

ORIGINAL RESEARCH

Interprofessional education can improve learning outcomes on school health among nursing students in Thailand

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ABSTRACT

Background and objective: Interprofessional education (IPE) is an important step in advancing the education of health professionals. This study aimed to evaluate IPE learning outcomes and satisfaction of students that participated in a school-health program. The program was delivered as a joint collaborative topic among nursing, dental public health, and public health students. We also sought to examine students' understanding of roles and teamwork, as well as their satisfaction with IPE.

Methods: This study had a quasi-experimental design. Third-year nursing students were randomly divided into 2 groups, the IPE and non-IPE groups. All third-year dental public health students and public health students were enrolled in the IPE group. All IPE students were stratified and randomized into interprofessional teams of ten or eleven students. The program included 3 modules: 1) foundational workshops for IPE role clarification in the school-health program and situation analysis of school-health problems, 2) project planning and implementation, and 3) evaluation and sharing. Non-IPE nursing students also received the same 3 modules of the school-health learning program without working in the interprofessional team. A pretest and posttest on school-health theoretical content were completed by both groups of nursing students. In the IPE group, we collected data regarding the understanding of students' roles within their teams before and after the course. Satisfaction with IPE learning was only asked after the course.

Results: The IPE group (n = 164) consisted of 60 nursing, 59 dental public health, and 45 public health students. There were 63 nursing students in the non-IPE group. For knowledge on school health, the nursing students in the non-IPE group had a significantly higher pretest score compared to the IPE group; while there was no significant difference in post-test scores between both groups. All aspects of the interprofessional collaboration among the three health professional student groups in the IPE group increased, with a significant difference for 4 out of 6 aspects. Students were satisfied with the IPE program and wished to extend their time spent in the program.

Conclusions: IPE learning provides a better understanding of different healthcare roles and enhanced teamwork between multidisciplinary teams. Incorporating IPE as a learning strategy is recommended for health professional students.

Key Words: Interprofessional team, IP learning, Multidisciplinary, School health, Healthcare collaboration

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1. INTRODUCTION

Interprofessional education (IPE) is defined as occasions when students or learners from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes.^[1] IPE is an important step in advancing health professional education by preparing learners to provide collaborative patient-centered care.^[2] When healthcare professionals work together in a collaborative manner, they are more likely to improve patient care.^[3] The initial efforts of IPE may aim to change attitudes, knowledge, and behaviors for learning and competency achievement.^[4] Moreover, IPE can be an effective method of learning to fill the gap between both education and practical practice.^[5] In addition, healthcare students can work through real-world scenarios during the IPE process.

School health is defined as all the strategies, activities, and services offered in association with schools that are designed to promote students' physical, emotional, and social development.^[6] In Thailand, the school health program generally includes four health-related elements: 1) healthful school living, 2) school health services, 3) school health education, and 4) school and home relationships.^[7] In order to promote the school health program effectively, a multidisciplinary team such as nurses, dentists, and public-health technical officers should work together and fulfill different roles that draw upon their varied skills. In Thailand, the nurse takes responsibility for school health services and education, including health promotion, disease control and prevention, diagnosis and treatment, and rehabilitation. Typically, the dentist provides oral health services and related oral health education. The public health technical officer normally takes the responsibility for environmental health and sanitation of the school. The multidisciplinary teams should also collaborate with school administrators and teachers to promote the school and home relationship.

School health programs are an example of integrated multidisciplinary collaboration that helps promote and continue good health within schools. Also, school health programs can help different health professionals understand their roles and responsibilities together. They can facilitate sharing and exchanging of knowledge among each other. As a result, health professionals who participated in such programs can increase their learning outcomes.

In this study, we used a school health program as a joint collaborative topic for the IPE program. To maximize the benefits of IPE, we considered that IPE should be started after each profession gains a sufficient understanding of their fields. Thus, we enrolled third-year nursing, dental public health, and public health students from two different

institutes (nursing and public health) in this program. The objective of this study was to compare learning outcomes before and after participating in a school health program in nursing students who participated and had not participated in the IPE program. Another objective was to examine the understanding of roles and teamwork, and satisfaction with IPE learning among nursing, dental public health, and public health students who participated in the IPE program.

2. MATERIAL AND METHODS

2.1 Design

We conducted a quasi-experimental study with a comparison group. The nursing students in the intervention group joined the school health program with the dental public health and public health students as an interprofessional team. Nursing students in the comparison group participated in the school-health program without other types of health professionals.

2.2 Participants and setting

The study participants were the third-year students of three different health professions including nursing, dental public health, and public health students from two educational institutes under Praboromarajchanok Institute (PBRI) in Khon Kaen Province, Thailand. The nursing students were from Boromarajonani College of Nursing Khon Kaen. Dental public health and public health students were from Sirindhorn College of Public Health, Khon Kaen Province.

To explore the impact of IPE on learning outcomes, the nursing students were randomly divided into two groups (IPE and non-IPE), after they finished a 6-hour classroom learning session on nursing care for school-health services. The dental public health and the public health students were all enrolled in the IPE group. Each profession finished classroom learning on their roles for school health services before participating in the school health program for IPE learning. The school health program for IPE learning was used as a joint collaborative topic within the interprofessional teams. This program was incorporated into the normal course syllabus of all health professional students participating in this study. The students in the IPE group were stratified and allocated into interprofessional teams with ten (or eleven) students per team. Each interprofessional team included 3-4 student representatives from each health profession and a faculty member who acted as a team facilitator. Likewise, the non-IPE group was also divided into groups of ten (or eleven) along with a team facilitator in each group.

2.3 Intervention

The intervention consisted of three weekly modules of activities. For module 1, students assessed school health problems

and planned on how they would solve the problems within interprofessional teams. For module 2, students implemented an intervention to solve a specific problem and learned with each other. For module 3, students shared about and evaluated their experiences. Each module provided 3 hours for working together in the interprofessional team at an expansion school in Khon Kaen province. We believed that these three modules provided students space to engage with each other in discussion about concepts of school health services, as well as opportunities to analyze or synthesize new information into their practice. Moreover, the learning modules provided opportunities to reflect on and articulate students' acquired knowledge. The facilitators could give feedback to students in their groups on students' learning and module objective accomplishments. Additionally, these three learning modules provided resources for students to extend their learning throughout the school health program using enriching activities, evaluation, and sharing. Since the school health program was included in the course syllabuses of the two institutes, it was mandatory for all students in this study to participate in the school health program.

Before starting the first learning module in the IPE group, we arranged for an extra three hours for icebreaking activities among the three health professional teams. In addition, the team facilitator provided some general and essential data regarding the indexed school. Then each interprofessional team worked together, discussed the data received and planned for implementation. If any team needed more additional data or information regarding school-health problems of the indexed school, they could find out by themselves using the extra time for supplementary assessment. All interprofessional teams in the IPE group were asked to finish planning their intervention projects with an estimated budget within module 1. In module 1, all interprofessional teams presented their intervention projects and the faculty members offered suggestions on the projects. Limited budgets for implementing the intervention projects were offered to each interprofessional team. In module 2, after planning and designing the intervention projects, the interprofessional teams were responsible for implementing the interventions at the indexed school under the supervision of their faculty facilitators. Finally, in module 3, all the interprofessional teams gathered together to share and reflect on what they had learned.

2.4 Comparison group

During the same period, nursing students in the non-IPE group continued their learning in groups of ten (or eleven) with a faculty facilitator in a group. As an intraprofessional team, they also had the same three weekly modules as the IPE group at another school in Khon Kean province. Each

module also provided 3 hours for working in an intraprofessional team without students from other professions. However, to eliminate the probable disadvantage of non-IPE nursing students, we provided time after the students finished their projects for sharing and exchanging learning experiences between both IPE and non-IPE groups of nursing students.

2.5 Student evaluation and research instruments

To assess the nursing students' knowledge on school health, a pretest was performed after concluding a 6-hour classroom learning session on nursing care for school health services. This test was developed by relevant faculty members. To evaluate the impact of IPE learning on school health theoretical content, both the IPE and non-IPE groups of the nursing students completed the posttest after completing the three weekly modules of activities on school health. The core competencies for interprofessional collaborative practice^[8] and the interprofessional collaborator assessment rubric (ICAR) can be used for summative assessment of learners' competencies in interprofessional collaboration.^[9] Our research team adapted the interprofessional-collaboration questionnaire from the ICAR to our context. Then we re-organized the adapted interprofessional-collaboration dimensions into new groups according to the learning outcomes in our course syllabuses. We also developed another questionnaire to measure satisfaction with IPE learning. Both questionnaires were then validated by 5 experts. The content validity index (CVI) of the adapted interprofessional collaboration questionnaire was 0.87. The CVI of the questionnaire measuring satisfaction with IPE learning was 0.85. To assess the reliability of the questionnaire, we measured internal reliability with Cronbach's alpha coefficient. Cronbach's alpha coefficient was 0.95 for the adapted interprofessional collaboration questionnaire, and 0.96 for the IPE learning satisfaction questionnaire.

We used the adapted interprofessional-collaboration questionnaire to assess the understanding of different roles and the level of teamwork within the interprofessional teams before and after participating in the IPE program. A five-point Likert scale was applied to the questionnaire including strongly disagree (1), disagree (2), undecided (3), agree (4), and strongly agree (5). The adapted interprofessional-collaboration questionnaire included six aspects: 1) role and responsibility of each profession and respect for other professions, 2) teamwork and leadership, 3) learning and reflection, 4) effective communication, 5) relationship with, and recognizing the needs of clients, and 6) morals and ethics. Each aspect consisted of two to six sub-aspects.

To determine their satisfaction with IPE learning, IPE parti-

Participants completed the satisfaction questionnaire with a five-point Likert scale after they completed their school-health projects. The students were also encouraged to reflect on their IPE learning, as well as to talk about and write relevant comments.

2.6 Ethical considerations

The study was approved by the ethics committee of Boromarajonani College of Nursing Khon Kaen (IRB-BCNKK-22-2019). The students from three faculties in both institutes were informed regarding the IPE school health project before participation.

2.7 Data analysis

We conducted data analysis using STATA software, version 16 (StataCorp LLC, College Station, Texas, USA). Data were analyzed using descriptive statistics when appropriate. Baseline characteristics of participants were described in terms of age, gender, and profession. The levels of satisfaction toward IPE learning were presented using mean and standard deviation (mean ± SD). The differences between the pretest and posttest scores on school health theoretical content between the nursing students in the IPE and non-IPE groups using the independent t-test. The paired t-test was used to compare within-group differences for pretest and post-test scores on school-health theoretical contents in the IPE and non-IPE groups. We also examined the scores for the understanding of roles and teamwork before versus after participating in the school health program in the IPE group using the paired t-test. A p-value of less than 0.05 was considered statistically significant.

3. RESULTS

We recruited 227 third-year students from the two institutes, which included 123 nursing, 59 dental public health, and 45 public health students. After randomization, we had 60 nursing, 59 dental public health, and 45 public health students in the IPE group. There were only 63 nursing students

in the non-IPE group. The mean age of the students in the IPE group was 20.8 years (SD = 1.2). The baseline characteristics of participants in the IPE and non-IPE groups are depicted in Table 1 and Table 2. The differences in baseline characteristics of the nursing students in the IPE and non-IPE groups were not statistically significant (see Table 2).

Table 1. Baseline characteristics of three different types of health professional students in the IPE group (n=164)

| Characteristics | Mean (SD) | n | (%) |
|--------------------------------|--------------|-----|------|
| Age (years) | 20.84 (1.23) | | |
| Health Professional Discipline | | | |
| Nursing | | 60 | 36.6 |
| Dental public health | | 59 | 36.0 |
| Public health | | 45 | 27.4 |
| Gender | | | |
| Male | | 21 | 12.8 |
| Female | | 143 | 87.2 |

Table 2. Baseline characteristics of nursing students in the IPE compared to non-IPE group

| Characteristics | IPE | | Non-IPE | | p-value |
|----------------------------|--------------|-------|--------------|-------|---------|
| | n | % | n | % | |
| Age (years) (Mean ± SD) | 22.63 ± 2.71 | | 22.36 ± 2.13 | | .542 |
| Gender | | | | | |
| Male | 4 | 6.67 | 1 | 1.59 | .200 |
| Female | 56 | 93.33 | 62 | 98.41 | |

Tables 3 and 4 show the test scores of the nursing students before and after participating in the school-health program by group participation. The nursing students in the non-IPE group had a significantly higher mean pretest score compared to those in the IPE group (Table 3; p-value = .044). But there was not a statistically significant difference in the mean posttest score (see Table 3; p-value = .958). For within-group comparisons, the mean posttest scores of both IPE and non-IPE groups were higher than the mean pretest scores (see Table 4; p-value < .001 in both the IPE and non-IPE groups).

Table 3. Between-group comparisons of the test scores on school health theoretical content in nursing students in IPE group versus non-IPE group before and after participating in the school health program

| Groups | Test scores | | | | | | |
|---------------|-------------|------|-------|---------|-------|----------|--|
| | Before | | | p-value | After | | |
| | Mean | SD | Mean | | SD | p-value* | |
| IPE group | 19.47 | 2.98 | 24.72 | 1.95 | .044 | .958 | |
| Non-IPE group | 20.74 | 3.89 | 24.73 | 1.90 | | | |

*Between-group comparison made with independent t-test.

Overall, the mean scores for all six aspects measuring students' understanding of roles and teamwork in the inter-professional collaboration of the students increased after partici-

pating in the IPE program. The increases were statistically significant for 4 out of the 6 aspects (see Table 5). The mean scores for the understanding of roles and teamwork on inter-

professional collaboration before and after participating in the IPE program stratified by the three health professional disciplines in the IPE group are shown in Table 6. After completing the IPE program, the mean scores for understanding the roles and teamwork among the nursing students consistently increased and tended to increase among dental public health and public health students (see Table 6). The mean scores for sub-aspects of the understanding of roles and teamwork among all professions before and after participating in the IPE program are illustrated in Supplementary Table 1.

Table 4. Within-group comparisons of the test scores on school-health theoretical content before versus after participating in the school health program among nursing students in the IPE group and non-IPE group

| Groups | Test score | | | | p-value* |
|---------------|------------|------|-------|------|----------|
| | Before | | After | | |
| | Mean | SD | Mean | SD | |
| IPE group | 19.47 | 2.98 | 24.72 | 1.95 | < .001 |
| Non-IPE group | 20.74 | 3.89 | 24.73 | 1.90 | < .001 |

*Within-group comparison made with paired t-test

Table 5. Mean scores for the understanding of roles and teamwork on interprofessional collaboration before versus after participating in the IPE program among nursing, dental public health, and public health students in the IPE group

| IPE Collaborative Issues | Before | | After | | p-value* |
|---|--------|------|-------|------|----------|
| | Mean | SD | Mean | SD | |
| 1. Role and responsibility of each profession and respect for other professions | 3.53 | 0.55 | 3.95 | 0.53 | < .001 |
| 2. Teamwork and leadership | 4.00 | 0.59 | 4.10 | 0.56 | .498 |
| 3. Learning and reflection | 3.72 | 0.64 | 3.94 | 0.64 | .007 |
| 4. Effective communication | 3.65 | 0.73 | 3.85 | 0.65 | .020 |
| 5. Relationship with, and recognizing the need of the clients | 3.76 | 0.64 | 3.79 | 0.65 | .678 |
| 6. Morals and ethics | 3.89 | 0.59 | 4.14 | 0.60 | .001 |

*Within-group comparison made with paired t-test

Table 6. Mean scores for the understanding of roles and teamwork on interprofessional collaboration before and after participating in the IPE program in the IPE group by health professional discipline

| IPE Collaborative Issues | Nursing | | | | Dental public health | | | | Public health | | | |
|---|---------|------|-------|------|----------------------|------|-------|------|---------------|------|-------|------|
| | Before | | After | | Before | | After | | Before | | After | |
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| 1. Role and responsibility of each profession and respect for other professions | 3.45 | 0.58 | 4.06 | 0.59 | 3.59 | 0.53 | 3.86 | 0.48 | 3.57 | 0.52 | 3.93 | 0.50 |
| 2. Teamwork and leadership | 4.02 | 0.61 | 4.10 | 0.59 | 3.96 | 0.55 | 3.96 | 0.54 | 4.1 | 0.61 | 4.1 | 0.51 |
| 3. Learning and reflection | 3.72 | 0.72 | 4.07 | 0.63 | 3.83 | 0.58 | 3.85 | 0.67 | 3.71 | 0.68 | 3.88 | 0.59 |
| 4. Effective communication | 3.60 | 0.81 | 3.95 | 0.70 | 3.69 | 0.71 | 3.73 | 0.59 | 3.73 | 0.67 | 3.89 | 0.65 |
| 5. Relationship with, and recognizing the need of the clients | 3.72 | 0.68 | 3.83 | 0.72 | 3.80 | 0.58 | 3.80 | 0.61 | 3.83 | 0.62 | 3.84 | 0.65 |
| 6. Morals and ethics | 3.83 | 0.59 | 4.14 | 0.72 | 3.94 | 0.57 | 4.12 | 0.47 | 3.98 | 0.58 | 4.16 | 0.63 |

Table 7 shows the mean scores for satisfaction with IPE learning among the three different health professionals in the IPE group after they finished the IPE program. Overall, a majority of the students from the IPE group were satisfied with the IPE program. The item with the highest student satisfaction score was that “the teachers are friendly, easily accessible, and accepting of students’ opinions” (mean ± SD; 3.69 ± 0.83). While the item for “the time spent during activities” had the lowest satisfaction score (mean ± SD; 2.95 ± 1.22). The levels of satisfaction with IPE learning by health professional discipline are depicted in Supplementary Table 2.

4. DISCUSSION

This study revealed significant improvements in interprofessional learning after participating in the interprofessional education program, based on our assessment of the level of theoretical knowledge of school health services among nursing students. The study also showed improvements in the understanding of roles and teamwork regarding interprofessional collaboration and satisfaction toward IPE learning among the nursing, dental public health, and public health students.

After participating in the IPE program, we found that nursing students significantly improved their mean posttest scores on the theoretical content of school-health services (see Table

4; $p < .001$). However, improvements were also observed in the non-IPE nursing students (see Table 4; $p < .001$). A reasonable explanation as to why nursing students in both the IPE and non-IPE groups improved their test scores after participating in the school-health project is that authentic learning in real-world situations and formulating solutions within their school-health projects, whether or not working in interprofessional teams, helped the students gain a better understanding.^[10] Moreover, our results revealed significantly

lower pretest scores among nursing students in the IPE group compared to the non-IPE group (see Table 3; $p = .044$). We also observed no significant difference in the posttest score (see Table 3, $p = .985$) between both groups. The findings may also imply the benefit of IPE learning on knowledge from real-world practice and collaborative teamwork,^[11,12] even though no additional teaching or seminars on theoretical content regarding school health were added to the three modules of learning during our study period.

Table 7. Mean scores for satisfaction with the IPE program among nursing, dental public health, and public health students in the IPE group

| Items for satisfaction with IPE learning | Mean | SD |
|---|------|------|
| 1. IPE can really help stimulate learning | 3.60 | 0.73 |
| 2. Participating in the school health program leads to applying knowledge in real-life situations | 3.84 | 0.75 |
| 3. Appropriateness of IPE to the school health program | 3.53 | 0.82 |
| 4. The activity details correspond to the course objectives | 3.43 | 0.81 |
| 5. Students clearly realize the learning objectives of the course | 3.31 | 0.89 |
| 6. Role of students in learning by themselves | 3.88 | 0.70 |
| 7. Applying what was learned to other situations or other courses | 3.78 | 0.76 |
| 8. Teachers' role supporting group learning | 3.69 | 0.83 |
| 9. Teachers were friendly, easily accessible, and accepting of students' opinions | 3.91 | 0.76 |
| 10. Appropriate numbers of a group advisor | 3.81 | 0.80 |
| 11. How interesting the case study of school health program was | 3.50 | 0.90 |
| 12. Time spent during activities (Appropriate amount of time during the semester) | 2.95 | 1.22 |
| 13. Opportunity to freely express opinions in the group | 3.81 | 0.74 |
| 14. Appropriate evaluation of learning in the course | 3.68 | 0.79 |
| 15. Need for this activity to be held in the next semester | 3.37 | 1.17 |

Significant learning outcome improvements have also been found in other recent IPE studies.^[13,14] A study from Egypt showed that health professional students from the Faculty of Medicine, Dentistry, Health Sciences, and Pharmacology who joined interprofessional teams received significantly higher grades for patient care planning compared to those in intraprofessional teams ($p < .001$).^[13] Likewise, a prospective controlled trial from New Zealand demonstrated the positive impacts of IPE on long-term condition management among health-professional students. After four weeks of IPE project participation, the health-professional students from dietetics, medicine, physiotherapy, and radiation therapy achieved significantly higher long-term condition management scores than those who did not participate in the IPE project ($p < .001$). These higher scores represented greater confidence, knowledge, and ability to manage long-term conditions. However, these scores were from student self-reporting.^[14]

Our findings on the understanding of roles and teamwork regarding interprofessional collaboration showed a better un-

derstanding among IPE students after participating in the program. The mean scores for understanding the different roles and teamwork among the three different health professional students (nursing, dental public health, and public health) increased in all 6 aspects. Notably, there were statistically significant increases in the scores for the aspects regarding 1) the role and responsibility of each profession, and respect for other professions, 2) learning and reflection, 3) effective communication, and 4) morals and ethics (see Table 5). However, the increases for two of the aspects, 1) teamwork and leadership (see Table 5, $p = .498$), and 2) relationship with, and the recognition of the needs of clients (see Table 5; $p = .678$) did not reach a statistical significance. In line with our findings, a prior study showed higher mean grades for health professional students on the role of and the understanding of other healthcare professions after they participated in the IPE project compared to those in the control group ($p < .001$).^[13]

Many previous studies have evaluated the participants' attitudes, role clarification, and readiness for interprofessional

learning in their IPE studies. The reports also revealed that IPE helped increase readiness for interprofessional learning as well as improved attitudes toward interprofessional learning and healthcare teams.^[13–19] Several studies reported the participants' readiness for interprofessional learning using the Readiness for Interprofessional Learning Scale (RIPLS). Several studies found that the mean RIPLS scores or total scores increased after participation in the IPE program compared to the control group, or that the pre-post test scores increased within the IPE program group.^[14–16,19] However, the increased RIPLS scores after participating in the IPE program were not observed in all healthcare disciplines.^[16] These findings may indicate that IPE can improve and promote students' readiness for interprofessional collaboration.

In the present study, the students expressed satisfaction with the IPE program. After participating in the IPE program, students' mean satisfaction scores were greater than 3.3 (out of 5) for all the items (see Table 7). However, students gave a lower score for the amount of time spent during activities (mean \pm SD: 2.95 \pm 1.22). The students explained that they needed more time to participate in the IPE program. In particular, they felt there was not enough time to prepare their sub-projects before implementing the intervention in module 2 of learning. However, students were satisfied that the IPE program encouraged self-directed learning and gaining understanding from real-life situations. The program also allowed the free expression of opinions from a place of respect. Our findings reflecting the positive attitude toward IPE among the participating students correspond to findings from a study in Saudi Arabia. This study revealed positive attitudes towards IPE on sharing learning and the value of teamwork and collaboration among undergraduate students of five health professions (respiratory care, clinical nutrition, cardiac technology, physical therapy, and clinical science laboratory) at the University of Dammam, Saudi Arabia.^[20] Positive changes in participants' attitudes toward IPE were also observed among medical and nursing students in an intervention study in Oxford, England. After completing the geriatric IPE program, both medical and nursing students rated significantly higher scores on teamwork and collaboration and positive professional identity. However, before participating in the program, the nursing students concerned that learning alongside medical students would be difficult due to the hierarchical relationship between nurses and medical doctors. Moreover, the study showed that the IPE program improved medical students' understanding of nursing priorities, the differences in skills, and roles between the two professions. The IPE program also successfully removed the nursing students' concerns about hierarchy. Both professions enjoyed sharing their different experiences.^[21] On the contrary, a study by Robben et al. revealed no dif-

ference in participants' attitudes towards working in an IPE team after participation in the IPE project. In this study, the IPE team consisted of already-graduated primary care professionals including general practitioners (GPs), pharmacists, nurses, physiotherapists, occupational therapists, dietitians, and gerontological social workers.^[22]

IPE learning may be influenced by cultural norms. Each health care profession has a different culture including values, beliefs, attitudes, and behaviors. Thus, the socio-hierarchical culture among healthcare professionals in any society may also affect IPE. A study from Indonesia showed that some hierarchical gaps existed among health professions in IPE learning. Barriers to IPE learning among health professionals participating in the study included different perceptions of patient-centered care among professionals, lack of face-to-face interaction, unequal decision-making, and misunderstanding of specific roles and responsibilities.^[23] Consistently, a study from England reported that nursing students had fear the hierarchy between nurses and medical doctors when participating in the IPE program with medical students.^[21] Moreover, gender was also found to be a factor affecting IPE collaboration.^[24] Different professional cultures contribute unique challenges to effective interprofessional collaboration. Thus, strengthening IPE requires a cultural shift by all those who support and lead the healthcare system.^[25]

The strengths of this study involve its experimental design with a control group, as well as embracing the IPE program in the course syllabuses of the two institutes. Thus, there were no participating students lost to follow-up. Moreover, almost all participating students provided the data requested. There were some limitations to this study. The sample size calculation was based on student availability instead of a power calculation. Thus, the number of students from each of the three health professions was not equal. Moreover, we used our internal tests for pre-post test scores to examine the effects of IPE on the level of knowledge in the nursing students. This decision may affect the generalization of the study to other settings using a different test to measure the effects of IPE.

5. CONCLUSION

In conclusion, the IPE program has the potential to enhance the acquisition of knowledge, the understanding of roles and teamwork within interprofessional groups, as well as general satisfaction with interprofessional learning among participants.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare that there is no conflict of interest.

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