

# Lecture-simulation-combined Education Improve Nursing Undergraduates' Knowledge and Attitude for Palliative Care

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**Abstract.** Continuous improvement for the teaching method is security for promoting the quality of palliative care. The didactic lecture and simulation-based learning were always used independently, which may negatively affect the results of palliative care education. This research aimed to explore the effectiveness of lecture-simulation-combined education in improving nursing undergraduates' knowledge and attitude of palliative care. A quasi-experimental single-group pre/post-test design was adopted to evaluate the variables with a sample of voluntary fifty-two nursing undergraduates before and after an 18-hour lecture-simulation-combined palliative care course. The course was composed of two hours didactic lecture, ten hours of lecture-simulation-combined learning, and six hours of simulation practise. Two questionnaires, named *Palliative Care Quiz for Nursing* and *Frommelt Attitude towards Care of the Dying*, were used to evaluate students' knowledge and attitude of palliative care before and after the course. By paired sample *t*-test, the results showed increased scores in students' knowledge ( $p < 0.05$ ) and attitude ( $p < 0.05$ ) after the course. Lecture-simulation-combined education is an effective strategy to improve nursing students' knowledge and attitude of palliative care. Lecture-simulation-combined education could either be good at equipping students with theoretical knowledge, but also be capable of helping students to construct a positive attitude on palliative care.

**Keywords:** Palliative care; Lecture-simulation-combined; Attitude; Knowledge; Nursing undergraduates

## 1. Introduction

According to the latest population projections, Macao will enter the "hyper-aged society" in 2031 with the elderly's proportion reaching 22.4% (Statistics and Census Service of Government of Macao Special Administrative Region, 2014). With increasing ageing, the requirement for palliative care in Macao is demanding. Palliative care, as an essential part of continuum nursing care, is to secure dignity and comfort at the last stage of people's life. The American

Association of Colleges of Nursing (AACN) identifies palliative care as one of the core competencies of qualified nurses (American Association of Colleges of Nursing, 2019). Because nurses accompany with the dying patients more than other medical staff, they become the centre and connection of the team (Smith, Macieira & Bumbach, 2018). Every nursing student needs to master seventeen palliative care competencies before graduation, which include symptom control, comfort supply, communication, team-work, and self-coping. Providing palliative care is not only challenging but also anxiety-provoking because of incurable diseases and impending death. Still, Macao's nursing curriculum has been slow to integrate palliative care as a compulsory course. Nursing undergraduates were not educated enough to cope with the situation of dying. The under-prepared nurses feel anxious and stressed when carrying out the palliative care, resulting in a poor quality of nursing and compromising patient satisfaction (Rodrigues, 2015; D'Antonio, 2017; Cant & Cooper, 2017).

### **1.1 The knowledge of palliative care**

Knowledge is defined as "knowing something with the familiarity that acquired through experiences such as understanding of a science or technique" (English Oxford Living Dictionaries, 2019). Palliative care, defined by the World Health Organization, is "an approach that improves the quality of life of patients and their families facing the problem associated with life-threatening illness" (World Health Organization, 2002). Palliative care knowledge includes basic concepts, ethical principles, and theories on terminal symptoms management (mechanism, assessment, medications, and supplementary treatment). Nurses' insufficiency knowledge is one of the main barriers to providing excellent palliative care, and nurses' knowledge deficit might originate from inadequate education during their undergraduate learning (Jaykumar, Karthikbabu, Karvannan, Kumar, Prem, Sisodia & Syed, 2012). Lacking a particular course, the knowledge of palliative care just "threaded" through the nursing curriculum; therefore, students' palliative care knowledge was not enough.

### **1.2 The attitude of palliative care**

Attitude is defined as "a settled way of thinking or feeling about something" (English Oxford Living Dictionaries, 2019). Attitudes are formed by evaluating favourable or unfavourable effects on specific entities. As experiences increases, attitudes change accordingly. The attitude of palliative care includes how the nurse regards palliative care and how about the position of nursing in palliative care (Frommelt, 2003). Feeling useless and unable to help dying patients and their families might accumulate into negative attitudes towards palliative care (Robinson & Epps, 2017). Exposure to the processes of patients' dying might remind nurses of their mortality, which may also result in a negative attitude towards palliative care. Passive attitudes will harm the quality of care and increase the burnout of nurses.

### **1.3 Medical simulation education**

Medical educators defined simulation as "an event or situation made to resemble clinical practise as closely as possible" (Grossman, 2013). In other words, medical simulation means that educators and learners conduct learning and teaching activities in a simulated clinic scenario. The reported benefits of simulation

including 1) improving critical thinking and clinical reasoning skills; 2) improving the knowledge acquisition; 3) improving putting the theory into practice; 4) improving the communication skills; 5) improving the problem-solving skills and nursing techniques; and 6) providing supportive and nonthreatening learning conditions (Gillan, 2014; Carman, Sloane, Molloy, Flint & Phillips, 2016; Tamaki, 2019). With limited palliative care practice units and ethical considerations, students did not have enough chance to practise palliative care, so the medical educators used simulation more widely in recent years.

#### **1.4 Lecture-simulation-combine education for palliative care**

Initially, palliative care education predominantly carried out by theoretical lectures which may be complained by both students and educators for lacking in practising. For example, Berndtsson used a didactic five-week palliative care course for the year three nursing students (Berndtsson, Margareta & Rejnö, 2019). Their study included 12 lectures: physical and psychological changes in the dying process, palliative diagnoses, terminal symptoms management, ethical issues, caring for families, and nurses' advocating roles in palliative care. Nevertheless, only with didactic lecture, students may find difficulties to use the knowledge. It has been concluded the didactic lecture was not good at training communication which was the most mentioned difficulty by researchers.

On the other side, among the increasing numbers of palliative care simulation researches, most of them used simulation without enough theoretical preparation. For example, Dame and Hoebeke (2016) ran a 15-minute simulation scenario, followed by a discussing and sharing debriefing to teach palliative care. Researchers conducted two simulation scenarios to train students' competency of palliative care (Valen, Holm, Jensen & Grov, 2019). Students should not only be encouraged to be kind and patient but also they should be equipped enough with knowledge before they enter palliative situations. Carman et al. (2016) suggested that the simulation should combine theoretical knowledge learning with practical application to provide palliative care education. Therefore, in this study, researchers designed educational interventions as a combination of theoretical lectures with simulation-based learning. This research aimed to investigate whether the lecture-simulation-combined course could improve nursing undergraduates' palliative care knowledge and attitudes.

## **2. Research design and method**

### **2.1 Design**

A quasi-experimental single-group pre/post-test design was adopted to investigate the effectiveness of the lecture-simulation-combined palliative course in improving nursing undergraduates' knowledge and attitudes.

### **2.2 Hypothesis**

The hypothesis generated in this research was that the nursing undergraduate would have increased knowledge and attitude of palliative care after the 18-hour lecture-simulation-combined course.

### 2.3 Participants and setting

Nursing students of Year 2 and Year 3 from a four-year undergraduate nursing program in a Macao institute were invited to enrol in this research. The research ruled out students of Year 1 and because they were still learning fundamental nursing theories and are not ready for palliative care. Year 4 students have too many clinical practising hours to coordinate with the schedule of this research. Fifty-two nursing students enrolled in and finished the 18-hour palliative care course. There were 15 (28.8%) males and 37 (71.2%) females. Twenty-three (44.2%) students were from Year 2 while twenty-nine (55.8%) were students from Year 3.

### 2.4 Interventions

The 18-hour palliative care course included a 2-hour theoretical lecture, a 10-hour lecture-simulation-combined terminal symptoms learning, and 6-hour simulation scenarios practising. Table 1 shows the course design. The course lasted for around one month, two times per week. To ensure every participant's active involvement, researchers divided fifty-two students into five groups, and there were about ten students in each group. The research ran the 18-hour-course five times, and each time had the same teaching contents and educators.

**Table 1. The framework of lecture-simulation-combined course in palliative care**

Content	Time
• Introduction for palliative care	2 hours
• Terminal symptom management for pain	2 hours
• Terminal symptom management for unconsciousness and respiratory and cardiovascular problems	2 hours
• Terminal symptom management for digestive problems	2 hours
• Terminal symptom management for malignant wounds	2 hours
• Psychological, spiritual and social supporting in palliative care	2 hours
• Hospice scenario simulation: expectable death	3 hours
• Hospice scenario simulation: un-expectable death	3 hours
Total	18 hours

The first two-hour lecture introduced fundamental theories and communication principles of palliative care. In the next ten hours, we focused on the mechanism, assessment, medications, complementary therapies, and nursing interventions of terminal symptoms. The involved terminal symptoms were pain, dyspnoea, fatal arrhythmia, fatigue, unconsciousness, anorexia, nausea and vomiting, thrush, hiccup, ascites, intestinal obstruction, and malignant ulcer/fistulae. Each symptom was taught firstly by didactic lectures and then followed by students' practising on manikins to care symptoms while communicating with patients. Terminal symptoms were demonstrated mainly by the high-fidelity manikin. Educators also used pictures and wounds apparatus to show symptoms which the manikin could not mimic. While students' practising, the tutor used the vocal system of the manikin to mimic the patient's voice, allowing the communication between the role-players. Tutors merged the communication skills, cultural and spiritual assessment, and interdisciplinary cooperation into 10-hour learning. Table 2 showed the example of educational design in lecture-simulation-combined learning.

**Table 2. An example of lecture-simulation-combined learning for pain**

<b>Content</b>	<b>Time</b>
Lecture: pain management for terminal patients	60 min
Simulation setting	
<ul style="list-style-type: none"> <li>• Background: 54-year-old, male, Buddhist, pancreatic cancer, stage IV, complaining "pain all over my body".</li> <li>• High-fidelity manikin: moaning, sweating, heart rate: 146/min, blood pressure: 169/92 mmHg.</li> <li>• Pictures: an old man with painful facial expressions and body postures; thrush.</li> <li>• Educator: complained pain through the vocal system of the manikin.</li> <li>• Pain management strategy: Oramorph, oral solution, 10 mg, Bid.</li> </ul>	
Students' practising in simulation	60 min
<ul style="list-style-type: none"> <li>• Identify various pain origins by communication with the patient: thrush because of chemotherapy, abdominal pain because of pancreatic cancer, pain in the bone because of metastasis, muscular pain because of long-term bedridden.</li> <li>• Assess and document the pain through the Visual Analogue Scale, the patient's facial expression, body posture, and fluctuating vital signs.</li> <li>• Evaluate and explain the current pain management strategy.</li> <li>• Suggest revising for the pain management strategy: medication adjustment and supplementary therapy.</li> <li>• Practise oral hygiene.</li> <li>• Health educate: the usage of Xylocaine mouthwash before the dinner to control the pain of thrush.</li> <li>• Comfort the patient continuously according to the patient's background.</li> </ul>	

The last six hours were composed of a 3-hour-scenario for the expectable death and a 3-hour-scenario for the un-expectable death. Educators grouped all learned symptoms in scenarios. At the beginning of the class, the educator introduced the case. Ten students were divided voluntarily into the Patient team, Nurse team, or Family team. Forty-five minutes were used for group discussion. Based on the framework drafted by the tutor, students in the Patient team and Family team detailed the possible interactions between the patient, nurses, and families. Students in the Nurse team did not know the details of the scenario, and they just made the nursing care plan according to the background of the patient. Every team picked one student to participate in the scenario. The scenario lasted 60 minutes. The educator controlled the manikin, and three students from each team role-play the patient (by manikin's vocal system), the family member, and the nurse respectively. The rest students were observers. The scenarios were followed by a 60-minute debriefing guided by the tutor and attended by all students. We invited the role-played nurse, patient, and family member to share their experiences of the scenario, asking the observers to discuss their ideas about death. Table 3 showed the example of scenario design for un-expectable death.

**Table 3. An example of un-expectable death scenario**


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Simulation setting	<ul style="list-style-type: none"> <li>• Background: 67-year-old, male, acute myocardial infarction with IV degree of heart function</li> <li>• High-fidelity manikin (symptoms show chronologically) <ul style="list-style-type: none"> <li>○ Moaning, sweating, old inferior wall myocardial infarction (ECG), bowel sound hyperaction</li> <li>○ Severe dyspnoea, vomiting</li> <li>○ R-ON-T phenomena, then ventricular fibrillation (ECG)</li> <li>○ Unconsciousness</li> </ul> </li> </ul>
Students' role playing	<ul style="list-style-type: none"> <li>• The patient <ul style="list-style-type: none"> <li>○ Refuse to use the bedpan and insist on going to the toilet for defecation.</li> </ul> </li> <li>• The nurse <ul style="list-style-type: none"> <li>○ Persuade and help the patient defecate by using the bedpan.</li> <li>○ Ensure oxygen supply.</li> <li>○ Monitor the electrocardiogram on the screen continuously and closely.</li> <li>○ Identify the fatal arrhythmia and inform the doctor instantly.</li> <li>○ Prepare instruments and medicines for resuscitation.</li> <li>○ Inform the family member in time.</li> <li>○ Communicate with the family member.</li> </ul> </li> <li>• The family member <ul style="list-style-type: none"> <li>○ Panic.</li> <li>○ Cannot accept the deterioration of the patient.</li> </ul> </li> </ul>

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## 2.5 Instruments

The Palliative Care Quiz for Nursing (PCQN) was used to examine palliative care knowledge. The scale was composed of 20 items. The dimension of philosophy and principles has four items, the dimension of pain and symptom management has 13 items, and the dimension of psychosocial and spiritual has three items. Students choose "true", "false" or "do not know" for each item, and the overall score is gained by calculating the number of correct responses. The overall scores range from 0 to 20, with higher scores representing higher levels of knowledge. The validity of PCQN was confirmed during its development with an acceptable alpha of 0.78. The correlation coefficient in test-retest reliability was 0.56 ( $p > 0.05$ ) (Ross, McDonald & McGuinness, 1996).

The Frommelt Attitude towards Care of the Dying (FATCOD) scale was adopted to evaluate students' attitudes towards end-of-life caring. It is composed of 30 items, rating on a five-point Likert-type scale. Item 1, 2, 4, 12, 16, 18, 20, 21, 22, 23, 24, 25, 27, and 30 are all positively statements ranging from 1 for strongly disagree to 5 for strongly agree. All others are negative, scoring from 1 for strongly agree to 5 for strongly disagree. The final score ranges from 30 to 150, with a higher score representing a more positive attitude. The items were classified into the patient-centred and family-centred dimensions. The reported internal consistency of the FATCOD was  $\alpha = 0.89$  (Frommelt, 2003).

## 2.6 Data collection

Participants were required to fill the demographic collecting questionnaires, the PCQN and the FATCOD before the course. They finished the post-test of PCQN and FATCOD immediately after the closure of the course.

## 2.7 Statistical methods

The data were analysed by SPSS version 26.0. The Chi-square test and a paired sample *t*-test were adopted to evaluate scores' differences between before and after the 18-hour course.

## 2.8 Ethical considerations

The research obtained informed consent from all participants. Research informants have been informed of their voluntary participation, and they could terminate their participation at any time without penalty. The personal data of all participants were kept confidential by coding numbers. Institutional review board approval was obtained (Grant number RP/ESS-02/2018).

## 3. Results

### 3.1 The knowledge of palliative care

The pre-mean score of PCQN was 8.98 (SD 2.46, range: 4-13). The post-mean score of PCQN was 12.98 (SD 2.47, range: 8-18). Twenty-two participants (42.3%) scored more than ten before the education, while forty-seven (90.4%) scored more than ten after the education. Table 4 shows the sub-total scores before and after the workshop for each dimension. Students' palliative care knowledge was improved after the course in the dimensions of philosophy and principles ( $p < 0.05$ ), pain and symptoms management ( $p < 0.05$ ), and psychosocial and spiritual care ( $p < 0.05$ ). The score details of PCQN were shown in Table 5.

**Table 4. Differences of the PCQN between pre-test and post-test (n=52)**

Dimension	Pre			Post			<i>t</i>	<i>p</i>
	Mean	SD	Range	Mean	SD	Range		
Philosophy and principles	1.62	0.89	0-3	2.38	0.89	0-4	-6.492	.000*
Pain and symptom management	6.23	1.58	3-10	8.75	1.40	5-11	-14.073	.000*
Psychosocial and spiritual	1.13	0.77	0-3	1.85	0.72	0-3	-5.892	.000*
Total score	8.98	2.46	4-13	12.98	2.47	8-18	-17.535	.000*

\*:  $p < 0.05$

Table 5. The response of the PCQN (n=52)

Item	Pre correct number (%)	Post correct number (%)	$\chi^2$	<i>p</i>
Philosophy and principles				
Q1	25 (48.1)	37 (71.2)	5.751	.016*
Q9	17 (32.7)	28 (53.8)	4.740	.029*
Q12	23 (44.2)	28 (53.8)	0.962	.327
Q17	20 (38.5)	31 (59.6)	4.656	.031*
Pain and symptom management				
Q2	29 (55.8)	48 (92.3)	18.059	.000*
Q3	13 (25.0)	19 (36.5)	1.625	.202
Q4	35 (67.3)	49 (94.2)	12.133	.000*
Q6	19 (36.5)	32 (61.5)	6.502	.011*
Q7	12 (23.1)	40 (76.9)	30.154	.000*
Q8	39 (75.0)	46 (88.5)	3.155	.076
Q10	16 (30.8)	40 (76.9)	22.286	.000*
Q13	1 (1.9)	13 (25.0)	11.886	.001*
Q14	33 (63.5)	40 (76.9)	2.252	.133
Q15	46 (88.5)	42 (80.8)	1.182	.227
Q16	11 (21.2)	17 (32.7)	1.759	.185
Q18	48 (92.3)	44 (84.6)	0.848	.357
Q20	27 (51.9)	25 (48.1)	0.154	.695
Psychosocial and spiritual				
Q5	4 (7.7)	14 (26.9)	5.442	.020*
Q11	34 (65.4)	48 (92.3)	9.743	.001*
Q19	24 (46.2)	34 (65.4)	3.898	.048*

\*:  $p < 0.05$ 

### 3.2 The attitude of palliative care

Before the course, students earned a mean score of 108.92 (SD 7.40) in the total score of FATCOD, 70.37 (SD 5.92) in the "patient-centred" dimension, and 38.56 (SD 2.61) in the "family-centred" dimension. After the course, students earned a mean score of 119.37 (SD 8.57) in total score, 78.89 (SD 6.84) in the "patient-centred" dimension, and 40.48 (SD 2.30) in the "family-centred" dimension. The differences between pre score and post score in FATCOD showed statistical significance ( $p < 0.05$ ). Table 6 showed the score of FATCOD.

Table 6. FATCOD Score of pre/post-course

Items	Pre		Post		<i>t</i>	<i>p</i>
	Mean	SD	Mean	SD		
Patient-centred dimension	70.37	5.92	78.89	6.84	-18.457	.000*
Q1	4.40	0.66	4.94	0.73	-5.156	.000*
Q2	3.56	0.78	4.44	0.73	-7.458	.000*
Q3	2.90	0.87	3.52	0.75	-4.657	.000*
Q5	3.87	0.72	4.06	0.73	-2.018	.049*
Q6	3.92	0.74	4.39	0.63	-5.196	.000*
Q7	3.14	0.74	3.44	0.80	-2.675	.010*
Q8	2.50	0.64	3.10	0.77	-5.080	.000*
Q9	3.12	0.83	3.58	0.70	-4.964	.000*
Q10	2.75	0.88	3.67	0.76	-8.724	.000*
Q11	3.27	0.89	3.77	0.83	-5.369	.000*
Q13	3.75	0.71	3.89	0.73	-1.188	.240

Q14	3.56	0.83	3.75	0.62	-3.120	.003*
Q15	3.85	0.83	3.98	0.92	-0.961	.341
Q19	3.90	1.02	4.37	0.84	-3.150	.003*
Q21	4.10	0.50	4.33	0.51	-3.546	.001*
Q23	4.52	0.61	4.56	0.57	-0.814	.420
Q25	3.10	1.00	4.00	0.63	-7.138	.000*
Q26	2.50	0.83	2.87	0.77	-4.428	.000*
Q27	3.50	0.70	3.87	0.69	-4.696	.000*
Q30	4.17	0.38	4.39	0.53	-2.844	.006*
Families-centred dimension	38.56	2.61	40.48	2.30	-7.937	.000*
Q4	4.50	0.51	4.73	0.49	-3.546	.001*
Q12	3.94	0.61	4.19	0.53	-3.244	.002*
Q16	4.04	0.44	4.31	0.47	-3.964	.000*
Q17	1.58	0.67	1.39	0.49	2.018	.049*
Q18	4.50	0.54	4.65	0.48	-1.935	.059
Q20	4.08	0.62	4.25	0.48	-2.901	.005*
Q22	3.96	0.44	4.33	0.55	-5.019	.000*
Q24	4.10	0.63	4.35	0.68	-2.360	.022*
Q28	4.46	0.61	4.77	0.58	-4.761	.000*
Q29	3.40	0.87	3.52	0.78	-2.579	.013*
Total score	108.92	7.40	119.37	8.57	-24.126	.000*

\*:  $p < 0.05$

## 4. Discussion

### 4.1 Course design

Palliative care education was conducted through a variety of teaching methods, including traditional lectures, clinical case discussions, hospice care facilities visiting, and simulation. Although educators used the simulation increasingly, the theoretical lecture rarely combined with it. One or two hours of simulation, maybe not enough to teach enough knowledge and construct positive attitudes. The lecture was good at teaching knowledge, while the simulation did well in the application of knowledge and practising communications. The two teaching methods have equal value, and neither should not be neglected in palliative care education. This study designed the course with a suitable length of learning hours and reasonable learning process, aiming to make students benefit from the two methods.

The objective of palliative care is not to cure but to relieve and comfort, and the medical and nursing principles should be changed accordingly. If we kept pushing our nurses to save the lives of human beings, enormous pressure and un-avoided frustration would cause passive attitudes of nurses. We set the acceptance of death as the first objective of our course. We took some time to explain the philosophy of death by lecture and guided deep reflection after the simulation scenarios. The principles of therapeutic communication in a dying situation were taught firstly in the lecture. Then we set the dying situations which included the dying patient mimicked by the educator and the families mimicked by the students. Participants could practise communication without being afraid of making mistakes. Role-playing family members allowed students to profoundly understand the families' dilemma, which may result in more

tolerance. We constructed our course based on handling terminal symptoms. Although persons died of different diseases, different diseases share some common terminal symptoms. We would take more aggressive and sophisticated methods to make patients avoid suffering. For example, we taught particular pain assessment scales for severely ill patients, emphasised that addiction should not be the primary concern, and introduced the complementary techniques and spiritual console for the pains. Only when participants found themselves useful in helping the dying patients and their families, the positive attitude could be constructed. In recent five years, most studies made the simulation as the only intervention to carry out palliative care education. For example, Tamaki (2019) carried out an 80-min simulation in end-of-life education. There was an innovative study with a 6-week online virtual activity through Second Life®, which was composed of 3-hour in pre-simulation learning, 1-hour in a virtual simulation, and 3-hour in guided reflection (Sanborn, Cole, Kennedy & Saewert, 2019). Only one research combining lecture with simulation was identified. Myers (2018) gave participants a 90-min lecture, followed by a 45-min simulation in the experimental group while a 45-min case study in the control group. This research has also proved the lecture-simulation-combined method an effective method for teaching palliative care by students' positive changes in knowledge and attitude.

#### **4.2 Knowledge of palliative care**

The low mean score of PCQN with a mean score of 8.98 (SD 2.46) before the course showed inadequate palliative care knowledge in Macao nursing undergraduates. Previous studies shared similar results and proved nursing students' insufficient knowledge. Al Qadire's (2014) research investigated 220 Jordan nursing students' palliative care knowledge. The results showed insufficient knowledge (mean=8 out of 20; SD 3.1). The same result was found in India's research (Chari, Gupta, Choudhary & Sukare, 2016). Four hundred and nine Saudi Arabia nursing students got a mean score of 5.23 out of 20 (SD 3.24) (Aboshaiqah, 2020). Dimoula surveyed 529 Greek nursing students, gaining a mean score of 8.2 (SD 2.8) (Dimoula, Kotronoulas, Katsaragakis, Christou, Sgourou & Patiraki, 2019).

This course got a statistically significant improvement in students' palliative knowledge by an elevated mean score of 3.0 points. All dimensions in the PCQN showed positive changes. A similar result was found in Tamaki's (2019) study. They used a knowledge questionnaire, which was quoted from nation nursing examination in Japan, to prove the simulation intervention could improve nursing undergraduates' knowledge of palliative care. Researchers used an end-of-life simulation elevated students' PCQN scores by 2.34 points (Kirkpatrick, Melin-Johansson & Bergh, 2017). In Myers' (2018) research, the group of lecture with simulation gained 1.23 points elevation in the mean score of PCQN.

There were four items in the dimension of philosophy and principles. Q1 showed the correction of the misunderstanding that palliative care was only for the person who was very near death. We emphasised the principle of palliative care in the first 2-hour lecture that palliative care should begin at the very beginning of diagnosing of a terminal disease. Before the course, most students

thought nurses should stand neutrally and kept emotional detachment to avoid burnout (Q9). In the debriefing, the role-played nurse shared his experience that it was impossible for a nurse to "detach" the terminal patient. His idea that not detaching but coping with the emotional connection was the only way to avoid nurses' burnout gained agreement from other students. Thirty-two students originally agreed on the judgment (Q17) palliative care will cause the nurses' inevitable burnout. After the course, the number decreased to twenty-one. We could induce that the confidence in coping palliative care increased in some students after the course. There were thirteen items in the dimension of pain and symptom management. The correct ratios were increased in six items while remained unchanged in seven items. Pain is the most serious and long-lasting symptom affecting the quality of life of the most dying patients. Pain management is at the core of the terminal symptom control. We taught students the rules of medication should be adjusted in palliative care, with more focus on pain-relieving rather than drug addiction (Q7, Q13). The pharmacy was taught in detail (Q2, Q8, 14), and some supplementary treatment, such as music therapy and aromatherapy, were introduced by the updated evidence (Q4). Although the results were not ideal, reciting the knowledge encouraged by a closed-book exam and continuous practising may be a practical way to enforce the learned knowledge. There were three items in the psychosocial and spiritual dimension in which all items gained positive changing. For instance, most participants believed families accompany until the patient's death was crucial (Q5) firstly. In the course, we emphasised that families should be included in psychosocial caring, and nurses should try to help families avoiding severe suffering and tortures, which might last for the rest of their life. After the course, added students realised avoiding severe attacks for the patient's family was the nurse's duty. In summary, extensive and profound learning through the lecture-simulation-combined could obtain positive changes in students' knowledge.

### **4.3 Attitudes of palliative care**

The FATCOD has been world-widely used in earlier studies for nursing undergraduates and nurses. The reported mean score was 96.96 (SD 8.30) in Palestine (Abu-el-Noor & Abu-El-Noor, 2016), 123 (SD 10.1) in Sweden (Henoeh, Melin-Johansson & Bergh, 2017), 93.83 (SD 5.96) in Indonesia (Muhamad, Baskoro & Dicky, 2018), 95.81 (SD 8.03) in India (Paul, Renu & Thampi, 2019), and 111.9 (SD 10.2) in Greece (Dimoula et al., 2019). Compared with other countries, Macao's score was in the middle position with a pre-test score of 108.92 (SD 7.40). Our study showed a statistically significant improvement in palliative care attitude after the 18-hour course by 10.45 points. This result is in line with Berndtsson's finding that the mean score was increased of 9.6 points after a dedicated five-week course which covers 12 lectures (Berndtsson et al., 2019). Also, using theoretical education in five weeks, Henoeh improved nursing students' attitudes by 6 points (Henoeh et al., 2017).

There were twenty items in the patient-centred dimension, and seventeen items have been statistically significantly improved. For example, most students reported difficulties in communication. Educators used every chance in simulation learning or practising, allowing students to practise communication. Especially, in the debriefing session, educators set the scenario, letting the

patient ask the nurse "Am I dying?" Then, we discussed how to answer that question properly in the debriefing after the scenario. After the course, students gained higher scores in talking about the impending death with patients (Q3, Q11) and finding it more acceptable to construct an intimate relationship with the dying person (Q9, Q14). Students were found to be braver to take part in palliative care (Q5), no longer running away from the dying situation (Q15, Q26) after the course. It also has been noticed students become more acceptable about death, not regarding death as the worst things that could happen to a person (Q2), feeling less upset with patients' giving up hope of getting better (Q8). Before the course, students might be hard to accept the words "death welcomed by the dying (Q10)". After the course, more students chose a neutral attitude to this statement. In the simulation, we set a scenario requiring the nursing to discuss with patients' families, whether the honest answer should be given in response to the patient's asking. The role-played nurse chose to support the ideas of being honest with the patient in the scenario. The student explained and shared her thoughts and behaviours in the debriefing, which aroused intense discussion. Accordingly, we found a positive change in Q27. We found there was no statistical difference in Q23, which indicated our students advocating flexible visiting time even before the course. Also, the scores of Q13 and Q15 were not improved by the course, showing students were still struggling on the edge of negative/positive. This result recommended that more extensive and profound educational intervention might be needed to construct a more stably positive attitude.

When it comes to the family-centred dimension, Q18 was the only item that was not changed statistically, because students got a high mean score before the course. We found before the course nursing students have already admitted the importance that we should not let the death of the patient harm the remaining life of the families. Our course corrected the misunderstanding that at the very last stage of the patient dying process, nurses need to withdraw and let families stay with the patient solely (Q17). After the course, students become more understanding of the idea that caring for families should be carried throughout the whole palliative period (Q7). Students have always been alerted when facing the patient' families under the pressure of behaving wrongly. After the course, students become more acceptable about the families' anxiety and would not regard the families as an interference to the treatments (Q29). Furthermore, we detected more cooperation that students were willing to invite families to attend the physical care and psychological connection with the dying person.

## **5. Conclusion**

This research showed an insightful picture of the Macao nursing undergraduates' knowledge and attitude in palliative care. Their knowledge and attitude of palliative care were not sufficient for the challenges in hospice situations. A compulsory palliative care course should be considered taking into the nursing curriculum.

The course design focused on terminal symptom management, merged with the principles of palliative care and communication skills. Relieving terminal

symptoms and supplying comfort may improve the quality of life for the patient who was at the last stage of life, also may make their dignity possible. To be helpful, instead of being helpless, nursing students gained positive attitudes.

Mainly, we conducted two educational methods: the didactic lecture and simulation practise. The lecture could teach knowledge comprehensively, profoundly and systematically. Students could apply the learned knowledge for the simulated patient right after the lecture. This connection between lecture and simulation decrease the gap between theoretic learning and application. Also, the simulation permitted students to practise communication with terminal patients, and role-playing allowed them to understand the sufferings of patients and their families. Debriefing played a vital role in the teaching process, which could guide students in sharing their feelings and reflect the life and death of human beings.

## 6. Recommendation

Our study supported that palliative care education should be combined into the nursing bachelor curriculum to ensure undergraduates' competency in palliative care. The eighteen hours was, in fact, not enough for including all terminal symptoms. More hours were recommended for the future's course. Although the simulation has been widely used in nursing education, the theory preparation should not be neglected. We strongly recommended lecture-simulation-combined method for future palliative care education. With positive changes in both knowledge and attitude, nursing students are expected to have better coping, which will benefit their future professional and personal career.

## 7. Limitation

A small number of convenience samples from a single institution limited the generalizability of the research results. Only using self-reported data may cause response bias. Objective methods, such as objective structured clinical examination, were needed to assess students' palliative care behaviour which belongs to the psychomotor domain. Follow-up retest also should be carried to find the stability of the effectiveness of palliative care education.

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## Appendix 1

### Palliative Care Quiz for Nursing

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- Q1: Palliative care is only appropriate in situations where there is evidence of a downward irreversible deterioration. (F)
- Q2: Morphine is the standard used to compare the analgesic effect of other opioids. (T)
- Q3: The extent of the disease determines the method of pain treatment. (F)
- Q4: Adjuvant therapies are important in managing pain. (T)
- Q5: It is crucial for family members to remain at the bedside until death occurs. (F)
- Q6: During the last days of life, drowsiness associated with electrolyte imbalance may decrease the need for sedation. (T)
- Q7: Drug addiction is a major problem when morphine is used on a long-term basis for the management of pain. (F)
- Q8: Individuals who are taking opioids should also follow a bowel regime (laxative treatment) (T)
- Q9: The provision of palliative care requires emotional detachment. (F)
- Q10: During the terminal stages of an illness, drugs that can cause respiratory depression are appropriate for the treatment of severe dyspnea. (T)
- Q11: Men generally reconcile their grief more quickly than women. (F)
- Q12: The philosophy of palliative care is compatible with that of aggressive treatment. (T)
- Q13: The use of placebos is appropriate in the treatment of some types of pain. (F)
- Q14: In high doses, codeine causes more nausea and vomiting than morphine. (T)
- Q15: Suffering and physical pain are synonymous. (F)
- Q16: Pethidine is not an effective analgesic for the control of chronic pain. (T)
- Q17: The accumulation of losses makes burnout inevitable for those who work in palliative care. (F)
- Q18: Manifestations of chronic pain are different from those of acute pain. (T)
- Q19: The loss of a distant relationship is easier to resolve than the loss of one that is close or intimate. (F)
- Q20: Pain threshold is lowered by fatigue or anxiety. (T)
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## Appendix 2

### Frommelt Attitude towards Care of the Dying

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- Q1. Giving care to the dying person is a worthwhile experience.
- Q2. Death is not the worst thing that can happen to a person.
- Q3. I would be uncomfortable talking about impending death with the dying person.
- Q4. Caring for the patient's family should continue throughout the period of grief and bereavement.
- Q5. I would not want to care for a dying person.
- Q6. The non-family caregivers should not be the one to talk about death with the dying person.
- Q7. The length of time required giving care to a dying person would frustrate me.
- Q8. I would be upset when the dying person I was caring for gave up hope of getting better.
- Q9. It is difficult to form a close relationship with the dying person.
- Q10. There are times when the dying person welcomes death.
- Q11. When a patient asks, "Am I dying?" I think it is best to change the subject to something cheerful.
- Q12. The family should be involved in the physical care of the dying person.
- Q13. I would hope the person I'm caring for dies when I am not present.
- Q14. I am afraid to become friends with a dying person.
- Q15. I would feel like running away when the person actually died.
- Q16. Families need emotional support to accept the behavior changes of the dying person.
- Q17. As a patient nears death, the nonfamily caregiver should withdraw from his/her involvement with the patient.
- Q18. Families should be concerned about helping their dying member make the best of his/her remaining life.
- Q19. The dying person should not be allowed to make decisions about his/her physical care.
- Q20. Families should maintain as normal an environment as possible for their dying member.
- Q21. It is beneficial for the dying person to verbalise his/her feelings.
- Q22. Care should extend to the family of the dying person.
- Q23. Caregivers should permit dying persons to have flexible visiting schedules.
- Q24. The dying person and his/her family should be the in-charge decision-makers.
- Q25. Addiction to pain-relieving medication should not be a concern when dealing with a dying person.
- Q26. I would be uncomfortable if I entered the room of a terminally ill person and found him/her crying.
- Q27. Dying persons should be given honest answers about their condition.
- Q28. Educating families about death and dying is not a non-family caregiver responsibility.
- Q29. Family members who stay close to a dying person often interfere with the professional's job with the patient.
- Q30. It is possible for non-family caregivers to help patients prepare for death.
-