Original Article

Asynchronous education improves emergency medical services clinician confidence and knowledge in caring for patients near the end-of-life

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Abstract

Objective: To evaluate the impact of a nationally available continuing education online curriculum on Emergency Medical Services (EMS) clinician confidence and knowledge in caring for end-of-life (EOL) patients.

Methods: This is a prospective observational study of EMS clinicians (emergency medical technicians [EMTs], advanced EMTs [AEMTs], and paramedics). EMS clinicians and physicians with both EMS and palliative care expertise developed two 20-min modules regarding: (1) communication skills (including death notification) and (2) hospice knowledge. EMS clinicians' subject confidence (modified Likert-scale) and knowledge were assessed electronically immediately before and after each module. Data analysis compared before and after module improvements in knowledge and confidence. Linear regressions analyzed baseline EOL skill confidence scores based on EMS agency, level of certification, and years of experience.

Results: We analyzed completed datasets for 1825 EMS clinicians (979 EMTs, 112 AEMTs, and 734 paramedics) representing a heterogeneous cohort across different

EMS agencies (617 private, 545 fire-based, 298 hospital-based, 61 third service, and 304 other) and all 50 states and the District of Columbia. After the communication module, the number of EMS clinicians who reported confidence in delivering bad news increased from 62% (1131/1825) to 80% (1468/1825) ($p < 0.001$). After the hospice module, the number of EMS clinicians who reported confidence in knowing what services hospice provides increased from 51% (925/1825) to 75% (1375/1825) ($p < 0.001$) and confidence in knowing what active dying patients look like from 57% (1033/1825) to 78% (1429/1835) ($p < 0.001$) in knowing what active dying patients look like. Linear regression demonstrated that before modules, EMS clinicians with more monthly EOL calls, those with more years of experience, and paramedics were more confident in their EOL skills than their peers. After module completion, those with the fewest years of experience (0–3 years) and EMTs gained significantly more confidence in communication skills than their peers.

Conclusion: Asynchronous, online continuing education improves EMS clinician knowledge and confidence in caring for patients near the EOL. The greatest benefit in improved confidence was for EMTs and those with the fewest years of EMS experience.

KEYWORDS
advanced care planning, communication skills, EMS, hospice, palliative care

1 | INTRODUCTION

1.1 | Background

Emergency medical services (EMS) clinicians frequently respond to calls for hospice and palliative patients nearing end-of-life (EOL).[1–3] Although many EOL patients' prefer to be cared for at home, EMS may be emergently called for reasons even when transport is not ultimately desired or required: difficulty in managing symptoms, anxiety/fear about death, inability to rise after a fall, caregiver burden, and slow hospice agency response.[4–6] Despite the frequency of these calls, EMS clinicians receive limited training in communication providing comfort-focused and goal-concordant care.[1,3,7,8] Continuing education on EOL communication skills, particularly in death notification has been demonstrated to mitigate burnout in EMS clinicians[9]; however, these effects have not been studied broadly. Partnerships between EMS and hospice/palliative care organizations acknowledge the critical need to build capacity within native EMS learning and care delivery systems.[10,11]

1.2 | Importance

This represents an important mismatch between EMS clinician training and field experience. Suboptimal EMS clinician skillsets lead to systems of care that potentially underachieve the quadruple aim in the several ways: (1) EOL patients and families have worse experiences, (2) exacerbate disparities in healthcare quality and access, (3) unnecessary transport perpetuates unnecessary utilization, and (4) EMS clinicians accumulate moral injury.

1.3 | Goals of this investigation

The primary objective of this study is to evaluate the effectiveness of a nationally available continuing education online curriculum on EMS clinician confidence and knowledge in caring for EOL patients.

2 | METHODS

2.1 | Study design

This is a prospective study of a national cohort of United States EMS clinicians (emergency medical technicians [EMTs], advanced EMTs [AEMTs], and paramedics) who completed educational modules about caring for patients near EOL. Yale University Institutional Review Board reviewed the project and considered it exempt from review. STROBE standardized reporting guidelines were used.

2.2 | Setting and selection of participants

The curriculum was administered to a national convenience sample of EMS clinicians at zero cost. It was hosted on a leading EMS Learning Management System (Prodigy) web platform and broadly advertised

to its user base. It was also disseminated through national specialty organization channels.

2.3 | Education modules

EMS clinicians received continuing education credit after completing two 20-min asynchronous modules regarding: (1) communication skills (including death notification and responding to emotions) and (2) hospice knowledge (including caring for actively dying and/or hospice patients). EMS clinicians and physicians with both EMS and palliative expertise (D.H.W., A.B., J.K.B., and B.G.) designed the curriculum content to address commonly encountered topics at a technical level appropriate to EMS clinicians. Furthermore, didactic content was augmented with vignette videos per Prodigy EMS approach to engaging adult learners.

2.4 | Before and after survey instrument

Immediately before and after each module, EMS clinicians self-assessed confidence using a five-point Likert-type scale (strongly disagree, disagree, neutral, agree, and strongly agree). Self-assessment confidence statements included: "I know how to effectively deliver bad news, including death notifications, to family," "I know what services are offered by hospice," and "I know what patients look like as they transition into the active dying process." EMS clinicians were considered confident in the subject if they either "agreed" or "strongly agreed" with a statement.

Immediately before and after assessing confidence statements, EMS clinicians' subject knowledge was assessed using focused content questions relevant to each module (Appendix 1). Before and after survey questions were identical. Curriculum content developers also designed the subject confidence and knowledge questions and thus the content was closely aligned and considered appropriate for EMS clinicians. The percentage of correct answers was compared before and after each educational module for each individual EMS clinician.

2.5 | Measurements

The primary outcome metrics were changes in EMS clinician subject knowledge and confidence before and after each educational module. Independent variables included age, gender, monthly estimated number of EOL-related calls, the highest level of EMS certification (EMT, AEMT, paramedic, and other), years of EMS experience, primary type of EMS service (fire department, hospital, private, third service, and other), and state of practice.

2.6 | Data collection

De-identified demographic data were collected for all participants. Each EMS clinician estimated how many EOL-related calls they typically respond to per month. Data were collected from January 15, 2023

The Bottom Line

Emergency medical technicians and paramedics who completed an online continuing education curriculum focused on communication skills (including death notification) and understanding of hospice demonstrated improved knowledge and confidence in caring for end-of-life patients.

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to March 31, 2023. Participants who did not fully complete the modules were excluded. Participants who gave non-sensical answers, such as uniformly identical answers, were excluded ($n = 33$).

2.7 | Data analyses

In the subject knowledge scores comparisons, Wilcoxon signed-rank test was used to identify significant improvements post-module completion, and further confirmed by paired T tests. Kruskal–Wallis tests were conducted to identify significant differences in knowledge scores in the subgroups among EMS agencies, levels of certification, and years of experience, followed by pairwise two-sided multiple comparison analysis using Dwass, Steel, Critchlow-Fligner (DSCF) method if an overall significant difference was found. In the confidence level comparisons, McNemar's tests were used to identify significant improvements after module completion. Unadjusted linear regressions were used to analyze baseline EOL skill confidence scores differences and related improvements between different participant cohorts.

Bonferroni corrections were used to adjust for multiple comparisons in the univariate tests among all related subgroups, and adjusted p-values were reported. Statistical significances were established at 0.05 level. Statistical analyses were completed using SAS 9.4M7.

3 | RESULTS

3.1 | Characteristics of study subjects

We analyzed complete datasets for 1825 participants, of which 58.2% (1063/1825) identified as male, 40.9% (746/1825) as female, and 0.9% (16/1825) as non-binary. The mean participant age was 37.9 years (median 36, interquartile range [IQR]: 28–46). Of all participants, 53.6% (979/1825) were EMTs, 6.1% (112/1825) were AEMTs, and 40.2% (734/1825) were paramedics. The remaining "other" types ($n = 61$) of EMS clinicians were a heterogeneous group of physicians, physician assistants, nurses, and emergency medical responders that were excluded from the analysis. Participants represented a variety of EMS agency types including 33.8% (617/1825) private, 29.9% (54/1825) fire-based, 16.3% (298/1825) hospital-based, 3.3% (61/1825) third service, and 16.7% (304/1825) "other." The "other" types of EMS agencies included a heterogeneous group including

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TABLE 1 Demographic characteristics of study participants (N = 1825).

	n (%)
Gender	
Female	746 (40.9%)
Male	1063 (58.2%)
Non-binary	16 (0.9%)
Age in years	37.8 (mean) 36 (median) IQR 28–46
EMS agency	
Fire-based	545 (29.9%)
Hospital-based	298 (16.3%)
Other	304 (16.7%)
Private	617 (33.8%)
Third service	61 (3.3%)
Level of certification	
EMT	979 (53.6%)
AEMT	112 (6.1%)
Paramedic	734 (40.2%)
Years of experience in EMS	
0–3 years	397 (21.8%)
4–10 years	645 (35.3%)
10+ years	783 (42.9%)

Abbreviations: AEMT, advanced emergency medical technician; EMS, emergency medical services; EMT, emergency medical technician; IQR, interquartile range.

military, unemployed, retired, law enforcement, university, healthcare facility/clinic-based, private facilities (e.g., casinos, ski patrol), and government (e.g., National Park Service). Participants practiced in all 50 states and the District of Columbia. The most common states represented included Massachusetts (29.4%, 537/1825), California (4.1%, 75/1825), Connecticut (3.8%, 70/1825), Georgia (3.8%, 70/1825), and Texas (3.6%, 66/1825). See Table 1 for a summary of participant demographics. For monthly EOL calls, participants reported a mean of 7.0 (standard deviation [SD] 12.5) and a median of 3.0 (IQR 1.0–9.0), which represented 5.0% (IQR 1.0–20) of monthly EMS call volume.

3.2 | EMS clinician subject knowledge

When analyzing the subject knowledge improvements of EMS clinicians in the EOL modules, both parametric and nonparametric tests were conducted. Paired T tests and Wilcoxon signed-rank test returned consistent results where an overall significant improvement in subject knowledge was detected in both the communications and hospice knowledge modules. For reference, a score of 100% on the knowledge modules was 1.0. The mean scores increased by 0.08 (SD = 0.24) in communications module and 0.02 (SD = 0.24) in hospice knowledge module; median scores increased from 0.67 (IQR 0.67–1.00) to 1.00 (IQR 0.67–1.00) in both modules (see Table 2).

In baseline communication and hospice knowledge prior to module completion, Kruskal–Wallis test results indicated no significant differences among subgroups of EMS agencies, levels of certification, and years of experience. The only exception, identified through subsequent DSCF tests, was that fire-based agencies had significantly lower scores in their baseline communication knowledge (mean 0.71 [SD = 0.25] vs. 0.76 [SD = 0.24]). Following the communications module, significant improvement was noted for all types of EMS agencies, levels of certification, and years of experience after adjusting for multiple comparisons in each subgroup analysis. However, this was not seen in the hospice module whereby only fire-based EMS clinicians and those with more years of experience (4–10 and 10+ years) demonstrated a statistically significant increase in subject knowledge after module completion. Overall, there was consistent baseline knowledge scores and subsequent post-module improvements across EMS agencies, levels of certification, and years of experience.

3.3 | EMS clinician confidence

After the communication module, the number of EMS clinicians who reported confidence in delivering bad news increased from 62.0% (1131/1825) to 80.4% (1468/1825) ($p < 0.001$). After the hospice module, the number of EMS clinicians who reported confidence increased from 50.7% (925/1825) to 75.3% (1375/1825) ($p < 0.001$) in knowing what services hospice provides and from 56.6% (1033/1825) to 78.3% (1429/1835) ($p < 0.001$) in knowing what active dying patients look like. Using McNemar's tests, overall participants' confidence significantly improved in both communication (62.0% before to 80.4% after) and hospice knowledge (50.7% and 56.6% before to 75.3% and 78.3%) ($p < 0.05$). Furthermore, all subgroups independently improved in confidence after completing modules, including agency type, levels of certification, and years of experience (see Table 3).

When analyzing the EOL skill confidence between different participants, linear regressions were used, and several trends emerged. Before module completion, paramedics (vs. EMT mean difference = 1.47, 95% confidence interval [CI] [0.90, 2.04] vs. AEMT mean difference = 1.41, 95% CI [0.22, 2.60]), those with more monthly EOL calls ($\beta = 0.04$, 95% CI [0.02, 0.06]), and those with more years of experience (4–10 vs. 0–3 years mean difference = 1.40, 95% CI [0.65, 2.15]; 10+ vs. 0–3 years mean difference = 1.71, 95% CI [0.99, 2.43]) were more confident in their EOL skills. Following module completion, those with the fewest years of experience (0–3 vs. 4–10 years mean improvement difference = 1.39, 95% CI [0.66, 2.13]; 0–3 vs. 10+ years mean improvement difference = 1.73, 95% CI [1.02, 2.44]) and EMTs gained more confidence in communication skills than paramedics (mean improvement difference = 0.82, 95% CI [0.26, 1.39]).

4 | LIMITATIONS

There are several limitations to this study. First, since this was a convenience sample of EMS clinicians who voluntarily completed the

TABLE 2 Emergency medical services (EMS) clinician subject knowledge in end-of-life (EOL) calls by EMS agency, level of certification, and years of experience.

	Knowledge in communication module		Knowledge in hospice module	
	Mean score before (SD) Mean score after (SD) Mean difference [95% CI] p-value[a]	Median score before (IQR) Median score after (IQR) Median difference (IQR) p-value[a]	Mean score before (SD) Mean score after (SD) Mean difference [95% CI] p-value[a]	Median score before (IQR) Median score after (IQR) Median difference (IQR) p-value[a]
Overall N (1825)	0.73 (0.24) 0.81 (0.22) 0.08 [0.07–0.09] **<0.001**	0.67 (0.67–1.00) 1.00 (0.67–1.00) 0.00 (0.00–0.33) **<0.001**	0.69 (0.24) 0.71 (0.25) 0.02 [0.01–0.03] **<0.001**	0.67 (0.67–1.00) 1.00 (0.67–1.00) 0.00 (0.00–0.00) **<0.001**
EMS agency				
Fire-based (545)	0.71 (0.25) 0.81 (0.23) 0.10 [0.07–0.12] **<0.001**	0.67 (0.67–1.00) 1.00 (0.67–1.00) 0.00 (0.00–0.33) **<0.001**	0.66 (0.24) 0.70 (0.25) 0.03 [0.01–0.05] **0.02**	0.67 (0.33–1.00) 0.67 (0.67–1.00) 0.00 (0.00–0.00) **0.004**
Hospital-based (298)	0.75 (0.23) 0.80 (0.23) 0.05 [0.03–0.07] **<0.001**	0.67 (0.67–1.00) 1.00 (0.67–1.00) 0.00 (0.00–0.00) **<0.001**	0.71 (0.23) 0.74 (0.24) 0.02 [–0.01 to 0.05] 0.41	0.67 (0.67–1.00) 0.67 (0.67–1.00) 0.00 (0.00–0.00) 0.44
Other (304)	0.76 (0.24) 0.84 (0.21) 0.08 [0.05–0.12] **<0.001**	0.67 (0.67–1.00) 1.00 (0.67–1.00) 0.00 (0.00–0.33) **<0.001**	0.69 (0.24) 0.72 (0.24) 0.03 [–0.00 to 0.06] 0.16	0.67 (0.67–1.00) 0.67 (0.67–1.00) 0.00 (0.00–0.00) 0.16
Private (617)	0.73 (0.24) 0.81 (0.22) 0.08 [0.06–0.10] **<0.001**	0.67 (0.67–1.00) 1.00 (0.67–1.00) 0.00 (0.00–0.33) **<0.001**	0.69 (0.24) 0.71 (0.24) 0.01 [–0.01 to 0.03] 0.69	0.67 (0.67–1.00) 0.67 (0.67–1.00) 0.00 (0.00–0.00) 0.54
Third service (61)	0.72 (0.22) 0.84 (0.22) 0.12 [0.05–0.19] **<0.001**	0.67 (0.67–1.00) 1.00 (0.67–1.00) 0.00 (0.00–0.33) **<0.001**	0.68 (0.27) 0.67 (0.25) 0.01 [–0.07 to 0.08] 0.99	0.67 (0.33–1.00) 0.67 (0.33–1.00) 0.00 (0.00–0.00) 1.00
Level of certification				
EMT (979)	0.73 (0.24) 0.81 (0.23) 0.08 [0.06–0.09] **<0.001**	0.67 (0.67–1.00) 1.00 (0.67–1.00) 0.00 (0.00–0.33) **<0.001**	0.69 (0.24) 0.70 (0.25) 0.02 [0.00–0.03] **0.03**	0.67 (0.67–1.00) 0.67 (0.67–1.00) 0.00 (0.00–0.33) **0.01**
AEMT (112)	0.71 (0.25) 0.79 (0.24) 0.08 [0.03–0.13] **0.001**	0.67 (0.67–1.00) 1.00 (0.67–1.00) 0.00 (0.00–0.33) **0.004**	0.68 (0.25) 0.72 (0.24) 0.04 [–0.00 to 0.09] 0.18	0.67 (0.33–1.00) 0.67 (0.67–1.00) 0.00 (0.00–0.33) 0.24
Paramedic (734)	0.73 (0.24) 0.82 (0.22) 0.09 [0.07–0.11] **<0.001**	0.67 (0.67–1.00) 1.00 (0.67–1.00) 0.00 (0.00–0.33) **<0.001**	0.69 (0.24) 0.71 (0.25) 0.02 [0.01–0.04] **0.02**	0.67 (0.67–1.00) 0.67 (0.67–1.00) 0.00 (0.00–0.00) **0.02**
Years of experience				
0–3 years (397)	0.74 (0.24) 0.81 (0.23) 0.07 [0.05–0.10] **<0.001**	0.67 (0.67–1.00) 1.00 (0.67–1.00) 0.00 (0.00–0.33) **<0.001**	0.70 (0.24) 0.71 (0.25) 0.01 [–0.02 to 0.04] 0.99	0.67 (0.67–1.00) 0.67 (0.67–1.00) 0.00 (0.00–0.00) 0.32
4–10 years (645)	0.73 (0.24) 0.80 (0.23) 0.07 [0.05–0.09] **<0.001**	0.67 (0.67–1.00) 1.00 (0.67–1.00) 0.00 (0.00–0.33) **<0.001**	0.68 (0.24) 0.71 (0.24) 0.03 [0.01–0.04] **0.01**	0.67 (0.67–1.00) 0.67 (0.67–1.00) 0.00 (0.00–0.33) **0.006**

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TABLE 2 (Continued)

	Knowledge in communication module		Knowledge in hospice module	
	Mean score before (SD) Mean score after (SD) Mean difference [95% CI] *p*-value[a]	Median score before (IQR) Median score after (IQR) Median difference (IQR) *p*-value[a]	Mean score before (SD) Mean score after (SD) Mean difference [95% CI] *p*-value[a]	Median score before (IQR) Median score after (IQR) Median difference (IQR) *p*-value[a]
10+ years (783)	0.73 (0.24) 0.82 (0.22) 0.09 [0.08–0.11] **<0.001**	0.67 (0.67–1.00) 1.00 (0.67–1.00) 0.00 (0.00–0.33) **<0.001**	0.69 (0.25) 0.71 (0.24) 0.03 [0.01–0.04] **0.009**	0.67 (0.67–1.00) 0.67 (0.67–1.00) 0.00 (0.00–0.00) **0.03**

Abbreviations: AEMT, advanced emergency medical technician; CI, confidence interval; EMT, emergency medical technician; IQR, interquartile range; SD, standard deviation.

Statistical signficant was .05. Bolded values are <0.05 and statistically signficant.

[a]Paired *T* tests for mean comparisons, and Wilcoxon's signed-rank tests for median comparisons. Tests among subgroups were adjusted for multiple comparisons with Bonferroni correction. Statistically significant when $p < 0.05$.

modules for continuing education credit, there may be a bias in the sample population may be biased to include participants with inherent interest in EOL topics and/or those who may require continuing education credit. The latter may explain why there were several "other" types of EMS agencies ($n = 304$; 16.7%) represented, including law enforcement, retirees, or unemployed individuals who may need continuing education credit to maintain licensure. Although including the heterogenous "other" types of EMS agencies in final analysis may complicates interpretation and application of findings, the authors ultimately concluded that this is an important subgroup to include because it represents the national diversity of the EMS workforce and environments of clinical practice. Participants from "other" types of EMS agencies had a fewer number of EOL encounters per month (median 0 [CI 0–2] vs. overall median 3.0 [IQR 1.0–9.0]) and are thus a subgroup for whom these educational modules might maximally benefit the most given their infrequent exposure. In addition, participants skewed heavily from Massachusetts (29.4%, 537/1825). This is likely because the learning management system is based in Massachusetts with a large in-state user base. Therefore, results may skew toward regional practice variation.

Second, this study was not designed to assess the longitudinal effects of the modules. It is unknown how improvement in participant subject confidence and knowledge endures over time. Moreover, subject confidence and knowledge in this study are determined by a brief set of questions (Appendix 1). It is unclear how these measures of confidence and subject knowledge translate to clinical practice.

Another limitation is the use of self-reporting which may underestimate the number of EOL calls EMS clinicians encountered per month. Although examples of EOL were provided as "advanced dementia, cancer, organ failure, etc.," the definition may not be familiar to all EMS clinicians if their training does not routinely involve the identification of when these serious illnesses transition from a chronic into EOL stage. Thus, the self-reporting of the number of EOL encounters is more an assessment of EMS clinicians' subjective perception of EOL encounters rather than the actual frequency of patients encountered with advancing serious illnesses. Potentially, underreporting may correlate with fewer years of experience.

5 | DISCUSSION

In this national cohort of 1825 EMS clinicians, participants frequently encountered patients near the EOL. Overall, these freely available online modules increased EMS clinicians' confidence and in EOL communication and hospice knowledge. Linear regression demonstrated that before modules, EMS clinicians with more monthly EOL calls, those with more years of experience, and paramedics were more confident in their EOL skills than their peers. After module completion, those with the fewest years of experience (0–3 years) and EMTs gained more confidence in communication skills than their peers.

A major strength of this project is the use of a national cohort representing a diverse variety of states, EMS agencies, and EMS clinicians. However, this heterogeneous cohort also poses some challenges. The EOL education modules were designed to be generic such that they could be applied nationally, but there does exist significant variation in local EMS protocols for palliative care,[12] regulation on death declaration by EMS clinicians, or local variation in hospice resources. More localized training may provide additional or alternate benefits in both subject confidence and knowledge.

Since the results of the study demonstrate that EMTs and EMS clinicians with fewer years of experience gained the most confidence from these modules, they represent participants who may benefit most from a focused deployment of this asynchronous format. For example, when EMTs enroll in paramedic school, integrating these topics into didactics may be well timed to maximize module benefit. Alternatively, for EMS agencies that hire less experienced EMS clinicians, particularly those EMS agencies who might anticipate frequent EOL calls (e.g., interfacility transport contracted with hospice programs, proximity to large cancer centers), the proactive inclusion into initial orientation and continuing education would accelerate upskilling and avoid overreliance on subjective experiential learning for these challenging topics.

In summary, asynchronous, online continuing education can improve EMS clinicians' confidence in caring for patients near the EOL, particularly for those with fewer years of EMS experience. Future research may investigate the long-term effectiveness of these asynchronous educational modules and compare them to or

TABLE 3 Emergency medical services (EMS) clinician confidence in end-of-life (EOL) topics before and after educational module by EMS agency, level of training, and years of experience.

	Agree/strongly agree (%)		
	Confidence in communication	Confidence in hospice knowledge	
	Q1[a] before (%) Q1[a] after p-value[b]	Q2[c] before Q2[c] after p-value[b]	Q3[d] before Q3[d] after p-value[b]
Overall N (1825)	1131 (62.0%) 1468 (80.4%) **<0.001**	925 (50.7%) 1375 (75.3%) **<0.001**	1033 (56.6%) 1429 (78.3%) **<0.001**
EMS agency			
Fire-based (545)	338 (62.02%) 423 (77.61%) **<0.001**	246 (45.1%) 383 (70.3%) **<0.001**	282 (51.74%) 399 (73.21%) **<0.001**
Hospital-based (298)	191 (64.9%) 248 (83.2%) **<0.001**	166 (55.7%) 229 (76.9%) **<0.001**	187 (62.8%) 241 (80.9%) **<0.001**
Other (304)	173 (56.9%) 240 (78.9%) **<0.001**	148 (48.7%) 227 (74.7%) **<0.001**	159 (52.3%) 233 (76.6%) **<0.001**
Private (617)	388 (62.9%) 506 (82.0%) **<0.001**	382 (53.2%) 482 (72.1%) **<0.001**	364 (59.0%) 500 (81.0%) **<0.001**
Third service (61)	41 (67.2%) 51 (83.6%) **<0.001**	37 (60.7%) 54 (88.5%) **<0.001**	41 (67.2%) 56 (91.8%) **<0.001**
Level of certification			
EMT (979)	526 (53.7%) 789 (80.6%) **<0.001**	471 (48.1%) 719 (73.4%) **<0.001**	502 (51.3%) 733 (74.9%) **<0.001**
AEMT (112)	72 (64.3%) 86 (76.8%) **<0.001**	54 (48.2%) 83 (74.1%) **0.02**	59 (52.7%) 89 (79.5%) **<0.001**
Paramedic (734)	533 (72.6%) 593 (80.8%) **<0.001**	400 (54.5%) 573 (78.1%) **<0.001**	472 (64.3%) 607 (82.7%) **<0.001**
Years of experience			
0–3 years	196 (49.4%) 337 (84.9%) **<0.001**	182 (45.8%) 301 (75.8%) **<0.001**	204 (51.4%) 318 (80.1%) **<0.001**
4–10 years	424 (65.7%) 518 (80.3%) **<0.001**	326 (50.5%) 484 (75.0%) **<0.001**	378 (58.6%) 505 (78.3%) **<0.001**
10+ years	511 (65.3%) 613 (78.3%) **<0.001**	417 (53.3%) 590 (75.4%) **<0.001**	451 (57.6%) 606 (77.4%) **<0.001**

Abbreviations: AEMT, advanced emergency medical technician; EMT, emergency medical technician.

Statistical signficant was .05. Bolded values are <0.05 and statistically signficant.

[a]Q1: I know how to effectively deliver bad news, including death notifications, to family.

[b]McNemar test, adjusted for multiple comparisons with Bonferroni correction. Statistically significant when $p < 0.05$.

[c]Q2: I know what services are offered by hospice.

[d]Q3: I know what patients looks like as they transition into the active dying process.

synergistically with other educational modalities, such as communication simulation.[13,14]

AUTHOR CONTRIBUTIONS

All authors have made substantial contributions. D.H.W., A.M.B., and C.D. were responsible for conceptualization and original draft. J.K.B., B.G., T.G., and A.M.B. were responsible for educational module development. Z.H. was responsible for formal analysis. All authors were responsible for writing reviews and editing.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

AUTHOR BIOGRAPHY

David H. Wang specializes in Emergency Medicine, Palliative Medicine, and Population Health. He builds models of care that meet patients where they are and advance the Quintuple Aim.