ORIGINAL ARTICLE

Effects of a Multimodule Curriculum of Palliative Care on Medical Students

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Background/Purpose: The objective of this study was to investigate the effects of educational intervention using a multimodule curriculum of palliative care on medical students, and to explore significant factors that influence improvement in beliefs of ethical decision-making.

Methods: A total of 259 medical students enrolled in the "Family, Society and Medicine" course, and accepted a multimodule palliative care curriculum that included a 1-hour lecture, 1 hour of patient contact, 1 hour of literature reading, and 1 hour of discussion. A questionnaire was administered before and after the course to evaluate improvements in medical students' knowledge (principles and clinical management) of palliative care and their beliefs concerning ethical decision-making in palliative care.

Results: The students showed significant improvements after the course in their knowledge of the principles of palliative care (pretest 58.4% *vs.* posttest 73.1%; $p < 0.01$) and clinical management of palliative care (pretest 58.8% *vs.* posttest 67.9%; $p < 0.01$). Although their beliefs about ethical decision-making were also improved after the course, the medical students did not have a positive belief of "artificial nutrition and hydration is not always beneficial for terminal cancer patients", with a mean score of only 3.15 and 3.51 (pretest and posttest, respectively; range, 1–5). The logistic regression model showed that improvement in knowledge of either principles or clinical management did not significantly improve beliefs about ethical decision-making.

Conclusion: A multimodule curriculum of palliative care for medical students can significantly improve their knowledge on principles of clinical management and beliefs about ethical decision-making in palliative care. As for changes in beliefs about ethical decision-making in palliative care, continued ethical and clinical training is required. [*J Formos Med Assoc* 2008;107(4):326–333]

Key Words: curriculum, ethical decision-making, palliative care, undergraduate

It has long been documented that education about palliative care for terminally ill patients and their families is of great importance. Medical schools and colleges have paid much more attention to end-of-life care education than in previous decades.[1,2] Many curricula on palliative care are arranged to enhance the education of terminal patient care, with an emphasis on patient- and family-centered care.[3,4] Traditional classroom-based medical training is inadequate for the task.[5] With concerns for clinical competence, various kinds of undergraduate curricula on end-of-life care have been developed for better quality of palliative care.[6] However, there are currently no

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globally accepted standards for undergraduate or graduate training in palliative medicine.[7]

In Taiwan, many medical schools offer their palliative care education program mainly through lectures. Few institutions have formal curricula and very few studies have been conducted on curricular evaluation. Our study assessed the impact of a 4-hour multimodule curriculum for fifth-year medical students on their knowledge and attitudes to end-of-life care. Through curricular evaluation, we identified factors that influence students' beliefs about ethical issues, so we can modify the curricular design to enable students to become more competent at giving better quality palliative care.

Methods

Study population

This study was a cross-sectional survey conducted from 2003 to 2004. The target population consisted of 259 fifth-year medical students from National Taiwan University (NTU), China Medical University (CMU) and Chung-Shan Medical University (CSMU). These students undertook the 4-hour multimodule curriculum on palliative education within the course "Family, Society and Medicine". The study design and participant selection were approved by the hospitals' ethics committees.

Description of multimodule curriculum

A fifth-year medical student at the NTU College of Medicine is required to complete a medical clerkship at the National Taiwan University Hospital (NTUH), which includes the 6-week course "Family, Society and Medicine". Within the 6-week course, a 4-hour multimodule curriculum at the hospice and palliative care unit was arranged. Sixty fifth-year medical students from CMU and CSMU, who will receive internship training at NTUH, also attended this 4-hour course. The 4-hour multimodule curriculum consisted of:

- 1-hour lecture provided by a well-trained palliative care specialist. Knowledge and beliefs in palliative care, typical clinical conflicts concerning palliative care, and associated regulations and laws were introduced. The structure of the lecture was uniform and standardized.
- 1-hour patient visit at the hospice and palliative care unit was arranged by a senior doctor. Verbal and nonverbal communication and interaction with terminal cancer patients were practiced during the visit. Patient consent for the meetings was obtained prior to the visits.
- 1 hour of literature reading concerning humanity was performed in a group discussion.
- 1 hour of discussion for students to share learning feedback with palliative care specialists, mainly in a patient-centered fashion.

Measurements

A structured, three-part questionnaire was administered to all subjects. The three-part questionnaire included questions on demographic characteristics, palliative care knowledge, and beliefs about ethical decision-making in palliative care. The entire questionnaire was tested for content validity by a panel composed of five palliative care specialists, all of whom were experienced in care of the terminally ill.

Each item that related to palliative care knowledge in the questionnaire was appraised by "yes", "no" and "unknown", while beliefs about ethical decision-making in palliative care were appraised by "strongly disagree" (1) to "strongly agree" (5). A *content validity index* (CVI) was used to determine the validity of the structured questionnaire. The questionnaire yielded a CVI of 0.920, computed by summing 0.238 from the "4" ratings and 0.682 from the "5" ratings on all items.

In addition, 10 students at the same year level filled out the questionnaire to confirm its face validity and ease of application. Demographic characteristics assessed by the questionnaire included age, experience in providing palliative care, and information on palliative care. The other two parts included:

- Palliative care knowledge. This measure consisted of the principles (6 items) and clinical management (9 items) of hospice and palliative

care, such as symptom management and psychologic and spiritual care to be given to individuals and their families. This 15-item measure was designed with careful scrutiny of the literature in this area. The main reference was the *Palliative Care Quiz for Nursing* that was originally developed by Ross.[8] All of the items were also grounded on the basis of real-life experiences of the investigators who were involved in palliative care. The scoring consisted of "true" (1) and "false/unknown" (0). Kruder-Richardson formula 20 (KR-20) was used to assess the internal consistency of this knowledge measure and showed a coefficient of 0.69.

- Beliefs about ethical decision-making in palliative care. This part included "breaking the bad news" of terminal illness, discharge planning for a symptom-controlled patient, artificial nutrition concern, and sedation in terminal cancer care.[9–12] Measurement of these issues was through a four-item set using a five-point Likert scale from "strongly disagree" (1) to "strongly agree" (5). Internal consistency was demonstrated with a Cronbach's alpha coefficient of 0.71.

Statistical analysis

Data management and statistical analysis were performed using the SPSS version 10.0 (SPSS Inc., Chicago, IL, USA). A frequency distribution was used to describe the demographic data and the distribution of each variable. The mean and standard deviations were used to analyze the degree of each variable about knowledge and beliefs in palliative care. ANOVA was used to correlate the posttest scores of students with gender, religion, family history of cancer, and experience of palliative care. Paired *t* test analyses were used to assess differences in palliative care knowledge and beliefs about ethical decision-making on pre- and posttest assessments. Spearman analysis was used to assess the correlation between students' beliefs about ethical decision-making and palliative care knowledge. Univariate and multivariate analysis were used to identify factors that significantly influence beliefs about ethical decision-making on pre- and posttest assessments. A logistic regression model was used to establish the key factor(s) that influence students' beliefs about ethical decision-making in palliative care. A p value < 0.05 was considered significant.

Results

We analyzed 259 paired evaluations using paired *t* test from students who rotated from September 1, 2003 to October 30, 2004. The students showed significant improvements after the ward curriculum. The majority of students were male (74.9%) and 20–32 years old. Most of them had no specific religious beliefs (60.2%). There were 108 (41.7%) students with a positive family history of cancer, while 237 students (91.5%) had never experienced palliative care (Table 1).

On questions relating to palliative care knowledge, the mean score for all 15 items before the curriculum was 8.21 (accuracy rate, 54.7%) and 10.50 after (accuracy rate, 70.0%). The difference between the pre- and posttest mean was 2.29 ($z = -11.926$, $p < 0.0001$). There were significant improvements in 14 out of 15 items, except for "hospice and palliative care definition".

Principles of palliative care

On a per item basis, six items regarding principles of palliative care had a mean score of 3.50 (58.3%) and 4.38 (73.0%) for pre- and posttests, respectively. Table 2 shows a 15.3% improvement in this part of the questionnaire. The paired *t* test showed that five out of six items had significant improvements ($p < 0.01$), while the Wilcoxon signed rank test showed a significant difference ($z = -9.902$, $p < 0.001$). The five items were: "palliative care is appropriate only in situations where there is evidence of a downhill trajectory or deterioration", "to rid personal emotion is essential to provide palliative care", "the principles of palliative care are compatible with those of aggressive treatment", "accumulation of feeling of loss inevitably makes the palliative caregiver collapse", "palliative care adapts 'natural death', neither shortens

Table 1. Characteristics of the students ($n = 259$)

	n (%)
Gender	
Male	194 (74.9)
Female	65 (25.1)
Age (yr)	
20–22	85 (32.8)
23–25	165 (63.7)
26–28	4 (1.6)
≥ 29	5 (1.9)
Religion	
None	156 (60.2)
Traditional faith	34 (13.2)
Buddhist	24 (9.2)
Daoist	8 (3.1)
Christian	26 (10.1)
Others	11 (4.2)
School	
College of Medicine, NTU	199 (76.8)
CMU	29 (11.2)
CSMU	31 (12)
Family or friends have had cancer	
Yes	108 (41.7)
No	151 (58.3)
Family or friends have received palliative care	
Yes	22 (8.5)
No	237 (91.5)

NTU = National Taiwan University; CMU = China Medical University; CSMU = Chung Shan Medical University.

nor prolongs patient life". Among these, students showed the lowest posttest positive rate of 51% on "to rid personal emotion is essential to provide palliative care" (Table 2).

Clinical management of palliative care

Table 3 shows nine items regarding the clinical management of palliative care, which had a mean score of 5.29 (58.8%) and 6.11 (67.9%) in pre- and posttests. All of the items showed a significant improvement, while a significant difference was also observed under the McNemar χ^2 test. However, some items showed less than half the accuracy rate, such as "during the last days of life, the drowsiness associated with electrolyte imbalance may decrease the need of sedation", "in high dose, codeine causes more nausea and vomiting than morphine", and "the loss of a distant or contentious relationship is easier to resolve than the loss of one that is close or intimate" (Table 3).

Beliefs about ethical decision-making in palliative care

The third part of the questionnaire consisted of four ethical issues concerned with terminal care: breaking bad news, discharge planning, artificial hydration and nutrition, and sedation for refractory symptoms. All of the items showed a significant improvement with the paired *t* test, except

Table 2. Improvement in palliative care knowledge principles after the curriculum

	Accurate rate (%)		*p*
	Pretest	Posttest	
Palliative care is appropriate only in situations where there is evidence of a downhill trajectory or deterioration	45.9	68.3	0.000*
To rid personal emotion is essential to provide palliative care	27.4	51.0	0.000†
The principles of palliative care are compatible with those of aggressive treatment	73.7	85.3	0.000*
Accumulation of feeling of loss inevitably makes the palliative caregiver collapse	29.7	47.9	0.000†
Palliative care adapts 'natural death', neither shortens nor prolongs patient life	78.0	87.6	0.002*
Palliative care is an alternative for curative nonresponsive patients	95.4	98.5	0.057
Average	58.4	73.1	0.000†
			Z = –9.902

**p < 0.01; †p < 0.001.*

Table 3. Improvement in palliative care knowledge with regard to clinical management after the curriculum

	Accurate rate (%)		*p*
	Pretest	Posttest	
Morphine is the standard used to compare the analgesic effect of other opioids	75.3	84.2	0.002*
During the last days of life, the drowsiness associated with electrolyte imbalance may decrease the need for sedation	30.5	42.9	0.001†
Individuals who are taking morphine should also follow a bowel regimen	87.3	93.8	0.004*
In high dose, codeine causes more nausea and vomiting than morphine	28.6	46.7	0.000†
Demerol is not an ideal choice for chronic pain	29.3	66.0	0.000†
The loss of a distant or contentious relationship is easier to resolve than the loss of one that is close or intimate	30.5	39.4	0.005*
Morphine is commonly used in cancer pain and should follow the rules of by mouth, by the o'clock and by ladder	65.3	90.3	0.000†
Nausea and vomiting are common symptoms of ileus which are usually treated with steroid and prokinetics as first line medication	34.0	51.7	0.000†
Support is one of the important treatments for dyspnea of terminal patients	90.3	96.5	0.000†
Average	58.8	67.9	0.000†
			Z = −10.249

*$p < 0.01$; †$p < 0.001$.

Table 4. Improvement in beliefs of ethical decision-making in palliative care after the curriculum

	Accurate rate (%)		*p*
	Pretest	Posttest	
Truth telling is helpful to a good death	4.270	4.380	0.008*
Discharge planning and home care are ethical for terminal patients	4.360	4.490	0.002*
Artificial hydration and nutrition have no benefit to terminal patients	3.150	3.510	0.001*
It is ethical to give sedation to terminal patients for refractory symptoms	4.160	4.250	0.085

*$p < 0.01$, range 1–5.

"it is ethical for terminal patients to receive sedation for refractory symptoms". Most of the students seemed to disagree much with "artificial hydration and nutrition have no benefit to terminal patients" (pretest, 3.15; post-test, 3.51; range, 1–5), while "discharge planning and home care are ethical for terminal patients" was the issue most accepted by the students (Table 4).

Correlation between palliative care knowledge and beliefs about ethical decision-making in palliative care

Spearman analysis was used to assess the correlation between improvement in beliefs about ethical decision-making and students' posttest scores of palliative care knowledge (principles and clinical management). A significant correlation between "truth telling is helpful to a good death" and principles of palliative care knowledge ($r = 0.160$, $p < 0.05$) was noted. A similar finding was noted between "artificial hydration and nutrition have no benefit to terminal patients" and principles of palliative care knowledge ($r = 0.160$, $p < 0.05$), and between "artificial hydration and nutrition have no benefit to terminal patients" and clinical management of palliative care knowledge ($r = 0.165$, $p < 0.01$). The remainder showed no obvious correlations. However, improvement in "discharge planning and home care are ethical for terminal patients" and "it is ethical for terminal

Table 5. Spearman's correlation between palliative care knowledge (principles and clinical management) and improvement in beliefs of ethical decision-making

	Palliative care knowledge, *r* (*p*)		Total, *r* (*p*)
	Principles	Clinical management	
Improvement in…			
truth telling is helpful to a good death	0.206* (0.001)	0.096 (0.123)	0.157† (0.011)
discharge planning and home care are ethical for terminal patients	0.099 (0.111)	–0.025 (0.692)	0.008 (0.904)
artificial hydration and nutrition have no benefit to terminal patients	0.185* (0.003)	0.176† (0.004)	0.255* (0.000)
it is ethical to give sedation to terminal patients for refractory symptoms	0.129 (0.038)	–0.066 (0.294)	0.055 (0.377)

*$p < 0.01$; †$p < 0.05$.

patients to receive sedation for refractory symptoms" did not correlate with the posttest scores of palliative care knowledge (principles and clinical management) (Table 5).

Factors influencing improvement in beliefs about ethical decision-making

Several factors in the study such as "family or friends have had cancer", "willingness to provide palliative care", "posttest's accurate rate of principles toward palliative care knowledge", and "understanding the laws about palliative care" were significantly correlated with improvement in beliefs about ethical decision-making, after univariate analysis. The study had also intended to investigate the possible factors that influence improvement in ethical decision-making. However, no factor was found to significantly influence improvement in beliefs about ethical decision-making in a logistic regression model ($p < 0.05$).

Discussion

To the best of our knowledge, this study is one of the first to investigate improvement in medical students' knowledge and attitudes concerning beliefs about ethical decision-making in palliative care, especially in the Asia-Pacific region. In this study, we demonstrated that fifth-year medical students can have obvious improvements not only in their palliative care knowledge (principles and clinical management), but also in their beliefs about ethical decision-making in palliative care after a concise 4-hour workshop on palliative care. Through an appropriate short-term curriculum design, the students learned more about palliative care knowledge and beliefs about ethical decision-making. The results are compatible with previously documented studies.[13–16] Our curriculum targeted fifth-year medical students because this is the very beginning of their involvement with the clinical environment and is also the best timing to deliver active clinical training.[17,18] Students at this level are more open to humanist competency, which is undermined gradually by the clinical environment of subsequent internship training and residency training.

While there were many improvements in palliative care knowledge, not so many were made in terms of beliefs about ethical decision-making. This is possibly because more time is required to achieve concept change than knowledge improvement. Concept change usually involves changes in traditional values, social attitude toward diseases, and culture. We also noted that posttest scores of palliative care knowledge significantly correlated with improvements made in beliefs about ethical decision-making, such as "truth telling is helpful to a good death" and "artificial hydration and nutrition have no benefit to terminal patients". In other words, the better the students scored in the

principles of palliative care knowledge, the more improvements were made in the belief that "truth telling is helpful to a good death" and "artificial hydration and nutrition have no benefit to terminal patients".

In our curriculum, we use a multimodule design that consisted of a lecture, bedside learning, relevant literature reading, and discussion. We believe that students who underwent such curriculum will learn more about palliative care.[19] While every student will eventually have clinical practice, this is the first time an integrated curriculum has been developed with both clinical practice and basic medical science together in end-of-life care in Taiwan.

Such a curriculum is easy to implement in other medical schools and clinical settings because the design concept is based on utilization of resources that already exist. Moreover, the curriculum is purposely condensed so that it can be easily exported to other medical schools. By implanting this curriculum, we hope to establish a standard for curricula development and outcome measurement in palliative medicine education earlier so that we can promote palliative medicine more broadly.

This study was conducted to understand the various factors that affect fifth-year medical students' learning improvement with regard to beliefs of ethical decision-making in palliative care. However, we found no significant factors correlating with these after the statistical analysis. There might be many other factors remaining to be taken into consideration and further efforts would be required to create the appropriate study and questionnaire design.

We are also interested in the pattern of information retention after this curriculum. Further assessment in subsequent years of medical training, including residency training and clinical practice,[20] toward curriculum design, and follow-up studies of students' knowledge, attitudes, and skill retention will provide more evidence to modify the curriculum.

There were several limitations inherent to this study. First, the study was conducted on only one intervention group. There was no control group because every student was required to undergo this curriculum. Second, although this program improved the students' knowledge of and attitudes on palliative care, the evaluation method was limited due to the short-term curriculum design. The maturation effect should also have been considered. Lastly, concept changes required more time to observe. A longitudinal study would allow for a better understanding of concept changes over time. Therefore, continued observation and evaluation of knowledge retention and attitude towards palliative care after the curriculum is necessary.

In conclusion, a multimodule curriculum of palliative care for medical students can significantly improve their knowledge, including principles and clinical management, and the beliefs of ethical decision-making toward palliative care. As for the change in the beliefs of ethical decision-making toward palliative care, continued ethical and clinical training is required.

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