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The impact of online interprofessional learning on family health education to prepare collaborative-ready health professionals: A mixed-method study

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Abstract:

BACKGROUND: Interprofessional education (IPE) is an experience that occurs when students from two or more professions learn about, from, and with each other to improve the quality of health services. One of the IPE teaching strategies is to use an online approach. Due to the COVID-19 pandemic, the community needs effective health education to prevent disease transmission. This study aims to assess the attitudinal changes toward IPE among health students in Indonesia after attending an online course during the COVID-19 pandemic.

MATERIALS AND METHODS: This study used a mixed-method study design with a concurrent approach. It was conducted in 2021 at a health profession education school of a University in Indonesia. An online project-based interprofessional learning in family health education was conducted. The quantitative analysis was carried out using pre- and post-tests with The Readiness for Interprofessional Learning Scale (RIPLS) survey. Meanwhile, the qualitative methods used the phenomenological approach to Focus Group Discussion (FGD) and student reflective essays. The qualitative data were coded using thematic content analysis. The paired samples *t*-test was used if the data were normally distributed, or the Wilcoxon test if the data had abnormal distribution.

RESULTS: The students' attitudes regarding team and collaboration; professional identity; roles and responsibility improved significantly from pre- to post-test (<0.001). The participants perceived that all four interprofessional core competencies were achieved in their learning. They also mentioned their experiences regarding factors contributing to the success of the online course. The family health education project gave the participants more insight into professionalism and patient-centered care.

CONCLUSIONS: Online IPE courses can increase student readiness in collaborative practice and support students' learning to achieve interprofessional core competencies. The students feel the benefit of family health education for their profession.

Keywords:

COVID-19, Family, Health promotion, Interprofessional education, Online

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Introduction

The COVID-19 pandemic impacted family health in several ways, such as changes in seeking healthcare and barriers to accessing the healthcare system.^[1] These problems force health workers to be more active in health promotion and education.

Public health initiatives must involve many parties to prevent and control COVID-19 with a family approach, including health professional students.^[2-4] Interprofessional collaboration between health professional students will improve communication and teamwork between professionals, leading to more significant health outcomes

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and reducing conflict. This shows the importance of interprofessional education, which is the key to improving the quality of health services focused on training students' knowledge, skills, and experience.^[5]

Due to the COVID-19 pandemic, initiatives and guidelines have been suggested for migrating medical and health profession education to an online platform worldwide.^[2,5,6] Meanwhile, because of the sudden need for physical distancing, several health professions schools shifted most of their learning activities online. This need comes as a shift in emphasis for a curriculum with a well-integrated online presence for some schools. The transition is challenging for others because it requires cultural and technological adaptations that have been planned over an extended period but were forced to rapidly implement changes to accomplish the educational mission despite the disruption.^[7] Since giving practical lessons and hands-on sessions online is difficult, students need to use their imagination and creativity. Ensuring students get the same opportunities and contribute to the team is also challenging. This shift to virtual delivery is an unplanned, unwanted, and uneasy learning experiment for curriculum designers, faculty, educators, facilitators, and students.^[6,7] Meanwhile, IPE is a complex curriculum because students from various programs will have multiple understandings, learning needs, and attitudes.^[8,9] These complexities of interprofessional education trigger the development of new learning methods to improve IPE learning. Four-component instructional design (4C/ID) is a model to plan educational interventions for teaching complex tasks.^[10,11]

The use of the 4C/ID model has been reported in different health profession educational settings, such as a physiotherapy curriculum,^[12] an online pharmacotherapy course,^[13] communication skills training,^[14] medication safety course for a nurse,^[15] advance care planning training,^[16] and course for the medical student during the internship phase.^[10] However, there is a paucity of studies regarding using the 4C/ID model in IPE. As well as, whether a 4C/ID project-based interprofessional learning will still be effective when family health education is implemented virtually remains to be evaluated. This study aims to assess the attitudinal changes toward IPE among undergraduate health students after attending an online course on family-centered health promotion. Through the objective, this study wants to answer research questions, namely 1) Is there an increase in student readiness for interprofessional collaboration after the IPE online course compared to before?; 2) to what extent are the IPE core competencies expressed in student reflections?; and 3) how is the student's experience regarding the family health education project?

Materials and Methods

Study design and setting

The study was conducted in an Indonesian medical institution where interprofessional education (IPE) is included in the national accreditation standard. During the COVID-19 pandemic in 2020, the IPE course transitioned to online learning with modifications to meet learning objectives.

An interprofessional course on family-centered health promotion was conducted online over 12 weeks. It had two phases. In Phase 1, students received online lectures and materials for family health assessment and education. They also analyzed collaboration cases and performed role plays. In Phase 2, students assessed a family's health and developed a corresponding education project. A lecturer and a local public health center director supervised each group. Families chosen for the project had members with chronic diseases, high-risk pregnancies, or malnourished toddlers. Throughout the course, students engaged in progressively complex learning tasks. They concluded the course by writing individual reflection essays on their collaborative experiences. The course was developed using the 4C/ID model of instructional design.^[10,11] Table 1 shows the 4C/ID component of the course.

The IPE group consisted of students from three study programs: medicine, midwifery, and pharmacy. Midwifery and medical students in this study were third-year students, while pharmacy students were fourth-year students. A total of 304 students from medicine ($n = 204$), midwifery ($n = 50$), and pharmacy ($n = 50$) participated in the online interprofessional learning activity as directed by their respective program coordinators.

This was a mixed-method study with a concurrent approach, where quasi-experimental pre- and post-test designs were carried out to evaluate the student's understanding before and after an online educational intervention. The Readiness for Interprofessional Learning Scale (RIPLS) survey was selected since it has been validated for health professions. The survey was distributed to all students enrolled in the course, but only 142 participants completed pre- and post-RIPLS surveys. The *t*-test (independent) was used to analyze the overall and specific dimensions of students' attitudes in the pre- and post-test. All data analyses were carried out using IBM SPSS Statistics 25 for Windows.

A qualitative study was conducted using a phenomenological approach. The data were collected using Focus Group Discussions (FGD) and individual reflective essays. For FGDs, the students were divided based on their study programs. The participants were

Table 1: 4C/ID component of the online interprofessional course

Task Class A	Perform family health assessment in a simulated setting
Learning Task 1	Analyze collaborative cases in primary health care, present, and give feedback to another group.
Part Task Practice	Small group discussion
Procedural Information	“Interprofessional Collaboration in Community” module Facilitator of the small group discussion Learning materials uploaded in Spada
Supportive Information	Online lecture: Interprofessional Education and Collaboration in Community Cognitive feedback from other groups on the discussion result
Learning Task 2	Roleplay and reflect on practicing family health assessment
Part Task Practice	Learning circle
Procedural information	Facilitator of role play
Supportive information	Online lecture: family health assessment A module of family health assessment provided in LMS
Task Class B	Perform and reflect on family health assessment and education directly to family (real setting)
Learning Task 1	Perform family health assessment and education
Part Task Practice	-
Procedural Information	Family health assessment form Guideline and technical instruction
Supportive Information	Online lecture: patient-centered comprehensive care Online lecture: Family engagement strategy Mentoring system
Learning Task 2	Project report and individual reflection essay on family health and education experience
Part Task Practice	-
Procedural Information	Project report guideline Guidance on individual reflection essay
Supportive Information	Mentoring system

determined according to the invitation sent to each IPE course coordinator. Each FGD group consists of ten participants. Four FGD groups comprised two medical student groups, one midwifery group, and one pharmacy group. The facilitators of the FGDs asked questions similar to the guided reflection in the student’s essays. The facilitators recorded the FGDs, and the recordings were processed into the verbatim transcript. A total of 27 reflective essays were randomly selected from 142 students who completed pre- and post-test questionnaires. The transcripts of FGD and the individual reflection essays were coded using thematic content analysis. First, two authors carefully read four interview transcripts and two focus group transcripts to develop initial themes based on research questions.

Then, four authors independently coded the transcripts. The authors independently created codes, sub-categories, and main categories. Once individual data analysis was finished; all authors discussed the data analysis to reach final consensus on categories and results.

Ethical consideration

Ethical clearance was issued by the ethics committee of Dr. Moewardi Hospital as the main institutional teaching hospital of Faculty Medicine Universitas Sebelas Maret, Indonesia (No. 335/III/HREC/2021). The consent for participating was obtained before filling out the RIPLS questionnaire and each Focus Group Discussion by providing them with the required information. All respondents had been informed that their participation was voluntary and would not affect their final course marks. The participants who consented to proceed with the data collection were required to approve the consent form.

Results

Of 304 students enrolled in the online IPE course, 142 (47%) completed the pre- and post-test using the RIPLS survey. Since the analysis required a pre- and post-matched sample, the subset comprised the data for this research. Table 2 shows the number of students from each profession, the percentage of males and females who are enrolled in the course, and the questionnaire respondents.

Table 3 presents the pre- and post-test results using the RIPLS survey. The students’ attitudes toward interprofessional learning improved significantly from pre- to post-test (87.89 to 90.68, $P = 0.00$) with all domains of their readiness for interprofessional education, which include team and collaboration (42.1 to 43.34, $P = 0.00$), professional identity (32.58 to 33.57, $P = 0.00$), and roles and responsibility (13.17 to 13.77, $P = 0.00$).

Table 4 shows the result of the qualitative analysis. The theme “interprofessional core competencies” consists of four categories that are discussed based on the four IPEC core competencies, which include value and ethics, roles and responsibilities, teamwork, and interprofessional communication. The students perceive the learning characteristics that support a collaborative environment. Moreover, they also state that the online IPE project benefits their profession and patient/family.

Discussion

a. Student readiness toward collaborative learning

The results show that the IPE online course can improve student readiness in interprofessional learning. This is indicated by the increase in students’ RIPLS scores

Table 2: Number and gender of students from each profession in the sample

Study program	<i>n</i> students enrolled in the course (% male/female)	<i>n</i> respondents (% response rate for the profession)	% male/female of respondents	The % response rate of the total sample
Midwifery	55 (0/100)	24 (43.6)	0.0/100	16.9
Pharmacy	34 (20/80)	27 (79.4)	0.07/93	19
Medicine	215 (32/68)	91 (42.3)	26.4/73.6	64.1
Total	304	142	26/116	100

Table 3: RIPLS pre and post-test results

	RIPLS Pre-test score Mean±SD (<i>n</i>)	RIPLS Post-test score Mean±SD (<i>n</i>)	<i>P</i>
Programs			
Medicine	87.2±8.31 (91)	91.01±5.37 (91)	<i>P</i> <0.001*
Midwifery	90.92±5.46 (24)	91.75±3.74	<i>P</i> =0.549
Pharmacy	87.52±7.30 (27)	88.63±6.77	<i>P</i> =0.432
RIPLS domains			
All	87.89±7.79 (142)	90.68±5.49 (142)	<i>P</i> <0.001*
Team and collaboration	42.1±4.0	43.34±2.63	<i>P</i> <0.001*
Professional identity	32.58±3.17	33.57±2.29	<i>P</i> <0.001*
Roles and responsibility	13.17±1.53	13.77±1.48	<i>P</i> <0.001*

Note: *statistically significant

before and after the course, which occurred in the overall score and all RIPLS dimensions. It shows that the online IPE course can facilitate better changes in student perceptions of team and collaboration, professional identity and roles, as well as responsibility. The course was developed to cover a variety of family health and the COVID-19-related problems, as well as to ensure that all programs were familiar with the content while still needing students to collaborate across disciplines to complete the project. Faculty from all programs actively participated in the course design and delivery to guarantee that all programs' requirements were addressed. Moreover, real patient/family health issues incorporated into the course provided a chance for collaborative interprofessional practice.^[15,17,18]

This is supported by the qualitative findings, which also provide evidence that the tasks set in each phase required all students to disseminate their discipline-specific information in the course. Previous work has reported that students felt positive about teamwork and collaboration and valued opportunities for shared learning with other health professional students after their online interprofessional learning.^[19] Other work has also revealed that most students reported positive experiences with online IPE.^[20]

b. The interprofessional competencies expressed in student reflections.

The qualitative analysis supports evidence of the increase in student readiness for collaborative learning through this course. The IPEC^[21,22] provides direction on four interprofessional core competencies that must be achieved in the interprofessional curriculum. Moreover,

reflection journals and FGDs from all professions involved in the IPE course also showed that these four competencies were applied in student learning. This corresponds to other investigations which stated that a reflective portfolio could describe the achievement of four interprofessional core competencies.^[23-25] Reflection apart from being an ability becomes an inter-professional competency; it is also a way to stimulate students to increase self-awareness when carrying out collaborative projects with students of other professions.^[26,27] According to prior research, students could only attain new understandings of collaborative practice through emotional and cognitive learning triggers if they are able to reflect on their own experiences.^[25,26,28]

c. Student's experience

Respondents felt that the activity in the course supports their collaboration with other health professional students. The high quality of interaction in the course activities forces students to share ideas and contribute according to their professional competence. The power of the interaction is one of the main factors affecting the success of IPE.^[18,29,30] The participant's high quality of interaction could be because the IPE program at the institution is implemented longitudinally from the beginning of the curriculum so that students can gradually adapt to interprofessional groups.^[31,32] A previous study stated that the design of the IPE curriculum could influence the development of the collaborative attitude of health profession students.^[33] Participants also mentioned that the IPE course provided a contextual learning experience. Collaboratively, students learn by interacting directly with the family.^[4,34,35] This experience provides an image of what their profession will be like.

Table 4: Themes, categories, sub-categories, and representative codes

Categories	Sub-categories	Quotes
Theme 1: Interprofessional main competencies		
Value and ethics	Mutual respect/ shared understanding	<i>"Each profession has mutual respect and also doing community service with pleasure by the feeling of being comfortable in the team" (FG-P)</i>
		<i>"So far, I am pleased with my team because they are very open and give good feedback" (RE-Med1)</i>
	Self-awareness/ reflection	<i>"I consider that all the professions in my team are equally important to each other, whether from midwives, pharmacists, or nurses and doctors." (RE-Med12)</i>
		<i>"When I have difficulty, I also don't hesitate to ask my colleagues, both in the same profession or in different professions." (RE-Med5)</i> <i>"Even though at the beginning I felt compelled, after taking this course, I felt that I personally and my profession needed another profession to be able to provide the best health services." (FG-P)</i>
Roles and responsibilities	Prioritize the group aim	<i>"What is clear is that even though in a team I act as a doctor as a leader or team leader, I will still trust my colleagues and team members." (RE-Med12)</i> <i>"Despite the tight academic schedule, we agreed to try to meet the group's targets so that education for partner families is successful." (FG-Med1)</i>
	Patient-centered care	<i>"From this course, I believe that communication is critical to realize safe and effective services for patients and health workers" (RE-Mw1)</i>
	Performing based on professional background	<i>"collaboration between professions, with our respective competencies, requires good teamwork for the welfare of patients." (RE-Mw3)</i> <i>"I try to complement each other with my professional colleagues if there are problems that can be solved according to my competence." (RE-Mw6)</i>
	Use of knowledge and skills	<i>"This (family health education project) can be done by dividing tasks according to the competence, knowledge, and skills of each profession." (RE-P3)</i>
Teamwork	Recognize one's limitation	<i>"....that peers always need other colleagues" (FG-P)</i> <i>"When I have difficulty, I also don't hesitate to ask my colleagues, both in the same profession or in different professions." (RE-Med11)</i>
	Interdependent relationship	<i>"...more aware of the importance of being interconnected and continuous with colleagues, both in the same profession or in another (FG-Mw)</i>
	Perform effectively	<i>"I try to actively contribute to carry out my duties and help my friends facing problems." (RE-Mw6)</i> <i>"every week, we provide feedback and discussion on the sustainability of partner families." (RE-P1)</i>
	Group dynamic	<i>"When we get group assignments, we always discuss first before deciding on the division of tasks for each group member" (RE-Mw6)</i>
Interprofessional communication	Consensus development	<i>"all group members have the same contribution and work according to a mutual agreement." (FG-Med2)</i>
	The roles of a leader	<i>"The group leader always asks if anyone has any objections or is not up to the task that has been divided" (RE-Mw6)</i>
	Shared accountability	<i>".....mutual help and combining different perspectives on the same case or project." (RE-Med2)</i> <i>"I try to complement each other with my professional colleagues if there are problems that can be solved according to my competence." (RE-Mw5)</i>
	Selecting the proper language	<i>"I strive for effective communication that can help me, who comes from the Banyumas area, which is very different in terms of language, to have one perception and one goal with inter and intra-professional students." (RE-Mw5)</i> <i>"From this project, we learn certain tricks or delivery methods or good communication to people with different backgrounds and different areas of origin." (FG-Med1)</i>
Interprofessional collaboration	Selecting social media to communicate	<i>"Usually, we continue the discussion on zoom or continue the discussion on WAG; it depends on the urgency discussed." (FG-P)</i> <i>"We choose to use WhatsApp group and zoom to communicate" (RE-Mw4)</i>
	Importance of interprofessional collaboration	<i>"For my small group, interprofessional communication is the key to all progress of assignments and health education to family partner" (RE-Med13)</i> <i>"...more aware of the importance of being interconnected and continuous with colleagues, both in the same profession or in another (FG-Mw)</i>

Contd...

Table 4: Contd...

Categories	Sub-categories	Quotes
Theme 1: Interprofessional main competencies		
	Listen, express ideas, and discuss.	<p>"For communication with friends from different professions, we learn to respect one another" (FG-Med1)</p> <p>"And our group also teaches to be able to respect opinions and be able to solve problems with maintaining discussions" (RE-Med6)</p> <p>"Yes, we know personally first so we can understand the characteristics of everyone, later so that there will be no barriers in communication. (FG-Mw)</p>
	Feedback	<p>"so far, I am pleased with my team because they are very open and give me feedback" (RE-Med9)</p> <p>"After each one has finished doing their job, we collect them together and give each other feedback." (RE-P2)</p>
Theme 2: Learning experiences		
Supporting the environment to be collaborative	Learning activity	<p>"We were taught to listen to each other's stories between one friend and another in a group discussing one's background, aspirations and abilities." (RE-Mw5)</p> <p>"We discussed topics that would be conveyed to partner families, making educational media and case study discussion assignments." (RE-P3)</p> <p>s"for the introduction of each student starting with a self-reflection task (learning circle) which explains about each other and from that moment we get to know each other better." (RE-Mw9)</p>
	Contextual learning	<p>"I was also taught. How to deal with patients who will come from various backgrounds. So that later we can collaborate to provide optimal health services" (RE-Mw4)</p> <p>"when giving advice, I am careful to use polite language and do not seem patronizing because cooperation does not function to dominate but complement each other to achieve effective cooperation." (FG-Med1)</p>
	Facilitation of team building	<p>"We have been trained for teamwork as evidenced by the formation of small groups for the family project and the supervision from a public health center."(RE-P3)</p> <p>"In the introduction phase, each student started with learning circle activities in which each student explained about each other, and from that moment, we got to know each other better" (RE-Mw5)</p>
Obstacles	Scheduling	<p>"...and difficulty in finding time to (online) meet and discuss" (RE-P2)</p> <p>"The obstacle we experienced was that we were working on a tight time with a due date.... because we all were busy with our own (study program) schedule"(RE-P2)</p>
	Engagement	<p>"Using online learning, more difficult to bond (with friends and family partners)" (FG-Med1)</p> <p>If online, it is more challenging to get to know and invite the partner's family (RE-Mw1)</p>
Theme 3: Benefits of the IPE project		
Related to profession		<p>"This is the first step I can learn how to engage a family and conduct health assessment because in the future, as a midwife, I will be more likely to meet and interact with family and society." (RE-Mw5)</p> <p>"We, as health workers, will be able to prepare and explore how good we are when later communicating with midwives or other health workers or patients and the community fully when we become a doctor." (FG-Med2)</p> <p>"I gain insight into my professional competence in more depth"(RE-P4)</p>
Related to patient or community		<p>"at the end of the meeting with the family, we were delighted because our client's family felt cared for and also felt that the education we conveyed was beneficial for the family's health." (FG-Med1)</p> <p>"Our project target family was content when they got masks and hand sanitizers. They also said they conveyed the educational materials we gave to neighbors and other relatives". (FG-P)</p> <p>"We were delighted to be able to help the puskesmas (public health center) to monitor the health of high-risk pregnant women who are the target of our project because, during the Covid-19 pandemic, many pregnant women were afraid to come to the puskesmas". (FG-Mw)</p>

FG=focus group, RE=reflective essay, Med=medical student, Mw=midwifery student, P=pharmacy student

This relates to the theory that contextual learning can foster professionalism. This also corresponds to other work, where immersion in collaboration, stimulating teamwork training, and learning in an authentic context are facilitators of IPE at the process level.^[30,36] Most students have difficulty inviting their families to be more engaged and interested in educational projects. This is probably because previously, students had never had

experience directly educating the community. Therefore, it is necessary to involve students in community activities from the beginning of their studies to train them in family engagement. Previous work mentioned that integrating student participation in school education and health promotion is of great importance during education and in preparing for future work and professional roles of health professionals.^[37]

Limitation and recommendation

The research was only done at one institution, and only approximately 40% of students who completed the RIPLS before and after the course. Hence, a potential selection bias constrains the interpretation of our pre-post assessment of interprofessional readiness. Future studies can be conducted with a bigger sample size, individuals from various backgrounds in the health professions, and samples from many institutions. Future research is also advised to determine if the interprofessional attitude can endure till the student graduates as a health professional.

Conclusion

Online IPE courses successfully improved health professional students' readiness to learn about, from, and with each other. It was also discovered that the course instructional design supports the interaction of health professional students in nurturing collaborative environment. Online interprofessional learning has the clear benefit of providing insights into the future work of health professionals and preparing them for collaborative practice. The family health project provided a meaningful experience for students to contribute directly to the community's health during the COVID-19 pandemic.

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Conflicts of interest

There are no conflicts of interest.

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