/18 mo	na	+	+	na	C, CBL	External palliative care nurse rounded with the ward staff discussing selected patients and offering expert consultations when needed 1 h/mo. Short briefing on how to select residents at high risk of dying for the rounds. Checklist to guide practice briefing notes were provided to staff.	Moderate	Moderate	Selected residents were discussed with facility staff and access to palliative care consultants. Case-based conferences arranged for NHs, focus on completing advance care plans.

+, favors intervention; ACP, advance care planning; AD, advance directive; CAD-EOLD, Comfort Assessment in Dying End-Of-Life in Dementia scale; ELNEC, end-of-life nursing education; EOL, end-of-life; EOLD, End-Of-Life in Dementia scale; GNS, gerontology nurse specialist; HSP, hospitalization or hospital days; I, intervention arm; na, not applicable; NH, nursing home; NS, nonsignificant; PACE, Palliative Care for Older People; PCPC, palliative care planning coordinator; QOC, quality of communication; QOD, quality of dying; QOL, quality of life; SWC, satisfaction with care; SWC-EOLD, Satisfaction With Care EOLD scale.

Learning methods: AI, learners' active involvement in developing palliative care; C, coaching, CBL, case-based learning, D/S, (small group) discussions/seminars, e-L, e-learning, F, feedback, L, lectures, RP, role play, TT, train-the-trainer, V, video, WS, workshops

*Only included deceased residents.

feedback to trainees or even retraining. However, this effort did not translate into better resident outcomes. It is impossible to determine whether low effectiveness is due to training or implementation. It is important to assess the fidelity of new practices and skills also in future studies to determine how well the changes are implemented.

The 2 largest included trials were both complex interventions. The early pilot INTERACT project showed significant reductions in burdensome hospitalizations[72] but later more rigorous trials did not manage to show effects.[34] Also, the large European multicenter collaboration PACE, with its well-outlined and long-lasting intervention, failed to show an effect on end-of-life care.[41] A previous systematic review noted that interventions having narrow aims and low complexity were more likely to be beneficial in changing care practices than those with ambitious aims and high complexity.[13] Ambitious and complex interventions may be hindered by common barriers such as high staff turnover, a high training attrition rate, low organizational support, a lack of resources or commitment, or opposing cultures and attitudes.

Strengths and Limitations

Previous systematic reviews noted that staff training may influence relevant skills and has been mostly well received by staff.[13,14] However, to our knowledge, this is the first systematic review to assess the effects of staff training on resident-related end-of-life care outcomes. We managed to find a large number of studies with robust RCT design and with a clinically oriented research question. Most of our included studies were not included in previous related reviews; thus, most of the contribution is novel. Our findings suggest that influencing resident-related outcomes is hard, and positive changes in staff-related outcomes may often fail to translate into resident-level outcomes.

The included studies presented varying perspectives and interventions. The interventions were too diverse to perform a meta-analysis, for example, on hospitalizations. We wanted to focus on training, but most of the studies had complex interventions where training played a varying but often limited role, thus making the assessment of the training effects challenging. Our evaluation of methodologic quality seems to give a useful numerical and categorical evaluation of the different methodologies but has not been optimized to evaluate clustered trials.

Conclusions and Implications

In this systematic review, we explored evidence of the effect of cluster RCTs using staff training intervention on the resident-level outcomes QOL, QOD, symptom management, proxy satisfaction, and residents' risk of hospital use. The effects were very mild and controversial. Our findings may guide future research. We showed that the pedagogic and theoretical backgrounds of training interventions were rarely clarified. It might be beneficial to investigate how to best motivate cultural change and ownership of development in end-of-life care to be continuous processes within facilities.

Supplementary Data

Supplementary data related to this article can be found online at https://doi.org/10.1016/j.jamda.2020.09.011.

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