

## Preparing Nursing Students for Inter-Professional Collaborative Practice through Simulation-Based Inter-Professional Education: A Systematic Review

Utami Rachmawati<sup>1</sup>, Muhamad Jauhar<sup>2</sup>, Lita Heni Kusumawardani<sup>3</sup>,  
Rasdiyanah<sup>4</sup>, I Gusti Ayu Putu Desy Rohana<sup>5</sup>

<sup>1</sup>Faculty of Nursing, Universitas Indonesia, Indonesia

<sup>2</sup>Faculty of Nursing, Universitas Muhammadiyah Kudus, Indonesia

<sup>3</sup>Faculty of Health Sciences, Universitas Jenderal Soedirman, Indonesia

<sup>4</sup>Faculty of Medicine and Health Sciences, Alauddin Islamic State University, Indonesia

<sup>5</sup>Nursing Department, Health Polytechnic of Ministry of Health Palembang, Indonesia

Corresponding author: [muhamadjauhar@umkudus.ac.id](mailto:muhamadjauhar@umkudus.ac.id)

### ABSTRACT

**Background:** Interprofessional Education (IPE) is an integrated education concept to improve collaboration capabilities initiated by WHO. Interprofessional collaboration practices are expected to minimize medication errors, improve quality of care and patient safety.

**Purpose:** to analyze integrative research on the role of simulation-based interprofessional education (IPE) in preparing nursing students to an interprofessional collaboration practices.

**Methods:** a systematic literature review search of four databases of indexed international journals, namely Science Direct, PubMed, ProQuest, and EBSCO was conducted. Inclusion criteria used for the search include original research, publication time 2016-2020, English-written, and accessible in full text. Studies were included if they have keywords of “knowledge” OR “perception” AND “interprofessional education” AND “nursing student”. Research articles were critically appraised and analyzed through a table containing the title, author, year, methodology, results, and recommendations. Lastly, data were synthesized narratively to address the study aims.

**Results:** there were 13 research articles that met the criteria. IPE can be implemented in the form of simulations, elective courses, and workshops integrated with the curriculum. The results showed an improvement of knowledge, attitudes, perceptions, skills, readiness, and competency of nursing students after simulation-based IPE implementation. Finally, simulation-based IPE implementation prepares nursing students to excel in interprofessional collaboration practices

**Conclusion:** simulation-based IPE should be integrated into the higher education health curriculum especially on clinical nursing practice and professional training. Further investigation is needed to identify relationship conflict, role conflict and performance satisfaction amongst IPC health staff.

### Keywords:

Interprofessional education; interprofessional collaboration; nursing; simulation.

## BACKGROUND

Increased awareness about health in the community has led to the emergence of demands for the achievement of effective and efficient quality of health services. On the contrary, this demand is not matched by the shortage of health workers, therefore innovative strategies are needed in health services. Various studies that have been conducted on efforts to increase the optimization of health services found that the application of collaborative practices between health professions can strengthen the health system and improve health outcomes ([The Institute of Medicine, 2015](#)). Interprofessional Education (IPE) is defined as students of two or more professions associated with health or social care engaged in learning with, from, and about each other (Barr, Freeth, Hammick, Koppel, & Reeves, 2000; WHO, 2010). IPE is a learning concept that combines several health disciplines that work together in teams that need to be introduced early on. The application of IPE in the learning process can develop collaboration skills between health workers to be more effective when working together to provide comprehensive care in various health services (Hall & Zierler, 2015). Furthermore, The achievement of the IPE application process requires a complex process in an effort to prepare prospective health workers who are ready to collaborate when entering the workforce through continuous professional development ([Girard, 2021](#)).

Instead of sticking to the separately educated courses, allied health programs should focus on preparing their students to work on interdisciplinary professional education programs in order to understand the skills of health care professionals and gain real-world experience ([Inman, Briggs, Theriot, & Heaston, 2016](#); WHO, 2010). WHO is the first institution that initiated the concept of integrated education to improve collaboration capabilities of various health professions in an effort to improve the quality and quality of services. Furthermore, The Institute of Medicine (IMO) was the first institution to recommend that health education providers be required to encourage collaboration between health professionals in health care teams (Antonakis, 2012). IMO focuses on applying learning concepts that combine several health disciplines that work together in team case management. This learning requires key competencies, including effective communication, interprofessional partnership skills among health professionals, professional respect and responsibility, and high standards of knowledge, skills, and professional attitudes to manage clinical cases collaboratively (Azamil & Meo, 2020). The application of IPE in several research results shows an increase in teamwork and collaboration among students who are involved in jointly managed case competition activities (Posey et al, 2017; [Leathers et al, 2018](#); Ferri et al, 2018).

Efforts to develop and change the methods and quality of health services are to strengthen the competence of graduates when receiving education in health institutions (Causack & O'Donoghue, 2012). However, in reality, training and education to prepare health practitioners in implementing team-based care has not been fully implemented. The IMO report explains that there are health care institutions that have implemented health service practices that require workers to work in interdisciplinary teams, but their workers have not received appropriate education and training (IMO, 2015). The

implementation and development of the IPE curriculum has not been carried out evenly in Educational Agencies. The implementation of IPE in several countries in institutional settings is as follows, doctor education is 10.2%, nurse and midwife education is 16%, and nutritionist education is 5.7% WHO (2010). The results of a survey conducted in 42 countries, data obtained that Health Education Institutions that have implemented the IPE curriculum are 24.6%. Meanwhile, the implementation of the implementation of the IPE in Educational Institutions in Indonesia has not been found (WHO, 2010). Data in Indonesia also shows that IPE had started to fostering interprofessional collaboration (IPC) practices into their IPE in several health cluster colleges. Thus, it is necessary to explore the readiness of students in IPC practices so that the implementation of IPE can be immediately developed in various curricula of health education institutions.

IPC is expected to be a solution in improving health services in the midst of the current world condition that is facing a health workforce crisis. IPC is so important because its implementation has various positive impacts on: patient safety, patient quality of life, reducing the risk of falls, preventing medication errors, and improving the patient's functional status ([Purnasiwi & Jenie, 2021](#)). Policymakers need to look for strategic innovations that can assist in the development of policies and programs to support the world's health care system. The framework for interprofessional education and collaborative practice recognizes that many health systems around the world are fragmented and struggle to manage unmet health care needs (WHO, 2010) and are well established in some countries. Competency mapping in the application of IPE and IPC can be an alternative solution for health education institutions to adjust student competencies in order to meet the needs of the business world. However, its essential role has not been implemented well in Indonesia due to the dynamics of finding ways to implement IPE/IPC better. IPE implementation best practices from other countries can be integrated into the education curriculum based on local needs. Therefore, an analysis of articles from researchers that focuses on the application of collaborative learning methods is very much needed as a ready-made competency mapping material for health workers. For this reason, it is necessary to explore the methods and effectiveness of their implementation so that the implementation of IPE can be immediately developed in various curricula of health education institutions.

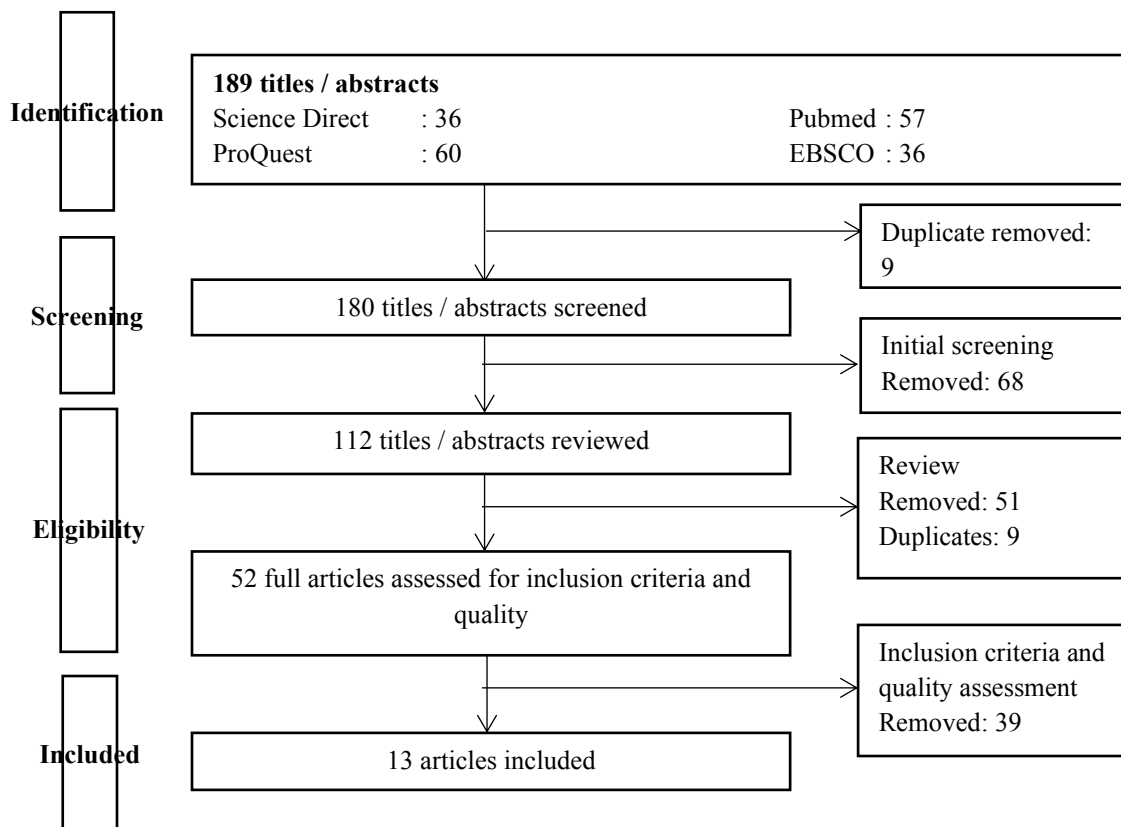
## **OBJECTIVE**

This study aims to analyze integrative research on the role of IPC simulation in preparing nursing students to a interprofessional collaboration practices.

## **METHODS**

This research used the systematic literature review method of relevant studies, with the inclusion criteria of articles taken as a reference source, which are published and indexed international journals for the period 2016-2020 in English, and can be accessed in full text. The articles used were taken from Science Direct, PubMed, ProQuest, and EBSCO with the used keywords of “knowledge” OR “perception” AND “interprofessional education” AND “nursing student”. Research articles obtained as many as 13 articles and were analyzed through several stages, namely, first the researcher chose the article to be examined by reading the title of the research article, followed by reading the abstract. If the title and abstract match the reference criteria required by the researcher, then the

article continues to be analyzed as a whole. The inclusion criteria are articles published in the last five years, original research, experimental study, and mix methods were included. The exclusion criteria are literature or systematic review study, duplicated, and abstract only. Articles with the substance that fit the criteria needed by researchers are taken as a source of reference (the article selection process flow and the analysis table attached). **(Figure 1)**



**Figure 1.** Article selection based on inclusion and exclusion

**RESULTS**

Articles that have met the inclusion criteria were analyzed by describing the contents of the title, first author's name, year of publication, the methodology used, and the research results narrated in the following table:

**Table 1.** Summary of articles on nursing students' knowledge and perceptions about interprofessional collaboration

No.	Title	Authors	Year	Methodology	Results
1.	Effectiveness of simulation-based interprofessional education for medical and nursing students in south Korea: a pre-post survey	Jihye Yu et al.	2020	Experimental study: pre-post quantitative survey	After the simulation-based IPE series, there was a significant increase in scores on the IPE attitude and competence variables in medical and nursing students. Although the perception of medical students did not increase significantly, the perception of nursing students increased significantly with the value of $t=3.02, p<0.01$ .

For complete information author guidelines please check

<http://ejournal.poltekkes-smg.ac.id/ojs/index.php/jnj/about/submissions#authorGuidelines>

No.	Title	Authors	Year	Methodology	Results
					The perception of collaboration between doctors and nurses increased with the value of $t=2.36$ , $p<0.05$ vs $t=3.64$ , $p<0.01$ . Perceptions of professional identity such as caring, autonomy, nurses' authority on medical students did not increase, as well as perceptions of doctor's authority on nursing students did not increase.
2.	Effectiveness of an interprofessional patient safety team-based learning simulation experience on healthcare professional trainees	Nirvani Goolsarran et al.	2018	Experimental study	More than 90% of students agree that the safety concepts learned will have an impact on clinical practice; 78% of students feel confident in analyzing errors in maintaining patient safety and their causes. Other components that have improved in this study are the ability to provide precise handoff using IPASS as well as the ability to provide safe discharge planning.
3.	Description and assessment of a pilot interprofessional education case competition activity	Savannah Posey, Jessica Brady, Kristen Pate, Jennifer Smith, Sherry Peveto	2017	Experimental study	This study assesses activities related to the achievement of IPE Core Competencies and students' readiness for IPE after participation in the IPE approach through case competencies. A total of 66.7% of the questions asked (The Readiness for Interprofessional Scale - RIPLS and IPEC Competency instruments) proved statistically significant, except for the domain of roles and responsibilities. The RIPLS instrument also shows an increase in teamwork and collaboration between students involved in IPE case competition activities. This research shows that IPE is a viable activity to help meet the 2016 standard on the integration of IPE in the curriculum. Research result.

For complete information author guidelines please check

<http://ejournal.poltekkes-smg.ac.id/ojs/index.php/inj/about/submissions#authorGuidelines>

No	Title	Authors	Year	Methodology	Results
4.	The efficacy of interprofessional simulation in improving collaborative attitude between nursing students and residents in medicine. A study protocol for a randomised controlled trial	Paola Ferri et al.	2018	Randomized Controlled Trial.	Nursing students and residents who participated in the interprofessional simulation training showed a significant increase in interprofessional scores as well as increased readiness for interprofessional education, as a follow-up to the effectiveness of the interprofessional simulation training.
5.	Stimulating Students' Interprofessional Teamwork Skills Through Community-Based Education: A Mixed Methods Evaluation	Endang Lestari, Albert Cherpier, Renee Stalmeijer	2020	Mix methods study design	Compared to the medical students, nursing and midwifery students have less positive perceptions related to teamwork components, namely: communication and mutual support. Furthermore, this results were also supported by the Focus Group Discussion (FGD) that mentioned three related aspects of this perception: lack of confidence that cause communication gap, contrasting way of thinking, and leadership culture in health services.
6.	Interprofessional education in geriatric medicine: towards best practice. A controlled before-after study of medical and nursing students	Sanja Thompson et al	2020	Mix methods study design	The RIPLS interpretation showed statistically tested results for both nursing and medical students in the intervention group. Higher teamwork and collaboration as well as positive professional identity were increased while negative professional identity was lower for the nursing students after the post-IPE . This finding also can be found in the control group (medical students). There was no statistically significant finding about the roles and responsibilities both in the intervention and control group. Furthermore, open-ended questions also addressed the awareness of roles, expertise and responsibilities; students concern about IPE; perceptions of each other's role; curriculum topics; receptiveness to geriatric IPE; understanding of interprofessional collaboration; expectation and future IPE session.

For complete information author guidelines please check

<http://ejournal.poltekkes-smg.ac.id/ojs/index.php/inj/about/submissions#authorGuidelines>

No	Title	Authors	Year	Methodology	Results
7.	Understanding students' readiness for interprofessional learning in an Asian context: a mixed-methods study	Endang <a href="#">Lestari</a> , Renee E. Stalmeijer, Doni Widyandana, Albert Scherpbier	2016	Mix methods study design	Total mean scores of RIPLS differed significantly between group ( $p=0,000$ ) which showed that medicine students have higher score compared to the other students. Besides, qualitative analysis identified four main themes: 1) negative and positive perceptions of IPE and the importance of learning communication and leadership skills were elicited from early clinical practice placement, 2) insecurity and disengagement among other students regarding the medical student, meanwhile , 3) medical students felt pressure to be leaders, and lastly 4) clarifying and understanding each other's' profession and their boundaries are needed.
8.	A pilot program to improve nursing and surgical intern collaboration: Lessons learned from a mixed-methods study	<a href="#">Neha Raparla et al.</a>	2016	Mix methods study design	Overall baseline scores of attitudes towards physicians-nursing students collaboration were similar ( $p=0.15$ ). No significant changed was found for nursing students' scores before and after the session ( $p=0.43$ ), while there was a significant increase for surgical interns ( $p=0.0004$ ). Pre-post comparison of all four categories demonstrated no significant differences between pre and post-session scores for all nursing students. However, there was a significant increase of sub-category collaboration for the surgical interns. Furthermore, three most significant, relevant, and recurring themes were obtained namely: role definition, value of the nurse, and lack of teamwork.

No	Title	Authors	Year	Methodology	Results
9.	Nursing and Biomedical Laboratory Science (BMLS) students' interprofessional training in the simulation laboratory.	Frøydis Vasset, Lindis Helberget, Synnøve HofsethAlm ås.	2018	Mix methods study design	There were two factors that involve a construct of the "Value of IPE" and "Need for Collaborative Practice (CP)". "Value of IPE" showed higher mean compared to "Need for CP" however, no statistically significant difference found between the two, study direction in secondary school, nor the students had experience in healthcare. Gender showed a statistically significant difference for the "Value of IPE" ( $p=0.02$ ) which means female students were more positive for "Value of IPE" compared to male students. The data was analyzed into three main categories: 1) IPE in the simulation laboratory, 2) the informants' advice on how IPE in the simulation laboratory could be improved, and 3) unfortunate components in the IPE intervention. IPE in the simulation laboratory found that the students learn more about each other, think that the simulation was useful as well as the debriefing approach that can reflect what they have done. Some advices about the IPE simulation includes earlier timing, additional information about each other's professionals' work, and some real implementation models for IPE. Some unsatisfactory components mentioned were confusion as the simulation was different compared to usual practice in hospital, disrupted communication as too many students in the laboratory, and some difficulty in collaborating.



No	Title	Authors	Year	Methodology	Results
10	Effects of a single interprofessional simulation session on medical and nursing students' attitudes toward interprofessional learning and professional identity: a questionnaire study	Bryan Burford et al.	2020	Experimental study: IPE simulation with pre-post	IPE simulation can improve attitudes towards interprofessional learning, enhance professional identity, especially the emotional aspect of group membership. Nursing students have consistently higher perception scores than medical students. Nursing students have consistently higher identification scores than medical students.
11	Use of profession-role exchange in an interprofessional student team-based community health service-learning experience	Jun Wang et al.	2020	Experimental study	The results showed a significant increase in the positive attitude of students in interprofessional collaboration and increased awareness of the role of students compared to the control group.
12	Students' understanding of teamwork and professional roles after interprofessional simulation—a qualitative analysis	Lena Oxelmark et al.	2017	Mix method study design	IPE can increase students' understanding of the professionalism of other health workers' roles and responsibilities. students demonstrate extensive knowledge of the principles of teamwork. Three main themes: (1) realizing the basics of teamwork, (2) reconsidering professional roles, (3) increasing trust.
13	Interprofessional Pharmacokinetics Simulation: Pharmacy and Nursing Students' Perceptions	Cheryl D. Cropp et al.	2018	Mix method study design	Identified themes: meaningful perception across all IPE competencies, safety, advocacy, rewards, and repairs. Students report effective learning from simulated experiences. The ability to explore students' perceptions of IPE in clinical health sciences is increased through simulation.

## DISCUSSION

Interprofessional Education (IPE) is a teaching and learning process that encourages collaborative work between two or more health profession students to improve patient health (Asmara, Bakri, Dewi, Afifah & Kristina, 2019). Collaboration and cooperation are important aspects in the implementation of IPE in health higher education. The research of [Posey et al., 2018](#) describes the application of IPE to nursing and pharmacy students. Students develop a treatment plan and answer questions from each case with the team for three hours. The research explains that the results of the evaluation of collaboration and collaboration have significant value. IPE is very helpful and effective in increasing collaboration and teamwork, providing opportunities for students to work together in providing health services. In addition, IPE also facilitates students to gain experience in collaboration, coordination, and case management of health services. IPE triggers teamwork so that it can improve the quality of care for patients (Riskiyana,

For complete information author guidelines please check

<http://ejournal.poltekkes-smg.ac.id/ojs/index.php/jnj/about/submissions#authorGuidelines>

Claramita & Rahayu, 2018). [Simko et al., \(2017\)](#) also explained how the interprofessional education elective course program that involved physiotherapists, doctors, clinical nurse specialists, and pharmacists can affect good perceptions of students about the role of each profession in pain management and enhance the interprofessional educational competence of nursing and pharmacy students.

The application of IPE needs to be integrated with several learning methods such as case-based learning, learning simulations, and experiences that tend to have a positive effect and influence the effectiveness of IPE (Riskiyana, Claramita & Rahayu, 2018). [Vasset's research \(2018\)](#) shows the experience of students learning to understand skills from other professions through IPE. Students from all health professions involved agreed that the simulation method was needed to obtain sufficient information in the implementation of IPE activities. Different levels of simulation experience create optimal interactions in overcoming obstacles during IPE implementation. [Cropp et al., \(2018\)](#) explained that the ability to explore students' perceptions of IPE in clinical health sciences increased through activities in the form of simulations. [Glauberman et al., \(2020\)](#) explained that IPC can be implemented through students performing roles based on disaster simulation case scenarios and showed how students' knowledge on disaster course and IPC competencies are increased. Learning simulation using manikins and demonstrations by facilitators can also be implemented as it can increase the IPC competencies ([Goolsarran et al., 2018](#)).

The application of learning methods is not only to evaluate one domain, such as knowledge or skills. Evaluation with one domain causes a low level of evaluation so that other methods are needed. Riskiyana, Claramita & Rahayu (2018) revealed that a low evaluation will weaken the picture of student competence. Based on this, a combined longitudinal method is needed through curriculum development so that the evaluation results are higher. Based on another perspective, apart from certain domains, there is also an evaluation when an activity or program is in progress (formative evaluation) or evaluation at the end of an activity or program (summative evaluation) as an assessment of learning, competence and IPE performance (Clark, 2018). In addition, the suitability of learning objectives, learning activities, and assessment methods also plays an important role in increasing the effectiveness of IPE implementation.

Several learning principles, such as collaborative, egalitarian, focus group, experiential, reflection, and applied learning, are the foundation of IPE implementation. Haruzivishe and Chipamaunga (2019) reveal several important points related to the ideal vision of IPE implementation, including: improving the quality of care, focusing on user service needs, engaging user services, encouraging professions to learn with, from, and about each other, respecting integrity and contributions. Each profession, improve practice in the profession, and increase professional satisfaction. Students who have passed the IPE stage will be able to collaborate in interprofessional teams and contribute positively to improving the patient's quality of life.

Clark (2018) revealed that the successful implementation of IPE requires teaching and learning strategies that create an interactive and collaborative environment among students from various health disciplines. This explanation also similar to the research conducted by [Lestari et al., \(2020\)](#) on medical, nursing and midwifery students that found nursing and midwifery students had a bad perception of the components of

cooperation, namely communication and support. Another IPC study by [Thompson et al., \(2020\)](#) involved 300 medical students and 150 nursing students showed that there is an increase in cooperation and a positive professional identity. In addition, planning and designing interventions must also consider local contexts that may affect the learning process such as the learning environment, learning resources, and socio-cultural conditions. Therefore, innovations in teaching and learning activities that are best suited to the local context should be encouraged to increase program effectiveness.

Ideally, IPE combines the entire vertically and horizontally integrated curriculum (Haruzivishe & Chipamaunga, 2019). Research by Fawaz and Anshasi (2019) explained about courses integrated with the interprofessional education curriculum are conducted at the Faculty of Medicine in which students are divided into interprofessional groups with competency achievements consisting of collaborative practice, group interaction, role clarification, and communication skills. Developers and organizers of the IPE curriculum need to pay attention to several factors such as the characteristics of students, lecturers or facilitators; learning outcomes to be achieved; and the availability of learning experiences for students. The IPE curriculum must consider learning outcomes, background, subject content, teaching and learning methods, evaluation formats, and required resources. In addition, the growing need for collaborative practice encourages curricula designed to strengthen the competencies required in IPE (Shakhman, Omari, Arulappan & Wynaden, 2020).

Several previous studies have shown that the application of IPE can improve students' understanding, attitudes, and skills in providing health services. Research by [Oxelmark et al. \(2017\)](#) changed students' understanding of the professional roles and responsibilities of other health workers so that students have broad knowledge of the principles of teamwork. [Burford et al., \(2020\)](#) in their research showed that student attitudes about IPE learning increased. IPE simulation enhances professional identity, especially in the emotional aspect of team members. The attitudes and competencies of interprofessional education in medical and nursing students increased significantly after the IPE program was implemented (Yu et al., 2020). In addition, the research of [Glauberaman et al. \(2020\)](#) showed that research results showed that students' knowledge of triage and disaster management increased. The results of this study indicate that through simulations Interprofessional Education and Collaboration (IPEC) can prepare nursing students in implementing professional collaboration practices that are strengthened by increasing knowledge, attitudes and skills in providing professional health services.

The description of the implementation of IPE in higher education in health in several worlds shows that IPE has been integrated into the curriculum, both intracurricular and extracurricular. Indonesia as a country with a large and varied number of higher health education is expected to be able to capture this collaboration issue and integrate it into the higher health education curriculum. Various forms of learning models can be adapted according to the needs and available resources. The IPE curriculum can be integrated at the academic and professional levels. So that students and practitioners are more exposed to the issue of collaboration and subsequently become a good culture when they become health professionals in health services. An example of collaboration integration in intracurricular is the existence of elective or basic courses that must be taken by students as a requirement before entering the professional level. This

intracurricular collaboration activity can be in the form of learning in the building or outside the building. Collaborative learning in buildings can be done in the form of interactive lectures on the basic concepts of IPE and implementation of IPE in health services, case-based small group discussions, role play, project-based, etc. Collaborative learning outside the building can be done in the form of real work lectures or real work practices where students provide health services to the community based on a health team.

Extracurricular collaboration activities can be carried out through health student organizations. Several health student organizations across majors can initiate activities that involve more than one or two organizations between health departments. The forms of activities that can be carried out are community social activities, community service, basic training in organizational leadership and management, etc. Various forms of collaborative activities can be developed based on the condition of the university. The ultimate goal of these various forms of activity is to introduce students to the importance of collaboration. The climate of collaboration that has been initiated since the education level will foster a culture of good collaboration, especially when students provide health services directly to the community later. This good collaboration culture is expected to increase patient satisfaction with the health services received. The quality of health services is an important indicator in achieving patient satisfaction. Communication, cooperation, understanding the duties, authorities, and responsibilities of the profession itself and other professions, as well as paying attention to ethical aspects are the basic competencies that must be achieved in implementing interprofessional collaboration.

## CONCLUSION

The study was conducted at the clinical stage to identify social interactions between health workers in clinical situations. The use of valid and reliable research instruments in identifying student attitudes and behaviors about IPC. There is a need for research with a larger sample involving different institutions and countries so as to strengthen research findings on the effectiveness of interprofessional education. The interprofessional education curriculum can be integrated into the health education curriculum by increasing the capacity of human resources, especially teachers, in implementing IPC courses. Universities in the health sector must be able to produce graduates who have good leadership and communication skills. The next research is to explore perceptions and attitudes about interprofessional education in all health students.

## REFERENCES

- Burford, B., Greig, P., Kelleher, M., Merriman, C., Platt, A., Richards, E., Davidson, N., & Vance, G. (2020). Effects of a single interprofessional simulation session on medical and nursing students' attitudes toward interprofessional learning and professional identity: A questionnaire study. *BMC Medical Education*, 20(1), 1–12. <https://doi.org/10.1186/s12909-020-1971-6>
- Cropp, C., Beall, J., Buckner, E., Wallis, F., & Barron, A. (2018). Interprofessional Pharmacokinetics Simulation: Pharmacy and Nursing Students' Perceptions. *Pharmacy*, 6(3), 70. <https://doi.org/10.3390/pharmacy6030070>
- Girard, M. (2021). Interprofessional education and collaborative practice policies and law: An international review and reflective questions. *Human Resources for*

- Health*, 19, 1-8. doi:http://dx.doi.org/10.1186/s12960-020-00549-w
- Glauberan, G. H. R., Wong, L. C. K., Bray, M. L., & Katz, A. R. (2020). Educational Innovations Disaster Aftermath Interprofessional Simulation: Promoting Nursing Students' Preparedness for Interprofessional Teamwork. *Journal of Nursing Education*, 59(6), 353–356. https://doi.org/10.3928/01484834-20200520-11
- Goolsarran, N., Hamo, C. E., Lane, S., Frawley, S., & Lu, W. (2018). Effectiveness of an interprofessional patient safety team-based learning simulation experience on healthcare professional trainees. *BMC Medical Education*, 2018(18), 1–9. https://doi.org/10.1186/s12909-018-1301-4%0ARESEARCH
- Inman, W. H., PhD., Briggs, R., D.H.A., Theriot, Rosemary, EdD., M.S.P.H., & Heaston, Alexis, EdS., M.S.P.H. (2016). TRAINING FUTURE HEALTH CARE PROFESSIONALS TO WORK IN TEAMS: THE NEED FOR INTERDISCIPLINARY PROFESSIONAL EDUCATION. *Journal of the National Society of Allied Health*, 13(1), 48-57. Retrieved from https://www.proquest.com/scholarly-journals/training-future-health-care-professionals-work/docview/1938050842/se-2?accountid=17242
- Johnson, A. M., & Howell, D. M. (2017). International service learning and interprofessional education in Ecuador: Findings from a phenomenology study with students from four professions. *Journal of Interprofessional Care*, 31(2), 245–254. https://doi.org/10.1080/13561820.2016.1262337
- Institute of Medicine (IOM). (2015). *Measuring the impact of interprofessional education on collaborative practice and patient outcomes*. Washington, DC: The National Academies Press.
- Leathers, J. S., Davidson, H., & Desai, N. (2018). Interprofessional education between medical students and nurse practitioner students in a Global Health course. *BMC Medical Education*, 18(1), 1–8. https://doi.org/10.1186/s12909-018-1307-y
- Lestari, E., Scherpbier, A., & Stalmeijer, R. (2020). Stimulating students' interprofessional teamwork skills through community-based education: A mixed methods evaluation. *Journal of Multidisciplinary Healthcare*, 13, 1143–1155. https://doi.org/10.2147/JMDH.S267732
- Lestari, E., Stalmeijer, R. E., Widyandana, D., & Scherpbier, A. (2016). Understanding students' readiness for interprofessional learning in an Asian context: A mixed-methods study. *BMC Medical Education*, 16(1), 1–11. https://doi.org/10.1186/s12909-016-0704-3
- Oxelmark, L., Nordahl Amorøe, T., Carlzon, L., & Rystedt, H. (2017). Students' understanding of teamwork and professional roles after interprofessional simulation—a qualitative analysis. *Advances in Simulation*, 2(1), 1–8. https://doi.org/10.1186/s41077-017-0041-6
- Posey, S., Brady, J., Pate, K., Smith, J., & Peveto, S. (2018). Description and assessment of a pilot interprofessional education case competition activity. *Currents in Pharmacy Teaching and Learning*, 10(4), 505–510. https://doi.org/10.1016/j.cptl.2017.12.009
- Purnasiwi, D., Jenie, I.M. (2021). Literature review: Effect of interprofessional collaboration implementation of patient services. *The Indonesian Journal of Occupational Safety and Health*, 10(2): 265-272. doi:10.20473/ijosh.v10i2.2021.265-272
- Raparla, N., Davis, D., Shumaker, D., Kumar, A., Hafiz, S., Sava, J., Adams, K., & Fitzgibbons, S. C. (2017). A pilot program to improve nursing and surgical intern collaboration: Lessons learned from a mixed-methods study. *American Journal of*

- Surgery*, 213(2), 292–298. <https://doi.org/10.1016/j.amjsurg.2016.10.014>
- Simko, L. C., Rhodes, D. C., McGinnis, K. A., & Fiedor, J. (2017). Students' Perspectives on Interprofessional Teamwork Before and After an Interprofessional Pain Education Course. *American Journal of Pharmaceutical Education*, 81(6), 1–9. <https://doi.org/10.5688/ajpe816104>
- Thompson, S., Metcalfe, K., Boncey, K., Merriman, C., Flynn, L. C., Alg, G. S., Bothwell, H., Forde-Johnston, C., Puffett, E., Hardy, C., Wright, L., & Beale, J. (2020). Interprofessional education in geriatric medicine: Towards best practice. A controlled before-after study of medical and nursing students. *BMJ Open*, 10(1), 1–14. <https://doi.org/10.1136/bmjopen-2017-018041>
- Vasset, F. (2018). Nursing and Biomedical Laboratory Science (BMLS) Students' Interprofessional Training in the Simulation Laboratory. *Journal of Research in Interprofessional Practice and Education*, 8(1), 1–14. <https://doi.org/10.22230/jripe.2018v8n1a271>
- Wang, J., Guo, J., Wang, Y., Yan, D., Liu, J., Zhang, Y., & Hu, X. (2020). Use of profession-role exchange in an interprofessional student team-based community health service-learning experience. *BMC Medical Education*, 20(1), 1–11. <https://doi.org/10.1186/s12909-020-02127-z>