



ORIGINAL ARTICLE

The impact of an interprofessional problem-based learning curriculum of clinical ethics on medical and nursing students' attitudes and ability of interprofessional collaboration: A pilot study



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Abstract Clinical ethic situations in modern multiprofessional healthcare systems may involve different healthcare professions who work together for patient care. The undergraduate interprofessional education of clinical ethics would help to incubate healthcare students' ability of interprofessional collaboration in solving ethical problems. However, the impact from an interprofessional educational model on student's attitudes and confidence of interprofessional collaboration should be carefully evaluated during the process of curricular development. This study aimed to conduct a pilot interprofessional PBL curriculum of clinical ethics and evaluate the curricular impact on interprofessional students' attitude and confidence of collaborative teamwork. Thirty-six medical and nursing students volunteered to participate in this study and were divided into three groups (medical group, nursing group, and mixed group). Tutors were recruited from the Medical School and the College of Nursing. The pilot curriculum included one lecture of clinical ethics, one PBL case study with two tutorial sessions, and one session of group discussion and feedback. A narrative story with multiple story

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lines and a multiperspective problem analysis tool were used in the PBL tutorials. The students' self-evaluation of learning questionnaire was used to evaluate students' learning of clinical ethics and interprofessional collaborative skills and attitude. The internal consistency of the questionnaire was measured by Cronbach α , and the criterion-related validity of the questionnaire was evaluated through associations between the dimension scores with the student group by one-way analysis of variance test (ANOVA) test and Tukey-Kramer honestly significant difference (HSD) comparison. There was significant difference among different groups in students' ability and attitudes about "interprofessional communication and collaboration" ($p = 0.0184$). The scores in the mixed group (37.58 ± 3.26) were higher than the medical group (32.10 ± 4.98). In conclusion, our model for the interprofessional PBL curriculum of clinical ethics is practicable and will produce positive impacts on students' attitudes and confidence of interprofessional collaboration.

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Introduction

Modern healthcare service involves collaborative teamwork by different healthcare professions. The interdependence and synergy of the team may improve patient outcomes and team members' individual job satisfaction and performance [1,2]. Interprofessional education (IPE) for healthcare professionals has gained more and more attention worldwide, and there appears to be a consensus in the published literature on the need for an interprofessional component in healthcare professionals' education [3–5]. IPE refers to occasions when students from two or more professions learn together during all or part of their professional training with the object of cultivating collaborative practice for providing patient-centered care [6,7]. IPE in undergraduate education would provide students opportunities to develop communication skills and positive attitude for their interprofessional teamwork in clinical situations [8]. The World Health Organization also acknowledged in 2010 that IPE is a necessary step in preparing a "collaborative practice-ready" health workforce that is better prepared to respond to local health needs [9].

Clinical ethics is a special field of biomedical ethics that has its focus on ethical issues in clinical medicine. In everyday clinical encounters, primary care professionals and patients may disagree about values or may face choices that challenge their values [10]. Conflicts of clinical ethics occur between patients and physicians as well as between different healthcare professions. Patients, families, and different healthcare professionals have to deal with conflicts of value that can cause tremendous impacts in decision making. Any failure of communication and collaboration to overcome conflicts of value may adversely impact patient care [11]. Students of healthcare professions would need IPE for clinical ethics to better prepare themselves for dealing with conflicts of values when working in collaborative teams. However, clinical ethics curricula in the undergraduate education are usually profession-specific, and usually, there are not enough interprofessional learning opportunities in which students of different professions could solve clinical ethical problems together.

Many educational strategies would provide opportunities of interprofessional learning. Among them, PBL is well-established that every medical school in Taiwan has adapted it for medical students. Interprofessional PBL curriculum would be a good and feasible approach for students to foster communication and collaboration skills for solving interprofessional conflicts of value [12–16]. However, an interprofessional curriculum in undergraduate education does not necessarily lead to successful interprofessional collaboration in later clinical life. Previous studies have shown that IPE may induce a negative attitude in students toward future interprofessional collaboration [17,18]. The professional identifications of undergraduate healthcare students are relatively immature, and the interaction of students in an interprofessional curriculum may differ from the interaction of different healthcare professions in the clinical situation. Therefore, it is very important to pay attention to the possible effects on students' attitudes towards future interprofessional collaboration.

In Kaohsiung Medical University (KMU), the College of Nursing and the College of Medicine worked together to develop an interprofessional PBL curricular model for clinical ethics in 2009. The impact of curriculum on student's attitudes and confidence in interprofessional collaboration was one of the major concerns from the steering force of curricular development. Therefore, we conducted a pilot curricular study to evaluate the curricular impact on students' confidence and attitude of interprofessional collaborative teamwork.

Materials and methods

Participants

Eighteen 4th-year nursing students and 18 5th-year medical students who had started their formal clinical course in hospital for <1 year were recruited for this pilot curriculum ($n = 36$). Students were randomly arranged into six groups, with two groups of medical students, two groups of nursing students, and two groups of mixed medical and nursing students (three students in each group). Six PBL tutors experienced in teaching clinical ethics were

recruited (three tutors each from the College of Medicine and the College of Nursing; $n = 6$). Two tutors from the College of Nursing joined the nursing student groups, and two tutors from the College of medicine joined the medical student groups. One of the tutors from the College of Nursing and another from the College of Medicine joined the mixed groups. The demographic distribution of the genders and professions of the students and tutors are shown in Table 1.

The curriculum design

The interprofessional PBL curriculum for clinical ethics consisted of a 2-hour lecture, two 2-hour PBL tutorial sessions, and a 3-hour feedback session. These four sessions were carried out over 4 continuous weeks. The lecture was delivered by an experienced teacher of clinical ethics to introduce foundations of clinical ethics, as well as the perspectives and ethical obligations of different roles and professions in clinical situations. During the feedback session, students completed questionnaires evaluating the course and their learning. After the survey by questionnaire, student representatives from each group also gave the rest of the class an oral presentation about their learning experience and achievement.

In order to provide information regarding perspectives of different characters in the scenario, we developed a multiperspective, rich-narrative text format, which could be used in sequential sections of PBL tutorials sessions. Such multiperspective stories contained a main-line story of a third-person perspective and several sideway stories of perspectives from different characters in the scenario. Stories were written in a rich narrative format in order to provide more details of interpersonal interactions and situational information. A multiperspective problem identification tool was used for students to describe problems that different people would encounter in the scenario. By using this multiperspective approach, students had to identify and define problems from

perspectives of different professions, including their own profession. Each group was required to document their consensus on problem identification in every section of the tutorials sessions.

The students' self-evaluation of learning questionnaire

We focused our evaluation of students on the outcome from interprofessional learning of clinical ethics and problem-based learning. A literature review to search for established assessment tools that were specific for the evaluation of interprofessional communication and collaboration in clinical ethics was carried out; we found a lack of such assessment tools, although a few questionnaires have been developed for evaluation of interprofessional clinical practice in general [18–24]. Based on the framework of interprofessional education by the World Health Organization and the behavioral teamwork rating tool proposed by Wright et al. [19] we developed a 10-item interprofessional communication and collaboration questionnaire (ICCQ) for assessing students' confidence and attitude about interprofessional teamwork with a modified 4-point Likert scale [9]. Students took this questionnaire at the end of the group discussion and feedback session. We compared the results between the single profession and mixed-professions student group to determine whether interprofessional collaborative learning in clinical ethics would increase students' confidence and attitude about interprofessional teamwork.

To cope with the established evaluation in PBL curriculum at KMU, we adapted and modified the scales and questionnaires from the PBL curriculum in the nursing college, including self-directed learning scale (SDLS), critical thinking scale (CTS), and students performance in PBL tutorial sessions questionnaire (SPIPTSQ) [24,25]. The original questionnaires were streamlined into eight questions with a modified 4-point Likert scale for three learning dimensions of PBL, including "self-directed learning (SDLS)", "critical thinking (CTS)," and "general performance (SPIPTSQ)." The result of evaluation on these three dimensions from different student groups were compared to determine the effectiveness of our curriculum on student's confidence and attitude about interprofessional collaborative teamwork.

The written texts on multiperspective problem identification tool from every student were collected after each tutorial session in order to analyze students' awareness of problems from different professional perspectives. The students were considered to be capable of taking perspectives if they could sort and define profession-specific problems after the initial steps of identifying general ethical conflicts and problems in the scenario. Students also completed the six-item satisfaction questionnaire for evaluation of the pilot curriculum. Each item of the satisfaction questionnaire was answered on a 5-point scale, from "strongly dissatisfied" (score = 1) to "strongly satisfied" (score = 5). During the group discussion and feedback session, tutors and representatives of each student group were required to provide verbal and written feedbacks about their teaching and learning experiences.

Table 1 Demographic distribution of students ($n = 36$) and tutors ($n = 6$) by group.

Group	Students		Tutors	
	Male	Female	Institution	Gender
	<i>n</i>	<i>n</i>		
Nursing group				
Group 1	2	4	Nursing	Female
Group 2	2	4	Nursing	Female
Mixed group				
Group 1	3 ^a	3 ^b	Medical	Male
Group 2	3 ^a	3 ^b	Nursing	Female
Medical group				
Group 1	4	2	Medical	Male
Group 2	3	3	Medical	Male

^a Medical students.

^b Nursing students.

Statistical analysis

SPSS version 14.0 (SPSS Inc., Chicago, IL, USA) was used for statistical analysis. Internal consistency (reliability) was assessed for students' self-evaluation of the learning questionnaire by Cronbach α . The criterion-related validity of this questionnaire was evaluated through the associations between the four-dimension score (SDLS, CTS, SPIPTSQ, and ICCQ) with the student group by one-way analysis of variance test (ANOVA) test and Tukey-Kramer honestly significant difference (HSD) comparison. The percentage of satisfaction of the pilot curriculum was determined by the percentage of students who responded with a score of 4 or 5 on each item in the scale.

Results

Thirty-six students and six tutors participated in this educational study. The demographic distribution of students and tutors in each group is shown in Table 1. However, two students in the medical student group did not attend the feedback session, and therefore, only 34 students completed the questionnaires and provided feedback. Table 2 shows each item of students' self-evaluation of learning questionnaire ratings. For the internal consistency of the questionnaire, the values of Cronbach α for four dimensions were more than 0.70. In particular, the value of Cronbach α for the "interprofessional communication and collaboration (ICCQ)" dimension was 0.93 higher than other dimensions (not shown in table). The results of the criterion-related validity of the questionnaire are shown in Table 3. There were only significant differences among the different groups in students' self-evaluation of their ability and attitude toward "interprofessional communication and collaboration (ICCQ)" ($p = 0.0184$). Furthermore, the mean score of the mixed group (37.58 ± 3.26) was significantly higher than the mean score of the medical group (32.10 ± 4.98). However, there was no significant difference between the three student groups in dimensions including "self-directed learning (SDLS)", "critical thinking (CTS)", and "general performance (SPIPTSQ)." By analyzing the written responses on the multiperspective problem list from the different groups of students, we also found that both the nursing group and mixed group were able to recognize problems related to both the nurses and the doctors in the clinical scenario but that students in the medical group were concerned only about problems related to the doctors.

During the feedback session, verbal feedback from students was recorded, and some remarks common to all groups summarized as follows:

- (1) "There are different perspectives among people involved in a clinical ethical dilemma. We should learn to recognize and respect other people's perspectives."
- (2) "Even when working together for the same patients, different professions may see problems differently and may hold values or perspectives that are unique to their own profession."
- (3) "We may have more than one single solution that would be good for a specific clinical ethic situation."
- (4) "The knowledge of law and ethical principles is critical to the decision-making for ethical dilemmas."
- (5) "A clear algorithm for ethical reasoning is important and tutors would better provide it during the tutorial sessions."
- (6) "It was challenging but enjoyable to work with students from the other professions to solve the clinical ethics problems."
- (7) "Students from the other professions are very helpful in getting ourselves a better understanding of the whole picture of clinical situations."

In terms of students' course satisfaction, the general satisfaction rating was around 79.41%. The average satisfaction rating of the performance of the lecturer and tutors was 82.35%. Most students (82.35%) considered the course effective in improving their understanding of clinical ethics (not shown in table).

Discussion

Our pilot curricular study aimed to determine the impact of our interprofessional PBL curricular model on students' attitude and confidence of interprofessional collaboration. In this pilot curriculum, we found the practicality and evidence supporting the effectiveness of our model.

There has long been a debate of whether medical ethics and nursing ethics are considerably different from each other [3,4,16,17,26]. The education of ethics for nursing and medical students are usually delivered in a profession-specific way, and our novel curricular model of clinical ethics has successfully created an interprofessional learning opportunity for both nursing and medical students. In modern multiprofessional healthcare systems, clinical ethics problems may involve issues far beyond patient-physician and patient-nurse relationships. More and more educational initiatives have recognized interprofessional education as an important strategy for teaching clinical ethics [13,21]. However, a review of recent literature in interprofessional curriculum of clinical ethics revealed a limited number of curriculum models [8,12,18]. Our model incorporated PBL and narrative scenario stories to create opportunities of interprofessional interaction and provide rich situational information that vignettes in traditional PBL scenarios could not offer.

The post-course survey on student's ability by self-evaluation questionnaire revealed that most students rated themselves well in all four dimensions including critical thinking, self-directed learning, general performance, as well as interprofessional communication and collaboration. However, we observed only significant differences among different groups in students' self-evaluation of their ability and attitude toward "interprofessional communication and collaboration (ICCQ)." The post-course survey actually represented student's evaluation on their learning experience. Such results indicated from student's perspectives that our model did have a positive impact on their attitude and confidence toward interprofessional collaboration in solving problems of clinical ethics. In our curricular model, undergraduate medical and nursing students may experience frustrations when

Table 2 Students' self-evaluation of performance questionnaire ratings.

Items	Strongly disagree (score = 1)	Disagree (score = 2)	Agree (score = 3)	Strongly agree (score = 4)
Self-directed learning (SDLS)				
Acknowledges own strengths and weaknesses in the learning process	0 (0.00)	1 (2.94)	20 (58.82)	13 (38.24)
Participates actively in defining own learning objectives	0 (0.00)	2 (5.88)	23 (67.65)	9 (26.47)
Utilizes appropriate resources to meet own learning needs	0 (0.00)	5 (14.71)	17 (50.00)	12 (35.29)
Demonstrates effective action to meet own learning need	0 (0.00)	4 (11.76)	18 (52.94)	12 (35.29)
Takes responsibility for actions and their consequences to self and group	0 (0.00)	1 (2.94)	15 (44.12)	18 (52.94)
Evaluations relevant learning outcomes	0 (0.00)	1 (2.94)	20 (58.82)	13 (38.24)
Seeks constructive feedback	0 (0.00)	1 (2.94)	23 (67.65)	10 (29.41)
Responds appropriately to constructive feedback	0 (0.00)	2 (5.88)	23 (67.65)	9 (26.47)
Critical thinking (CTS)				
Analyzes the problem in a systematic, organized fashion	1 (2.94)	1 (2.94)	23 (67.65)	9 (26.47)
Demonstrates an understanding of underlying concepts	0 (0.00)	0 (0.00)	24 (70.59)	10 (29.41)
Interprets, analyzed and applies relevant theories, concepts and facts	0 (0.00)	1 (2.94)	23 (67.65)	10 (29.41)
Makes links with prior relevant readings, experience or knowledge	0 (0.00)	1 (2.94)	19 (55.88)	14 (41.18)
Clarifies the issues in the problem	0 (0.00)	3 (8.82)	14 (41.18)	17 (50.00)
Asks questions to clarify points, enhance understanding	0 (0.00)	0 (0.00)	19 (55.88)	15 (44.12)
Checks accuracy and validity of information	0 (0.00)	3 (8.82)	23 (67.65)	8 (23.53)
Justifies reasons or actions	0 (0.00)	2 (5.88)	22 (64.71)	10 (29.41)
Generates and considers alternative perspectives	0 (0.00)	1 (2.94)	13 (38.24)	20 (58.82)
General performance (SPIPTSQ)				
Uses different resources to obtain needed information	0 (0.00)	2 (5.88)	20 (58.82)	12 (35.29)
Presents well-organized information relevant to the case	0 (0.00)	4 (11.76)	20 (58.82)	10 (29.41)
Is persistent in the study of the case	1 (2.94)	1 (2.94)	13 (38.24)	19 (55.88)
Is motivated to know more	1 (2.94)	0 (0.00)	17 (50.00)	16 (47.06)
Implements activities to achieve the learning objectives	1 (2.94)	2 (5.88)	18 (52.94)	13 (38.24)
Gives feedback (reflections, ideas and suggestions)	0 (0.00)	0 (0.00)	16 (47.06)	18 (52.94)
Helps her/his peers to clarify ideas	0 (0.00)	0 (0.00)	19 (55.88)	15 (44.12)
Interprofessional communication and collaboration (ICCQ)				
Understand the role of the other professions in clinical situation	0 (0.00)	2 (5.88)	13 (38.24)	19 (55.88)
Recognize and respect roles and contribution of other professions	0 (0.00)	0 (0.00)	14 (41.18)	20 (58.82)
Recognize and respect competence of others	0 (0.00)	2 (5.88)	9 (26.47)	23 (67.65)
Capable of working as a team with people from other professions	1 (2.94)	0 (0.00)	15 (44.12)	18 (52.94)
Capable of communication, coordination, and conflict resolution	0 (0.00)	1 (2.94)	16 (47.06)	17 (50.00)
Recognize and respect leadership in collaborative practice	0 (0.00)	1 (2.94)	20 (58.82)	13 (38.24)
Capable of facilitating collaborative practice	1 (2.94)	1 (2.94)	21 (61.76)	11 (32.35)
Confident in own ability as well as others'	1 (2.94)	1 (2.9)	10 (29.41)	22 (64.71)
Capable of patient-centered collaborative practice	0 (0.00)	1 (2.94)	12 (35.29)	21 (61.76)
Willing to work as a team and share the same goal with people from other professions	0 (0.00)	1 (2.94)	11 (32.35)	22 (64.71)

Data are presented as *n* (%).

CTS = critical thinking scale; ICCQ = interprofessional communication and collaboration questionnaire; SPIPTSQ = students' performance in PBL tutorial sessions questionnaire.

Table 3 Students' self-evaluation of learning by student group.

Dimensions	Nursing group (n = 12)		Mixed group (n = 12)		Medicine group (n = 10)		p ^a	Significant pairs from Tukey-Kramer HSD
Self-directed learning	26.08	(2.43)	27.50	(2.91)	25.20	(3.08)	0.1689	
Critical thinking	30.25	(2.26)	30.67	(3.55)	28.60	(4.09)	0.3326	
General performance	27.25	(3.17)	27.83	(3.51)	25.90	(3.48)	0.3579	
Interprofessional communication and collaboration	34.83	(4.47)	37.58	(3.26)	32.10	(4.98)	0.0184*	Mixed > Medicine

Data are presented as mean (SD).

HSD = honestly significant difference.

* $p < 0.05$ (highlighted in bold).

^a One-way analysis of variance test.

they encounter conflicts of profession-specific ethical obligations and values. Therefore, it is very important that we have paid special attention to the design of PBL tutorial sessions and used the multiperspective narrative stories to promote equal and friendly discussion.

The impacts of interprofessional curriculum on student's attitude and confidence toward future interprofessional collaboration have always been a major concern during the development of a clinical ethics curriculum. In actual daily patient care practice, conflicts between different health-care professions occur, and the interactions and relationships may be very intense. Students in such a prelicensure education stage may not yet have developed a professional self-identity owing to the lack of professional qualification and clinical experience. In this pilot curriculum, conflicts of profession-specific values and ethical obligations did occur during discussions between nursing students and medical students while they tried to understand and solve the problems identified by the other profession. Despite the conflicts, students in the mixed groups still reported in the feedback session that they enjoyed the discussions and problem-solving process with students from the other profession. Perhaps the interactions of students in the interprofessional collaborative learning are not as intense because of the lack of strong professional self-identity. The equal and friendly interactions may actually contribute to students' willingness for future interprofessional collaboration.

By reviewing each student's written text about problem identifications, we also found that nursing students were more capable of taking perspectives than medical students. In this pilot curriculum, medical students defined only profession-specific problems, whereas nursing students were able to define problems from the perspectives of both professions. Such findings indicated that the current education for medical students may be insufficient for their future collaborative patient care practice. Medical education has mostly focused on diseases and issues regarding patient-physician relationships. Little attention is paid to issues about interprofessional interaction that would occur in everyday clinical practice. Students in a single professional learning environment may not be able to learn the skills and attitudes that are required for their collaborative clinical practice. We should provide an interprofessional learning environment and opportunities to foster student's ability of interprofessional teamwork.

There are some limitations in this educational study. First, this is a pilot curriculum with a limited number of medical and nursing students. The educational effects could be different if such a curriculum was practiced as a formal curriculum of more students and more professions. Second, the "Pygmalion effect" may have occurred in this pilot curriculum, and students' performance was actually affected by the hidden instruction from the title of the curriculum but not the curriculum itself. Another problem was the assessment of students' learning achievement in clinical ethics. Although the effectiveness of interprofessional PBL in students' attitude and confidence to participate in interprofessional collaborative practice was disclosed by the self-evaluation questionnaire, the educational outcome in learning clinical ethics remained undetermined. A longer course of such a curricular model may be required prior to determining its effects on students' knowledge and skill of clinical ethics.

In conclusion, interprofessional PBL curriculum would be a good educational strategy for teaching clinical ethics, but it could also result in negative effects on students' attitude towards future interprofessional collaboration. This pilot interprofessional PBL curriculum for clinical ethics showed that our curricular model was effective in improving students' attitude and confidence to participate in future interprofessional collaborative practice. We hope that a full-length course of this format would be put into practice in the future and more research would be carried out to enrich our understanding of interprofessional education for clinical ethics.

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