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Increasing the value of Community-Based Education through Interprofessional Education

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Abstract

Introduction: This study aimed to examine the usefulness of Community Based-Education (CBE) and Interprofessional Education (IPE) to community health outcomes.

Methods: The design was a mixed-method study. Each small group worked together to identify family health problems, implement interventions, and evaluate the results. The Readiness for Interprofessional Learning Scale (RIPLS) questionnaire was applied to compare students' perceptions before and after the implementation. In addition, qualitative data were acquired from students' comments on the questionnaire, interviews with community representatives, and FGDs with instructors at the end of the program.

Results: Three hundred and sixty-seven out of 465 students returned the completed paired questionnaire (78.9 % response rate). Paired t-test showed that student perception of responsibility slightly increased, whereas teamwork and collaboration, negative and positive professional identity decreased somewhat. However, most pre-post students' responses already trended to the positive side (scales 4 and 5). Moreover, the Chi-square test showed that pre-post students' confidence levels significantly increased. Most small groups of students successfully empowered the community to solve health problems. Students, instructors, and representatives of community members appreciated the program. However, several students felt their instructors were not motivated to mentor their tasks, and sometimes they had difficulty conducting home visits together.

Conclusion: This study showed that the combination of CBE-IPE contributes to more favourable community health outcomes. However, it was challenging in several aspects of preparation, including highly motivated instructors. Nevertheless, pre and post-implementation students' attitudes are still positive.

Keywords: *Interprofessional Education (IPE), Community Based Education (CBE), Health Profession Students, Readiness*

Practice Highlights

- Students empower the community to solve health problems.
- A combination of CBE-IPE programs can improve students' self-confidence and responsibility.
- Students have positive attitudes toward the CBE-IPE program.

I. INTRODUCTION

Community-based education (CBE) programs for medical and other health professionals expose students to community health problems, in which they will work in the future as health professionals. However, the CBE program is usually implemented within a single discipline, whereas community health problems must be

solved collaboratively among a health care team (Housley et al., 2018).

Interprofessional Education (IPE) has been identified as a valuable method of learning experiences to increase the collaboration and communication of health professionals in healthcare settings. Several studies have reported

positive student perceptions of IPE, including improved patient and community outcomes (Dynes et al., 2013). For example, the Leicester Model of IPE demonstrated that students and healthcare professionals gain valuable insights into the balance task of patient-related issues and offer clarity about the effectiveness of collaborative opportunities in addressing patients' needs (Lennox & Anderson, 2012). Carr (2015) also reported that after the IPE experience, students perceived strong confidence in communication with other professions, increased knowledge of the importance of teamwork and collaboration, learning professional roles, respecting other professional points of view, and improved communication skills.

The goal of undergraduate education for students in the health professions is mainly to produce graduates who can solve community health problems and increase community health, particularly in primary health care. Moreover, community health problems should be solved collaboratively. Thus, Community Based Education (CBE) combined with IPE is needed to be implemented in health professions schools. Several studies have implemented IPE in the community and positively affected students. For example, a study in the Philippines showed the usefulness of the IPE in the community, such as: learning about collaboration, appreciation of roles, holistic care, service to the community, and unique learning experience (Opina-Tan, 2013). A qualitative study in Australia also concluded that students who were voluntarily involved in an IPE program appreciate the opportunity to have direct practice experience in a community context and see this as a valuable way of engaging in interprofessional learning (Stewart et al., 2015). Furthermore, Wagner et al. (2011) stated that IPE in the community improved teamwork.

However, the IPE implementation in community-setting in Indonesia is not yet promising. Lestari et al. (2020) reported that communication and mutual support were problems faced by students. Furthermore, Randita et al. (2019) also stated that collaborative patient-centred competence has a moderate effect when IPE is implemented in the community setting. Therefore, IPE in Indonesia needs further exploration, especially when it is implemented in the community setting with a large number of students who are not volunteers but are obliged to be involved in such programs. In addition, it is anticipated that a learning model combining CBE and IPE will have additional benefits in supporting community health. Thus, the research question of this study was, is the combination of CBE-IPE valuable on community health outcomes, and what are the students' attitudes and perceptions towards the new program?

A. The Combination CBE-IPE Model

Before implementation, we matched the curricula of three health professions study programs (Medicine, Nursing, and Nutrition) at the Faculty of Medicine Universitas Diponegoro (a government medical school in Semarang, Indonesia). Based on the acquired competencies and timing possibility, we agreed that the new CBE-IPE program should be implemented for students in the 6th semester. In the 6th semester, all 465 health professions students (212 medical students, 127 nursing students, and 126 nutrition students) participated in this program during one semester.

Before implementation, we discussed with the head of the district health office and the director of the community health centre (CHC) to receive suggestions related to this program, especially in conjunction with the population health situation. As a result, we agreed that students should be assigned to families with pregnant women to support the local government health program in reducing maternal mortality. Thirty-six cadres (voluntary community members) were requested to participate in the project by the director of the CHC and agreed to help them in the program implementation. All cadres had been trained to conduct simple health promotion by the CHC.

A total of 465 health professions students were divided into 126 small groups consisting of 1-2 medical and nursing students and one nutrition student. One small group was attached to one family with a pregnant woman. To have experiences with a continuum of care, small groups of students added one other family if the first family had no children or elderly. Students had to work together to measure the health status of all family members, identify health problems, and propose a solution for identified health problems in discussions with their instructors. Based on those discussions, the students worked collaboratively with the cadres to implement collaborative interventions and eventually evaluated the result of their interventions. During this implementation, groups of students presented their work three times in seminars attended by all instructors and coordinators from three departments. The head of CHC received final reports for follow-up.

B. Study Design and Subjects

The design of this study was a mixed-method study to combine quantitative and qualitative data, in which the qualitative data was used to enrich the quantitative ones. Quantitative data was acquired by asking all students (465 health professions students) to fill out questionnaires before and after implementing the CBE-

IPE program. We used the Readiness for Interprofessional Learning Scale (RIPLS) to evaluate students' perceptions. This questionnaire has been widely used to collect students' attitudes and perceptions to measure the readiness of healthcare professional students to undertake shared learning activities (Hertweck et al., 2012; Parsell & Bligh, 1999). Negative professional identity items represented negative statements regarding the value of working with other healthcare students. Therefore, this study reversed scored items so that high scores indicated IPE readiness (McFadyen et al., 2006). We used RIPLS in the Indonesian language version, which was developed by Tyastuti et al. (2014). It used exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The EFA accounted for 59.9% of the total variance, while the alpha coefficient of CFA was > 0.7 . Furthermore, construct validity was acceptable goodness of fit. Thus, the RIPLS in the Indonesian language version is a valid tool to assess students' attitudes toward IPE.

The qualitative data were gained by collecting student comments in the questionnaire by asking: "Please write your words regarding this new program." Moreover, TNK conducted interviews one by one with representatives of community members: two housewives and three cadres. At the end of the program, we conducted a workshop, including two times FGD conducted by TNK, FYA, and SB with 16 instructor's representatives. Verbatim of all qualitative data was completed by TNK. The result of students' intervention for patients and families was identified from students' reports.

C. Data Analyses

We described the student's characteristics and the result of student intervention on community outcomes. Paired-sample t-tests were used to compare the pre-post students' responses to RIPLS. In addition, students' perceptions related to self-confidence before and after the implementation were compared using chi-square. SPSS v22 was used to analyse the quantitative data. The students' comments and interviews with community member representatives and instructors were analysed using content analysis according to Braun and Clarke (2006). First, keywords were identified as codes, and we used a matrix consisted three columns, namely keywords, categories, and themes. TNK and FYA conducted qualitative data analysis. Different coding was discussed to reach a consensus.

D. Ethical Consideration

We verbally explained this study to all participants before collecting the data. Especially for students, we guaranteed that their perceptions would not affect their scores. Then, we asked for participants' agreement to join this study by signing the informed consent. The author would confidentially keep their identity.

III. RESULTS

Three hundred and sixty-seven out of 465 students returned the completed paired questionnaire (78.9 % response rate). Table 1 shows the subject's characteristics of this study.

No	Subject's characteristics	Categories	Quantity	Percentage
1.	Students (n= 367)			
	The study program	Medicine	167	45.4
		Nursing	100	27.3
		Nutrition	100	27.3
	Gender	Male	73	20
		Female	294	80
2.	Instructors (n: 16)			
	The study program	Medicine	6	38
		Nursing	5	31
		Nutrition	5	31
	Gender	Male	4	25
		Female	12	75
	Age	31-40	6	37
		41-50	10	63
3	Representative of community members			
	Age	30-40	3	60
		41-50	2	40
	Gender	Male	0	0
		Female	5	100

Table 1. Characteristics of study subjects

A. The Result of Students' Intervention in the Community Outcomes

Various health problems were identified and successfully managed by the students in collaboration with cadres (Table 2 and 3). Students also recognised that most families with low social-economic status and little

education did not have health insurance. The head of the CHC agreed to follow up on some parts of the identified health problems, such as visiting pregnant women with high risk to ensure that they will deliver in the hospital, giving intervention for malnutrition toddlers, and vitalizing the post-health for the elderly.

No	Problems identified	Students' interventions	Results
1	One pregnant woman with an abortion	Students and cadre provided education and accompanied the mother to the hospital.	a. The mother should be curettage by the doctor in the hospital. b. The mother healthy and agrees to postpone the next pregnancy.
2	Only 20% of pregnant women without risk factors who follow gymnastic program in CHC	Motivation to follow gymnastic for pregnant women	Moderate-high compliance
3	About 40% of pregnant women have low knowledge about monitoring of pregnancy and low compliance with routine ANC	Direct education and gave motivation	Increasing knowledge and compliance for ANC
4	25.4% of pregnant women with risk factors according to the standard of WHO and 0.04% with high risk	Motivation to routinely ANC and monitoring	High compliance
5	42.1% of pregnant women do not have health insurance	Education to apply government health insurance	25% have insured key person agrees to follow up
6	Social and cultural problem (do not want to eat fish)	Direct education	Moderate-high compliance
7	83.3% of pregnant women not enough nutrition in their daily diet (2 days recall)	Gave leaflet and an example of healthy food	Moderate-high compliance
8	20% of pregnant women with anemia)	Gave Fe from CHC or midwives.	Low compliance (reason: not good taste and felt nausea)

Table 2. Students' work-related pregnant women in the community

No	Problems identified	Students' interventions	Results
Baby and Toddlers			
1	10% with malnutrition	Education to mother and giving an example of healthy food	Head of CHC followed up based on student's report
2	Acute Respiratory Infection	Education and Suggested to CHC	Cured
3	Diarrhoea	Education and Suggested to CHC	Cured
4	Motoric low development	Education and Suggested to CHC	Still to be followed up
5	Difficult to eat, low knowledge of mother about healthy food	Education to mother and give an example of healthy food	Increasing knowledge
6	One child with hydrocephalus	Motivation to go to the hospital and finding the agency of hydrocephalus	Has been tackled by the agency of hydrocephalus
Puberty			
1	Low knowledge about reproductive health	Direct education	Increasing knowledge and Head of CHC agree to follow up
2	Smoking habit & Narcotic consumption	Direct education	
3	Anemia among girl	Direct education	
Adult			
1	Low knowledge of occupational accident	Direct education	Increasing knowledge
2	Low knowledge about family planning	Direct education	Increasing knowledge
Elderly			
1	Hypertension, Knee osteoarthritis, DM type II, Low Back Pain, Stroke, Low quality of life due to osteoarthritis and LBP	Education and Suggestion to routinely to CHC	Have been followed up by CHC
2	Only 15% routinely come to the integrative post health for elderly	Education and Motivation	Low compliance

Table 3. Students' work with other family members

B. Pre-post Comparison of Students' Perceptions

Students' perceptions using RIPLS (5-point Likert scale) from all study programs showed a slight decrease in team collaboration, professional identity, and the cumulative sub-scale. Only student perception of responsibility

slightly increased (Table 4). However, most pre-post students' responses to the RIPLS questionnaire already trended to the positive side (scales 4 and 5). Comparison of pre-post students' self-assessment of their confidence level significantly increased (Table 5).

No	Subscale	Pre Mean ± SD	Post Mean ± SD	P
1	Teamwork & Collaboration	38.96 ± 3.2	36.93 ± 4.0	< 0.001*
2	Negative professional identity	6.01 ± 2.4	5.29 ± 1.9	< 0.001*
3	Positive Professional identity	20.91 ± 1.9	20.23 ± 2.5	< 0.001*
4	Role of responsibility	5.38 ± 1.3	5.56 ± 1.5	0.07
5	Total subscale	70.57 ± 5.0	68.74 ± 5.9	< 0.001*

Table 4. Comparison of all students' perception using RIPLS pre and post implementation (n: 367)

*Significance ($p < 0.05$) with paired t test

No	Level of Confidence	Pre	Post	Sig
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1	Not so confident	69 (18.8%)	3 (0.8%)	< 0.00*
2	Confident	272 (74.1%)	281 (76.6%)	
3	Very confident	26 (7.1%)	83 (22.6%)	

Table 5. Level of students' Confidence (N: 367)

*Significance ($p < 0.05$) with chi-square test

C. Students' Comments

Only 141/367 (38%) students wrote their comments in the questionnaire. However, most students (94% of 141 students) appreciated this program and suggested it be continued.

"The program is good; it can help community member to solve their health problem"

F23Nurs

"I agree if the program will be continued"

F50Nurs

Positive aspects raised by the students were:

- Opportunity to have direct communication with the community member (68%),

"I have the opportunity to communicate directly with patients and family, which is difficult to do when I'm only studying in the class"

M13Med

- Understanding each other when exploring and sharing knowledge to solve the identified health problems (32%),

"I feel amazed that each of us has our roles in solving health problems"

F67Med

- Learning about health team collaboration in the actual situation (40%),

"I learn a lot about how to collaborate with other health students in the real situation"

F90Nut

- Feeling proud that they had the opportunity to contribute to managing community health problems (69%).

"This program gives me an opportunity to collaborate with other professions to solve community health problems"

F44Nurs

The student's complaints were as follows:

- Their task of working with a continuum of care was too heavy and exhausting.

"Focus on one family problem for one small team would be more useful."

F57Med

- Several students (13%) also felt that their instructors were not motivated to mentor their tasks.

"It is difficult to make an appointment with the instructors, so we don't have enough time to get feedback from him"

F21Med

- They had difficulty conducting home visits together (73%).

"Our biggest problem is matching the schedule to do a home visit."

M98Nut

D. Interviews with Representatives of Community Members (two housewives, three cadres)

Both housewives and cadres appreciated the students' work. They believed the students already had enough competencies to help their health problems. Cadres were still committed to participating in the following program and working with the students to implement, monitor, and evaluate the intervention.

"We are so happy that students help us a lot to identify and to solve our health problems"

F01HW

"Yes, of course, we will help students to communicate with the family as well as report the result of students' intervention to Community Health Centre"

F03C

Community members thought they were not receiving enough information about the students' purpose for visiting their house. They suggested that the cadre should have explained to them this program. However, they welcomed the students and told them to make an appointment before the home visit.

"There was no information from cadres of CHC that students will come to our house, but we still welcoming the students because it gives many benefits for us"

FHW02

E. FGD with Instructors at the End of the Program

Most instructors (94,5%) appreciated the value of this program. However, they needed more detailed information about the program, especially assessing students. They also thought it was too hard for students to add one family after already concentrating on one family's health problem. They agreed that a tiny group should only be attached to one family with a pregnant woman. To strengthen collaboration competencies, all groups of students should implement a "collaborative intervention" that involves all disciplines.

"Sometimes students implemented their intervention within a single discipline that they thought more appropriate to solve the specified health problem."

F05Inst

The instructors suggested that the assessment include peer assessment to increase students' attitudes toward valuing each other. It was finally agreed that in the next implementation, various types of assessment would be implemented, namely students' activities, presentation and discussion, peer assessment, and students' assessment by the family members.

"Various assessment methods are preferable to capture students' performance from the different side"

M09Inst

IV. DISCUSSION

This study aimed to examine the impact of implementing the CBE-IPE model on the outcomes of student intervention in the community and students' attitudes and perceptions towards the new program. Within the CBE-IPE program, the health professions students successfully worked together to empower the community to solve most community health problems. The CBE-IPE program aims to give health profession students direct experiences in working as a health team in dealing with community health problems that might correlate with the social and economic backgrounds of community members. In this study, students identified several health problems in the family with low financial status, low education, and did not have any health insurance. Hence, the health profession students within this program also had an opportunity to learn several principles, including the level of education and economic aspects when implementing their interventions. It is in line with the

study by Ngo et al. (2021), who reported that hypertension and cardiovascular risk could be identified by conducting CBE-IPE in homeless adults.

We implemented the CBE-IPE program without any serious obstacles due to the support from the local health government and the director of CHC. Cadres and representatives of community members also commented that the students' presence and work were beneficial. They stated that they would be involved in the program and work with students to implement, monitor, and evaluate the result. It is important to involve cadres in this program because they will handle the follow-up under the supervision of CHC. Some studies also involved non-health workers in IPE implementation, such as Akter et al. (2016), who involved lay health workers, and Dynes et al. (2013), that involved health extension workers and community health promoters in improving maternal and neonatal health outcomes.

A. Students' Attitudes and Perceptions Toward the CBE-IPE Program

This study showed that students' attitudes and perceptions toward this program have improved, especially regarding the role of responsibility and confidence level. In this study, students have tasks to implement health intervention after discussing health problems identified with their instructor, which might increase their commitment and confidence. Tan et al. (2021) also demonstrated the importance of feedback and discussion, in which IPE participants noted that the debriefing process improves their compliance and teamwork.

Students' perceptions as assessed by the RIPLS in aspects of team collaboration and interprofessional identity were slightly lower, although statistically significant. These statistically significant differences might result from the large sample size of this study. Several studies have shown that one-time IPE implementation is unlikely to change attitudes, whereas multiple or longitudinal IPE experiences elicit attitudinal change with a more positive response (Hammick et al., 2007; Pollard et al., 2006). Hind et al. (2003) reported little to no change in the health professions students' perception of the RIPLS between pre-and post-implementation. Schreiber et al. (2014) also reported a slight increase and no statistically significant differences in the pre-post response to the RIPLS because the students already had positive attitudes toward IPE. Torsvik et al. (2021) reported that RIPLS tends to have a ceiling effect. Therefore, RIPLS no longer seems suitable for measuring and evaluating the impact of interprofessional learning. In this study, "most pre-post students' responses to the RIPLS

questionnaire already trended to the positive side." Thus, the RIPLS also possibly has a ceiling effect in this study.

B. Wrapped up CBE-IPE Program Evaluation

Evaluation of this initial program demonstrates that students felt favourable toward the CBE-IPE program and felt more confident when dealing with community health problems. In line with Wong et al. (2018) study, the final students of six health programs have a positive attitude towards working together in an interprofessional health care team.

Nevertheless, students also complained that their tasks in working within a continuum of care were too heavy. As a result, they felt exhausted and less motivated to identify other health problems in another family. This complaint was in line with the instructors' opinion. It concurred that students could learn from each other when they presented and discussed their work in the seminar. The recommendations included an adjustment in the tasks, scheduling, and improvements in the communication and quality of supervision. Therefore, the students' tasks must be adjusted to accommodate these suggestions in the following implementation. Sunguya et al. (2014) reported that curriculum is an essential challenge in implementing IPE, which is in line with the study conducted by Thistlethwaite (2012) and Herath et al. (2017), which states that teaching methods and learning activities can be problems faced when implementing IPE. Furthermore, scheduling is one of the problems faced by faculty who implement the IPE program (Ngabonzima et al., 2020)

The instructors mentioned that the students' interventions were not always "collaborative disciplines" since sometimes only a single discipline intervention for some health problems, and very little content was contributed by the other students in the specified group. Therefore, these circumstances might influence the lower perception of negative professional identity after the program implementation (Hind et al., 2003). Milot et al. (2015) also reported that it could sometimes be challenging to combine heterogeneous student teams during the learning together phase, where every discipline should be represented.

Understanding the attitudes of health professional students and the factors that influence their perceptions, including the situation they face during implementation, may help implement the program in several stages. There are four levels for the students to join the interprofessional collaborative practice. These include level 1: intra-professional education: the foundation of group skills, level 2: introduction to interprofessional

education and collaboration: exposure to the healthcare team, level 3: interprofessional collaboration, and level 4: becoming an influential member of the healthcare team (Salfi et al., 2012).

C. Limitations

This study's limitation lies in the type of data collection that only uses a closed-ended questionnaire and asks the students to write their comments on the program. Although the students raised several positive attributes, this study did not obtain sufficient information about what happened during the implementation and what was behind the students' rated aspects. Therefore, FGDs with students are still needed to understand program implementation in-depth. Further, direct participation in program implementation might identify obstacles regarding when students should collaborate in their intervention program. Additionally, limitations in this study are acknowledged as data were collected from less than 80% of students participating in the program. Finally, no formal feedback was collected from the community members, although verbal input in the interview was positive. A collection of more detailed data would have provided a deeper understanding of the program's impact on community perceptions.

We realize that implementing the CBE-IPE program in the community, which involves many students, was challenging and needed more careful preparation. Moreover, the lecturers' motivation might be increased by encouraging and facilitating them to include field epidemiology research in the same area, with research funding from the faculty. Several changes should be made based on this evaluation, including more detailed guidance for the students and instructors.

V. CONCLUSION

This study revealed that the combination of CBE-IPE for 6th-semester health profession students had been perceived as a valuable learning experience to build community health. Nevertheless, it was challenging for many students in several aspects of the preparation. Moreover, highly motivated lecturers are required, which might be increased by encouraging and facilitating field epidemiology research in the same area. Finally, further research is needed to explore students' experiences during implementation, primarily how they work as a team and their belief in professional identity. It is also important to identify the result of a combination of CBE-IPE implementation in terms of the satisfaction of students, instructors, and family members.

Notes on Contributors

Tri Nur Kristina conceptualised and designed the research, participated in the analysis and interpretation of data, drafted and revised the manuscript, and giving final approval of the version to be published.

Fatikhu Yatuni Asmara conceptualised of the program implementation, participated in the data collection, and revised the manuscript.

Sudaryanto conceptualised of the program implementation.

Nuryanto conceptualised of the program implementation and participated in the data collection.

Saekhol Bakri conception of the program implementation and participated in the data collection.

Ethical Approval

The Medical and Health Research Ethics Committee (MHREC), Faculty of Medicine Diponegoro University-Dr. Kariadi General Hospital had approved this study (No. 519/EC/FK/2020).

Data Availability

Author could not share the data of this study widely because of its privacy. It also contains qualitative data.

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Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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