



Designing And Piloting Of Online Interprofessional Education Programme For Medical Students: A-Mixed Method Study

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Abstract

Interprofessional education (IPE) is a strategy used to prepare a future interprofessional collaboration team. This research aims to design an online interprofessional program for Medical School. This study uses a mixed-method approach. In the first stage of qualitative research (structured interviews and FGD) on leadership elements, 2 lecturers, and 5 students from each study program generated 14 themes and 47 sub-themes which were explained into module learning outcomes, study topics, learning activities, and characteristics online IPE program. Module evaluation was carried out by examining differences in 252 students' perceptions of pre- and post-module using IEPS (Interprofessional Education Perception's Scale) questionnaire. The results of the bivariate Wilcoxon test showed that there was a significant difference in perception scores regarding post-module compared to pre-module ($p=0.00$). There is a positive difference, obtained post-module scores are greater than the pre-module scores obtained by 141 people. The increase in perception scores can also be seen from the results of the bivariate analysis of each study program. This research shows that the implementation of the online IPE module has succeeded in increasing students' perceptions toward interprofessional collaboration. This is an alternative solution that can be considered for interprofessional learning further.

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Introduction

The world of health is currently facing complex and increasingly challenging conditions. According to the results of a study on global health issues conducted by the Indonesian Ministry of Foreign Affairs (2018), the cause of this complexity is the emergence of new infectious diseases; epidemiological transition from infectious to non-communicable diseases; and climate, environmental, behavioral, and demographic change. To be able to overcome various potential risks that may arise, health professionals are expected to work together and collaborate effectively. The ability to work together and collaborate within a team is an important pillar for improving the quality of health services. (Findyantini A, et al, 2019).

Interprofessional collaboration (Interprofessional Collaborative Practice - IPCP) is a form of participatory, collaborative, coordinative cooperation between health professions, and between health professions and patients, patient families, and local communities which aims to improve patient health outcomes. Components of interprofessional collaboration include responsibility, accountability, coordination, communication, cooperation, firmness in decision-making, autonomy, trust, and mutual respect. (World Health Organization, 2010).

However, interprofessional collaboration cannot just happen. Collaboration requires an educational process that allows students to develop interprofessional collaboration, communication skills, and an understanding of the roles and responsibilities of each health profession. Interprofessional education plays a role in developing competencies related to collaboration, namely effective communication, conflict management, leadership, patient-centered care, and ethical practice. Through the interprofessional education process, students will be more likely to show respect and positive attitudes towards both colleagues and future work and can work together better to improve patient outcomes. (World Health Organization, 2010).

Interprofessional education (IPE) is a strategic approach that can be used to prepare interprofessional collaboration teams in the future. Bridges, et al (2011) stated that students who are trained using the IPE approach will tend to become members of interprofessional teams who show respect and a more positive attitude towards other professions and can work together better to improve patient outcomes. The World Health Organization in the Framework for Action on Interprofessional Education and Collaborative Practice (2010) states that the implementation of IPE in the health service and education system is an important key to creating a successful collaborative practice in the future.

Darlow (2015) explained that interprofessional practice training should be included in future health professions education curricula. Interprofessional education (IPE) is a learning forum for effective communication and mutual respect between health professionals. The results of a study conducted by Ruebling (2014) stated that embedding IPE in the future health professional education curriculum has a positive impact on increasing self-confidence, especially in communicating and interacting with other professions as well as for developing international professional relationships in the future.

The results of a literature review of existing IPE programs show that most forms of program implementation are didactic, community-based, simulation, and clinical programs. (Bridges, 2011). This form of implementation requires direct interaction between students and patients, patient families, the community, and students from other health professions. Learning conditions that require direct physical contact are of course very difficult to implement in the era of the COVID-19 pandemic, where social restrictions are something that must be obeyed by all parties. Students cannot have direct interactions with other students, patients, and the community and are not allowed to travel to community areas where IPE learning will be carried out. This of course makes implementing the IPE program very difficult or even impossible to implement at all.

However, on the other hand, handling the COVID-19 pandemic requires interprofessional collaboration, both from health and non-health professions. There is a need for innovation in interprofessional learning strategies. Solomon, et al (2010) through the results of a study of interprofessional learning held remotely at Hamilton University, Canada, showed that students were able to solve problems collaboratively, identify their professional roles, and provide information from their professional perspective. Solomon's study also shows that facilitators are an important key in the successful implementation of long-distance IPE programs. A limitation of this study is that it only evaluated participants' immediate post-module reactions. However, long-term effects, for example, changes in post-module attitudes, are difficult to evaluate.

A study conducted at Moorhead University, United States, exemplifies a fully online interprofessional education program. The IPE program is implemented in 5 modules, namely an introductory module regarding the basic concepts of IPE, a quality and safety concept module, a module regarding the roles and responsibilities of health service team members, a module regarding the importance of effective communication between professions, especially in handling COVID-19 cases, and finally is a module that emphasizes the importance of group collaboration, especially in managing critical cases in health services. The learning activities used are interactive discussions, case studies, and asynchronous sessions in the form of reading the module material presented. The evaluation was carried out using mixed methods, namely by using the Readiness for Interprofessional Learning Scale (RIPLS) questionnaire which had been adapted before and after the program as well as a qualitative survey during the program. Quantitative survey results obtained from the RIPLS questionnaire show that students reflect positive outcomes toward IPE even though it is carried out in an online setting. The results of a qualitative survey by Singh and Matthes (2021) show that (1) IPE increases awareness of the role of other professions and increases collaboration, (2)

increasing communication and cohesion between team members is important during the pandemic, and (3) IPE can facilitate better health services for COVID-19 patients (Singh and Matthees, 2021).

An interprofessional study conducted at the Nagoya University School of Medicine in Japan serves as an exemplary hybrid interprofessional education program. The IPE program lasts for 1 month and consists of face-to-face workshop settings, asynchronous and synchronous online learning environments, and interaction with patients. The study focused on students' experiences and perceptions of the IPE program using a qualitative design. Students show better interest in real or semi-real educational space sessions that allow direct interaction with patients. This method also makes it easier for students to understand. However, unreal educational space has also proven effective in overcoming psychological barriers because it can help students build the relationships they want with friends and patients. Overall, the IPE program was perceived well by students. The drawback is that the data was taken after the session ended, so it has the potential to cause recall bias which affects the validity of the data. Another weakness is that regarding technical problems, students tend to have difficulty using devices that are rarely used compared to smartphones, so it can be concluded that technological problems can also be an obstacle to implementing the IPE program even in developed countries like Japan. (Suematsu, 2021).

Considering the importance of IPE learning, both fully online and hybrid, but studies on online IPE programs are still very limited, this research aims to design an online IPE program that can be used in learning during the pandemic.

Methods

Study design

This study uses a mixed-method approach to design and test an online interprofessional education program. The design of the online IPE program is based on an exploration of stakeholder needs based on qualitative studies and literature reviews. The IPE program trial was conducted with 252 medical faculty students out of a total of 558 students. These students were active preclinical students in their 3rd and 4th years. The participants included students from the departments of general medicine, midwifery, nursing, and psychology. The IPE learning program was implemented from May 30, 2022, to June 3, 2022, over the course of 5 days. The program was conducted entirely online using the Zoom meeting platform. An evaluation was conducted to assess students' perceptions of interprofessional collaboration using the validated Indonesian version of the Interdisciplinary Education Perception Scale (IEPS). The questionnaire comprised 12 items, each rated on a 6-point Likert scale (strongly agree, agree, somewhat agree, somewhat disagree, disagree, and strongly disagree). The questionnaire consisted of three components: competence and autonomy, perceived need for cooperation, and perceptions of actual cooperation.

Qualitative data collection

Qualitative data collection took place from February to March 2022, carried out through structured interviews and focus group discussions (FGD) with lecturers, leadership elements, and students at the Private Medical Faculty. The duration of the interview and FGD lasted 30 to 45 minutes. There were 4 structured interviews and 4 FGDs for lecturers and students from the Midwifery, Medicine, Nursing, and Psychology study programs. The entire interview process was recorded audiovisually and verbatim and then analyzed thematically. The researcher read the compiled transcripts several times and then grouped them into themes and subthemes. The themes and sub-themes that have been generated will be the basis for consideration in developing the online IPE program.

Development of online IPE modules

Six-step of curriculum development approach from Kern (2016), namely (1) identification and analysis of general need assessment, (2) analysis of targeted need assessment, (3) learning objectives, (4) learning strategies, (5) implementation, and (6) evaluation methods. Analysis of the targeted needs assessment is carried out by exploring the needs of policy stakeholders regarding the design of the IPE program, namely regarding characteristics, expected context, learning activities, and expectations of achievement after completing the program.

Trial an online IPE program

The online IPE program trial will be held from 30 May 2022 to 3 June 2022, for 5 days, with a total of 252 participants in the 3rd and 4th years of the Medicine, Nursing, Midwifery, and Psychology Study Programs. The context presented in this online IPE program is the basic principles of effective communication; the definition and basic concepts of interprofessional collaboration; the role and ethics of

health professions; principles of critical thinking, effective communication, and leadership in interprofessional collaboration; as well as barriers and solutions in interprofessional collaborative practice. The resource persons in this online IPE module are teaching staff who have previously received special training regarding interprofessional learning. The learning methods used in this online IPE program are interactive lectures, case discussions, presentations, and role plays.

Quantitative data collection

Quantitative data collection was carried out using the Indonesian version of the Interprofessional Education Perception Scale (IEPS) questionnaire by Fauziah A (2016) which has been validated to assess the perceptions of 252 students towards interprofessional education. The IEPS questionnaire was chosen because it is more suitable for measuring the perceptions of advanced students than the Readiness for Interprofessional Learning Scale (RIPLS). (Lie, et al, 2013). Hamada (2019) stated that the use of RIPLS as an instrument to assess student perceptions of IPE programs should be avoided because its validity has been questioned in many previous studies and has the potential to cause bias. Questionnaires were distributed 2 times, namely 3 days before and immediately after completing the last session of the IPE module. The results obtained were then recapitulated and analyzed using the Wilcoxon SPSS test to see the differences in student perceptions before and after taking the online IPE module regarding interprofessional collaboration.

Results

Qualitative data results

Based on the results of the thematic analysis of policy stakeholder interviews, 5 themes and 25 subthemes were obtained regarding the online IPE program design required by stakeholders. The list of themes and subthemes is attached in Table 1

Table 1. Theme and Subtheme Matrix of Qualitative Analysis Results

Variable	Premodule		Postmodule	
	Mean score	Elementary school	Mean score	Elementary school
Total score	63.31	7,923	65.64	6,830
Medicine Study Program	64.56	6,682	65.77	6,214
Nursing Study Program	62.65	8,886	66.43	7,115
Midwifery Study Program	62.51	10,466	67.03	5,085
Psychology Study Program	59.98	7,933	63.70	9,523

Learning characteristics

Through structured interviews, it was found that the required learning characteristics of the IPE program were group-based, interactive, and equal learning.

"IPE is interactive, group-based learning which will create a collaborative learning atmosphere so that collaborative learning practices in the field will run well ." (W3.1)

Equality is an important characteristic in the IPE program, where it is hoped that effective communication and collaboration between students can be established well. By establishing good communication and collaboration, certain professional stereotypes that can become obstacles in interprofessional implementation can be removed.

"What's the name, of course, the modules that provide various professions, of course, the professions that take part there must be one level, for example, S1, all S1 " (W4. 1)

Benefits of learning

The expected benefits of IPE learning based on the analysis of the FGD results are as a forum for getting to know each other, sharing, collaborating, building networks, teamwork, communication, and collaboration.

"I also agree with that doctor. For IPE itself, namely deep learning, involving two or more professions, to share thoughts, in solving problems on a case or topic " (F2.3).

Learning context

Through the results of interviews, the expected learning context is patient safety, disaster management, community-based IPE, basic life support, psychological first aid, and handling pregnant women with complications.

"A suitable IPE program that we implement on campus is an IPE program that goes into the community " (W3.1).

"For me, the main thing is probably handling the initial disaster, where there can be many stakeholders involved, which suits the situation of FK X which consists of psychology, pharmacy, nursing, midwifery, and medicine. " (W3.2)

Learning activities

The expected IPE learning activities are clinical skills, lectures, role plays, and case studies.

"In my opinion, apart from lectures like this, Doc, it would also be good if there were role plays too, there are case studies too, Doc. So it's better, at least we are more aware and know better doc. The problem is that in my opinion, doc, it's like it's close to this, so if it's just like an expert lecture, it doesn't seem like it's enough, doc, because as far as I know, if it's interprofessional, it has to be rich, there's also collaboration, doc, or the same as exchange of ideas too, doc, so there's a lot of - communicate a lot and also about teamwork ." (F2.5)

Learning preparation

Based on the analysis of the FGD results, the expected preparation for IPE learning is socialization and scheduling.

"Because maybe this will be a new system, so it would be better before launching, to hold socialization first, secondly because it has already been socialized to students, maybe there can be more briefings to prepare the teaching staff, because the system is also somewhat different, although still just like online ." (F2.1)

Based on the results of the needs analysis of the online IPE learning design, a mapping of the IPE program components was obtained as shown in Table 2.

Table 2. Table Mapping the Results of Qualitative Analysis of the IPE Program Learning Design

No	Qualitative analysis results	The results are described in the IPE learning module design in the following criteria
1	Learning characteristics: equality, involving 2 or more health professions	Learner characteristics
2	Learning characteristics: interactive,	Interactive and participatory learning activities, for example, case discussions and <i>role plays</i>
3	The characteristics of IPE learning are group-based	Group-based learning activities, for example, case discussions and <i>role plays</i>
4	Benefits of IPE learning: IPE is a place to get to know each other, share, and work together to solve a problem together.	Module learning outcomes, which are then explained into study topics and module learning activities
5	Learning activities: lectures, case studies, <i>role play</i>	Learning activities: introductory lecture, case discussion, and role play
6	IPE learning context: emergency management, disaster management, <i>psychological first aid, community-based IPE, handling maternity complications</i>	Case scenarios are good for case discussions and <i>role plays</i> .
7	IPE learning preparation	a. Systematic preparation of modules in the form of learning plans b. <i>Review</i> learning design modules with experts (supervisors) c. Staff training by resource persons d. Socialization of the implementation of the module to students 1 week before implementation

Quantitative data results

Univariate analysis

Univariate analysis was carried out to see the frequency distribution of program participants based on their characteristics, namely age, gender, study program, level, and perception scores pre- and post-following the IPE module. The total number of participants who took part in the program to completion was 252 students, who came from the Medical Education Study Program (142 participants; 56.36 %), S1 Midwifery (37 participants; 14.68%), S1 Nursing (23 participants; 9 .13%), and Psychology (50

participants; 19.83%). The students were third-year students (229 participants; 90.87 %) and fourth-year students (23 participants, 9.13%). The mean age of respondents was 20.56 years, SD 1.499. The results of the univariate analysis are based on the IEPS score obtained as shown in table 3 below.

Table 3. Obtained IEPS Perception Scores on Interprofessional

Variable	Premodule		Postmodule	
	Mean score	elementary school	Mean score	elementary school
Total score	63.31	7,923	65.64	6,830
Medicine Study Program	64.56	6,682	65.77	6,214
Nursing Study Program	62.65	8,886	66.43	7,115
Midwifery Study Program	62.51	10,466	67.03	5,085
Psychology Study Program	59.98	7,933	63.70	9,523

Based on Table 3, it can be seen that the order of pre-module scores from highest to lowest is Medicine Study Program (mean 64.56; SD 6.682), Nursing (mean 62.65; SD 8.886), Midwifery (mean 62.51; SD 10.466), and Psychology (mean 59.98; SD 7.933). Meanwhile, the order of obtaining post-module scores is Midwifery Study Program (mean 67.03; SD 5.085), Nursing (mean 66.43; SD 7.115), Medicine (mean 65.77; SD 6.214), and Psychology (mean 63.70; SD 9.523).

Bivariate analysis

Bivariate analysis with the non-parametric Wilcoxon test was carried out to see whether there was a significant difference between perception scores before and after taking the IPE module. The hypothesis is accepted if the significance value is $p < 0.005$. The bivariate analysis results obtained are shown in Table 4 below.

Table 4. Comparison of IEPS Scores Pre and Post An Online IPE Module

Variable	n	p-value
Total score		
post-module score < pre-module score	95	0.00
post-module score > pre-module score	141	
post-module score = pre-module score	16	
Medical		
post-module score < pre-module score	52	0.092
post-module score > pre-module score	76	
post-module score = pre-module score	14	
Nursing		
post-module score < pre-module score	7	0.088
post-module score > pre-module score	14	
post-module score = pre-module score	2	
Midwifery		
post-module score < pre-module score	11	0.026
post-module score > pre-module score	22	
post-module score = pre-module score	4	
Psychology		0.02

Variable	n	p-value
post-module score < pre-module score	17	
post-module score > pre-module score	32	
post-module score = pre-module score	1	

Based on the Wilcoxon test, a significance value of $p < 0.05$ was obtained for the variable total score, midwifery score, and psychology score, meaning that there was a significant difference between the total score of student perceptions of interprofessional before and after taking the IPE learning module, the perception score of midwifery students before and after following the module, and perception scores of psychology students before and after taking the module. This difference shows a positive difference, namely the number of post-module score gains that are greater than the pre-module score gains. Therefore, it can be concluded that there is an influence of implementing online IPE learning modules on students' interprofessional perceptions.

Discussion

The online IPE learning module was designed based on the results of a literature review and analysis of stakeholder needs. The results of the analysis of the stakeholder needs provide an overview of stakeholder needs for the design of IPE learning modules, namely regarding learning characteristics, topics, activities, and learning benefits after completing the program.

Learning characteristics

The characteristics of online IPE learning are that it is interactive, group-based, equal, and involves all existing study programs.

Interactive and group-based

The description of the characteristics of interactive and group-based learning in the IPE module is the existence of active-approach learning, namely interactive lectures, case-based discussions, and role plays, where students not only sit to learn together but also interact with each other to increase cooperation and collaboration. This is in line with research by Syahrizal, et al (2020) which states that the principles of interprofessional education include interaction, collaboration, directed-group learning, reflective learning, applied learning, and egalitarian-equality between health professions in the learning process.

Equality

All participants in the online IPE module are level 3 and 4 students of the undergraduate study program at the Private Medical Faculty Equality can eliminate stereotypes which are one of the obstacles to implementing IPE. (Hasibuan PL, 2019).

Learning topics

Based on the analysis results, the topics presented in the online IPE module are the basic principles of effective communication; the definition and basic concepts of interprofessional collaboration; the role and ethics of health professions; principles of critical thinking, effective communication, and leadership in interprofessional collaboration; as well as barriers and solutions in interprofessional collaborative practice. This is in line with studies by Colla, et al (2011); Hunter, et al (2015); and Darlow, et al (2015) suggest the need for orientation at the beginning of program implementation which contains an introduction to the aims and benefits of implementing the IPE program, and an introduction to the roles and responsibilities of each health profession involved in the IPE program.

Learning activities

The learning activities presented in the interprofessional module are interactive lectures, case discussions, simulations, and role plays. The scenarios developed for discussion and role play are scenarios that involve all existing health professions, including medicine, midwifery, nursing, and psychology, and are designed in such a way as to be close to actual clinical conditions. Norsen, et al (2012) and Tsakitidis (2015) stated that to increase student engagement, the case scenarios developed must be appropriate and show the involvement of all health professionals participating in the program.

Benefits of learning

The learning benefits that module participants are expected to achieve are being able to get to know each other, share, build networks, and collaborate between health professions to solve common problems, as well as to prepare collaborative teams in the future. The benefits of this learning are then explained in module learning outcomes, study topics, and interprofessional module learning activities.

The benefits of learning this IPE module are in line with those expressed by Bridges, et al (2011) who stated that students who are trained using the IPE approach will tend to become members of interprofessional teams who show respect and a more positive attitude towards other professions and can work together better. to improve patient outcomes. Darlow, et al (2015) also emphasized the same thing that IPE is a learning forum for effective communication and mutual respect between health professionals. Ruebling (2014) stated that embedding IPE in the future health professional education curriculum has a positive impact on increasing self-confidence, especially in communicating and interacting with other professionals as well as for the development of interprofessional relationships in the future.

Learning preparation

Based on the results of the stakeholder needs analysis, the things that need to be prepared in implementing the online IPE module are (1) Systematic preparation of the module in the form of a learning design ; (2) Review the learning design module with experts (supervisors) ; (3) Staff training by resource persons; (4) Scheduling of resource persons and students, bearing in mind that in the era of the COVID-19 pandemic, resource persons are also medical professionals who may be busy with various activities to control SARS-COV2 infection. Scheduling is also important for students because they come from different study programs, each of which has a routine curriculum schedule; (5) Socialization of the implementation of the module to all module participants; and (6) Internet network and other supporting infrastructure. Connection is one of the determining factors for the success of online IPE learning.

Norsen, et al (2012); Hannigan, et al (2014); and Arenson, et al (2015) emphasize the importance of time management and scheduling so that there are no conflicts with the activities of both resource persons and students which are quite busy during this pandemic. Another logistical challenge stated by Solomon, et al (2010) and Singh & Matthees (2021) is the difficulty of carrying out timely communication between teaching staff and students. This is due to the large number of students who work, so they rarely open emails from institutions regularly. There is also difficulty presenting resource persons even online due to the extraordinary busyness of dealing with the COVID-19 pandemic. Suematsu, et al (2021) explain that only a small percentage of students can install and modify the software and correctly connect the hardware needed in the learning process. Students tend to show resistance to electronic equipment or devices that are rarely used. The use of technology can be an obstacle to implementing online or hybrid IPE programs even in developed countries such as Japan.

Module evaluation

The evaluation results are expressed in the form of a score, which is obtained through the accumulation of the total score for each questionnaire question. It can be seen that there has been an increase in the average post-module perception score compared to the pre-module perception score and an increase in the percentage of good categories post-module compared to the pre-module. Based on the results of the Wilcoxon bivariate test, there were 141 students with post-module scores higher than pre-module and the significance value was $p < 0.005$. This shows that the implementation of online IPE modules can increase the interprofessional perception of students. This was similar to what was found in a study conducted by Singh, et al (2021) at Moorhead University, where it was found that students reflected positive outcomes on IPE even though it was carried out in an online setting.

Online IPE modules have the greatest impact on midwifery and psychology study programs. This is in line with research by Lestari, et al (2016) which states that the characteristics of certain professional education which emphasize independence in health services, such as medicine and dentistry, are major obstacles in the implementation of IPE. The characteristics of the psychology, nursing, and midwifery professions require continuous cooperation and collaboration with other parties.

The results of this research indicate that the IPE module trial has shown an increase in student perceptions of competence and autonomy, the perceived need for collaboration, and perceptions of interprofessional collaboration, even though it is carried out in an online setting. This shows that the right learning strategy can produce almost the same impact as direct face-to-face learning. This innovation is a breakthrough that can be considered for interprofessional learning methods in the future. Where online interprofessional learning can be used as a combination of existing learning methods. Delivery of material can be carried out online, while case discussions, role plays, and other interaction activities are carried out offline. An interprofessional learning design needs to be developed to focus on one particular topic, for example, the management of clinical conditions of severe bleeding that require interprofessional collaboration.

Conclusion

The IPE learning design in this research was prepared based on the results of a needs analysis and literature review. This is a very good approach to compiling a curriculum. Stakeholder needs need to be a

consideration factor in the process of preparing learning designs. Evaluation of the teaching design in this research shows that the implementation of the online IPE module has succeeded in increasing students' perceptions of competence and autonomy, the perceived need for collaboration, and perceptions of true interprofessional collaboration. This shows that the right learning strategy can produce almost the same impact as direct face-to-face learning. This breakthrough is an alternative solution that can be considered for interprofessional learning in the future.

Author Contributions

Conceptualization, Suryanti; Soemantri Diantha and Widaty Sandra, review; Hamzah, funding acquisition. All authors have read and agreed to the published version of the manuscript." Authorship must be limited to those who have contributed substantially to the work reported.

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Conflicts of Interest:

The author declares there are no conflicts of interest in this study.

References

- Arenson C, Umland E, Collins L, Kern SB, Hewston LA, Jerpbak C, et.al. (2015). The health mentors program: three years of experience with longitudinal, patient-centered interprofessional education. *Journal of Interprofessional Care*. *J Interprof Care*, 29 (2):138-143.
- Bridges DR, Davidson RA, Odegard PS, Maki IV, and Tomkowiak J. (2011). Interprofessional collaboration: three best practice models of interprofessional education. *Medical Education Online*. Available from DOI: 10.3402/meo.v16i0.6035
- Colla J, Douglas A, Derek P, and Irmajean B. (2011). Renewal through team development: experiencing an emerging program design in interprofessional education for healthcare professionals. *The Journal of Health Administration Education*. *J Health Adm Educ*.
- Darlow B, Coleman K, McKinlay E, Donovan S, Beckingsale L, Gray B, et.al. (2015). The positive impact of interprofessional education: a controlled trial to evaluate a program for health professional students. *BMC Medical Education*. *BMC Med Educ*, 15-98.
- Fauziah F. (2016). An overview of the knowledge, perceptions, and readiness of final year health science students regarding interprofessional education at Andalas University, Padang in 2016. Faculty of Public Health, Andalas University.
- Findyantini A, Kambey DR, Yusra RY, Timor AB, Khairani CD, Setyorini D, et.al. (2019). Interprofessional collaborative practice in primary healthcare settings in Indonesia: A mixed-methods study. *Journal of Interprofessional Education & Practice*. *J Interprof Educ Pract*.
- Hannigan NS, Takamiya K, and Nadal LL. (2014). Sharing a piece of the PIIE: Program of International Interprofessional Education. *Educational Innovation*.
- Hasibuan PL (2019, December 4). Faktor penghambat pelaksanaan interprofesional collaboration di rumah sakit. <https://doi.org/10.31219/osf.io/9x8qm>
- Hunter JP, Stinson J, Campbell F, Steven B, Wagner SJ, Simmons B, et.al. (2015). A novel pain interprofessional education strategy for trainees: Assessing impact on interprofessional competencies and pediatric pain knowledge. *Pain Res Manag*, 20(1): e12-e20.
- Norsen L & Spillane LL. (2012). Partnering in interprofessional education to design simulation program to promote collaboration and patient safety. *Creative Nursing*.
- Center for Multilateral Policy Research and Development, Indonesian Ministry of Foreign Affairs Policy Research and Development Agency. (2018). Health for All: Indonesia's Global Health Diplomacy Strategy. Independent Study 2018. Ministry of Foreign Affairs of the Republic of Indonesia.
- Ruebling I, Pole D, Breitbach AP, Frager A, Kettenbach G, Westhus N, Kienstra K, Carlson J. (2014, January). A comparison of student attitudes and perceptions before and after an introductory interprofessional education experience. *J Interprof Care*, 28(1):23-7. doi : 10.3109/13561820.2013.829421

- Solomon P., Baptitste S., Hall P., Luke R., Orchard C., Rukholm E., Damiani-Taraba G. (2010). Students' Perceptions of Interprofessional Learning through Facilitated Online Learning Modules. *Med. Teach.* doi: 10.3109/0142159X.2010.495760
- Singh J, Matthees B. (2021, May 11). Facilitating Interprofessional Education in an Online Environment during the COVID-19 Pandemic: A Mixed Method Study. *Healthcare (Basel)*, 9(5):567. doi: 10.3390/healthcare9050567.
- Suematsu M, Okumura K, Hida T, Takahashi N, Okazaki K, Fuchita E, et.al. (2021). Students' perception of a hybrid interprofessional education course in a clinical diabetes setting: a qualitative study. *Journal of Medical Education*, 12:195-204. Available from DOI: 10.5116/ijme.6165.59e0
- Syahrizal D, Renaldi T, Dianti SW, Jannah N, Rachmah R, Firdausa S, et.al. (2020). The differences in perceptions of interprofessional education among health profession students: The Indonesian experience. *Journal of Multidisciplinary Healthcare. J Multidiscip Healthc.*
- Thomas PA, Kern DE, Hughes MT, and Chen BY. (2016). *Curriculum development for medical education: A six-step approach.* Johns Hopkins University Press.
- Tsakitzidis G, Timmermans O, Callewaert N, Truien S, Meulemans H, and Royen PV. (2015). Participant evaluation of an education module on interprofessional collaboration for students in healthcare studies. *BMC Medical Education*, 15:188.
- World Health Organization. (2010). *Framework for Action on Interprofessional Education & Collaborative Practice.*
- Evans, A. C., Jr., Garbarino, J., Bocanegra, E., Kinscherff, R.T., & Márquez-Greene, N. (2019, August 8-11). *Gun violence: An event on the power of community* [Conference presentation]. APA 2019 Convention, Chicago, IL, United States. <https://convention.apa.org/2019-video>.