



# Medical Students' Perceptions of the Implementation of Inter-Professional Education (IPE): Findings from a Medical School in Central Java, Indonesia

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**Abstract.** There have been few studies in Indonesia on medical students' perceptions of the application of interprofessional education (IPE). The purpose of this study was to describe medical students' perceptions of the implementation of IPE at Faculty of Medicine, Universitas Muhammadiyah Surakarta. This cross-sectional study was done at the Faculty of Medicine, Universitas Muhammadiyah Surakarta, Indonesia. The Indonesian version of the Interdisciplinary Education Perception Scale (IEPS) and the Readiness for Interprofessional Learning Scale (RIPLS) were used to assess the medical students' perceptions. A total of 409 students, consisting of 211 undergraduate medical students and 198 clinical medical students, filled out the questionnaire. Around 91.94% of UMS medical students, both pre-clinical and clinical, have good IEPS scores. The RIPLS score average is 66.80, and most students are ready to implement IPE in professional settings. The results indicated that female students had significantly greater IEPS and RIPLS scores than male students. Results from this study can be used for improvement and development of the curriculum in medical schools, whether for undergraduate or clinical professional students.

**Keywords:** interprofessional education, IEPS, RIPLS.

## 1 Introduction

Interprofessional education (IPE) is a process where students from multiple health professions engage in mutual learning and gaining insights from one another, with the aim of promoting efficient teamwork and enhancing health results (1,2). IPE is an essential requirement that must be present before establishing a collaborative practice setting in health professionals (3). Healthcare teams

need effective communication with other professionals to develop patient-centered care (4). IPE could improve attitudes, benefit patient outcomes, and enhance collaborative skills and behavior and leadership among different health professions, benefiting patient satisfaction, cost reduction, and improved healthcare (3,4).

Implementing IPE courses in the curriculum can help medical students prepare for the healthcare workforce, where teamwork and collaboration are essential competencies (2,5). Many international health organizations encourage universities to develop IPE as part of healthcare system redesign to promote inter-professional teamwork, enhance patient care quality, and improve health outcomes (5,6). Educating students in IPE is essential to enhance interprofessional collaboration in the healthcare system (4,5).

In order to develop curriculum of IPE, universities should consider various elements, including learning outcomes, subject contents, teaching methods, also how to evaluate and feasibility of resources (1,7,8). Key learning principles such as collaboration, egalitarianism, experiential learning, and reflection align with adult learning theory, fostering students' responsibility in directing their education (9,10). Studies have found that health professions students in Indonesia showed positive results in the IPE course that was developed using instructional design components and IPE principles (2), emphasizing student-centered active learning strategies (9).

Implementation of the IPE curriculum has been conducted in various universities, including Indonesia. One study showed that most of health professions students have positive perceptions and readiness towards IPE, both before and after the implementation. It was also noted that IPE should be improved by adding pre-patient simulations, diverse profession-based supervisors and evaluate the existing IPE curriculum in medical study program (11). Other studies on evaluation of health professions student readiness for IPE showed that their cognitive abilities, early exposure, socialization impact, and motivation demonstrate their preparedness for facing interprofessional collaboration with other health profession (12,13).

Studies in Indonesia regarding the medical students' perceptions of the implementation of IPE are still scarce. Therefore, this study was conducted to describe medical students' perceptions on the implementation of IPE at the Faculty of Medicine, Universitas Muhammadiyah Surakarta.

## **2 Method**

This is an observational study with a cross-sectional design. This study was conducted at the Faculty of Medicine, Universitas Muhammadiyah Surakarta, Indonesia, in July 2023. A specific IPE course at the Faculty of Medicine, Universitas Muhammadiyah Surakarta, Indonesia, is added to the curriculum of the undergraduate (bachelor of medicine) program, starting from the fourth semester. Undergraduate students from the medical school, school of pharmacy, and nutritional science department are

invited to attend a class in which students are asked to discuss about a clinical case together. IPE is implemented in all departmental curriculums of the medical school that clinical medical students attend (2).

### **2.1 Participants**

The inclusion criteria for this study are medical students (undergraduate and clinical) of Universitas Muhammadiyah Surakarta (UMS), Indonesia, that have passed IPE courses. Participants are invited to join the study through chat messengers (2).

### **2.2 Data Collection**

Data were collected by an online questionnaire in Google Forms, similar to the method used by Fahrudin et al. (14) and Sulistyanningrum et al. (15). All subjects have agreed to participate in this study by filling in the written informed consent according to the Declaration of Helsinki principles. We collected demographic data such as sex, age, and entry year, which is a common practice in studies like those conducted by Fahrudin et al. (14).

### **2.3 Study Instrument**

Two validated self-administered scales were used to assess the students' perceptions of IPE and interprofessional collaboration. The Interdisciplinary Education Perception Scale (IEPS) and the Readiness for Interprofessional Learning Scale (RIPLS) were both previously validated questionnaires. The two tools have been validated and published in English and are licensed for public use.

The Interdisciplinary Education Perception Scale (IEPS) was initially created to evaluate participants' professionally focused perceptions and associated affective domains. The initial 18-item version, created by Luecht et al., has four subscales: Competency and autonomy, perceived need for cooperation, perception for actual cooperation, and understanding others' value (16). However, this study used the modified 12-item version, which was validated by McFadyen et al (17). This version only has three subscales: competency and autonomy, the perceived need for cooperation, and the perception of actual cooperation (17). In a similar vein, Gumartifa et al. (18) explored the perception of teachers regarding Problem-Based Learning and Traditional Method in the Classroom Learning Innovation Process.

McFadyen et al. (17) argued that the subscale "understanding others' value" may need to be more appropriate for assessing undergraduates at the beginning of their professional careers. The items in the subscale may require professional working environment experience before they become relevant (19). This version has been validated and tested for reliability in a previous study in China (20). Hence, in this study, the modified version of the Indonesian IEPS scale was used to assess both the undergraduate and clinical medical students' perception of IPE. The modified IEPS questionnaire contains 12 questions with six-point Likert scales (1 = strongly disagree; 2 = disagree; 3 = slightly disagree; 4 = slightly agree;

5 = agree; 6 = strongly agree) (21). The Indonesian version of modified IEPS, translated and validated by Ulung, is used in this study (Ulung, 2014). In our study, the Indonesian version of the modified instrument showed good reliability with the total Cronbach's Alpha value of 0.932 and 0.878, 0.453, and 0.926 for its subscales, respectively (23). These values are similar to the values reported by McFadyen et al. (17).

This study also used the Indonesian version of the Readiness for Interprofessional Learning Scale (RIPLS) questionnaire to identify the readiness of clinical medical students to implement IPE through interprofessional collaboration (2). This scale was used in our study specifically for the clinical medical students because the questions revolve around the experience of professional collaboration, something that only the medical students in clinical rotations experience. The Indonesian version with 16 items has been validated and is reliable to use (24). Item 17 in the original RIPLS scale, which mentions that nurses and therapists primarily support doctors, was left out of the Indonesian translation. In the validation study, no students who are therapists participated, and the term "therapist" is used ambiguously in Indonesian society because it is also used in professions outside of medicine. The Likert scale used had five points: 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for strongly agree. Higher scores indicated more agreeable attitudes. The Indonesian RIPLS questions cover three subscales: teamwork and collaboration, negative professional identity, and positive professional identity.

In this study, the instrument showed good overall internal consistency ( $\alpha = 0.843$ ) and for its three subscales ( $\alpha = 0.914, 0.818, \text{ and } 0.923$ , respectively) (25,26). Moreover, for this study, the total scores of modified IEPS and RIPLS are divided into three categories; good, intermediate, and bad, using the determination of the instrument category based on the interval formula (27). The categories for the modified IEPS instrument were eventually divided into three, namely good (52-72), moderate (32-51), and bad (12-31). The RIPLS questionnaire categories were divided into three, namely good (58.7 – 80), moderate (37.4 – 58.6) and bad (16 – 37.3).

#### **2.4 Statistical Analysis**

Data were analyzed using SPSS version 26 (IBM Corp, USA). Descriptive analysis was done to analyze the data and produce a frequency distribution. A Kolmogorov-Smirnov test was then used to determine whether the data was normally distributed. A Mann-Whitney U test analysis was then used to compare the levels of IPE readiness among the variables. Spearman correlation coefficient was measured to determine the correlation between the IEPS and RIPLS scores in the clinical medical students' population.

### 3 Results and Discussion

A total of 409 students, 211 undergraduate medical students, and 198 clinical medical students filled out the questionnaire. The respondents' average age was 21.79, and 71.6% were female. All respondents have passed the IPE courses in the Faculty of Medicine, Universitas Muhammadiyah Surakarta (UMS). The characteristics of the respondent are shown in Table 1.

Around 91.94% of UMS medical students, both pre-clinical and clinical, have good IEPS scores. This shows that most students already have a good perception of the IPE. This finding is higher than the numbers from a study from Padang, Indonesia, where 84% of medical students perceive the IPE well (28). This finding is similar to previous research done in Manado, Indonesia, where 97.9% of students have good perceptions (27).

**Table 1.** Characteristics of Participants (Pre-clinical and Clinical Medical Students).

Variable		Pre-clinical medical students (N, %)	Clinical medical students (N, %)
Gender	Male	55 (13.44)	61 (14.9)
	Female	156 (38.14)	137 (33.49)
IEPS Category	Good	194 (91.94)	186 (93.93)
	Moderate	15 (7.11)	10 (5.05)
	Bad	2 (0.94)	2 (0.10)

Table 2 shows the descriptive characteristics of the clinical medical students and their RIPLS score categories. The total RIPLS score average is 66.80 (standard deviation = 7.097), and most students already have good readiness to implement IPE in professional settings. However, only 54.5% of students felt that they had felt the implementation of IPE in their clinical medical education. Despite this, all of the students scored in the good category.

This might be related to the clinical rotations model used in UMS medical school, where IPE is directly implemented in professional settings as opposed to the model used in the undergraduate classes where medical students were sharing classes with other health professional schools, such as nursing and pharmacy students. This poses a good suggestion to emphasize IPE in various clinical rotation settings.

**Table 2.** Characteristics of Clinical Medical Students.

Variables		Frequency	Percentage
Gender	Male	61	30.8%
	Female	137	69.2%
Implementation of IPE	Yes	108	54.5%
	No	90	45.5%

RIPLS Category	Good	169	85.4%
	Moderate	29	14.6%
	Bad	0	0%

A Mann-Whitney U test was performed to evaluate whether IEPS scores differed by sex and level of education (Table 3). The results indicated that female students had significantly greater IEPS scores than male students,  $z = -2.23$ ,  $p = 0.026$ . This finding differs from other studies which have found that there was no difference between sex in terms of IEPS scores (29,30).

The findings also showed that IEPS scores did not significantly differ between pre-clinical (undergraduate) and clinical medical students ( $p = 0.255$ ). This finding is similar to a previous study in the United States (31). According to another study, students have a high interest in learning IPE in the early stages of education and will decline when students are nearing the end of their education (32).

**Table 3. IEPS Scores.**

Variables	IEPS Score Category (N, %)			p-value (Mann-Whitney U)
	Bad	Intermediate	Good	
Sex	Male	0 (0)	11 (9.5)	0.026*
	Female	4 (1.4)	14 (4.8)	
Education	Pre-clinical	2 (0.9)	15 (7.1)	0.255
	Clinical	2 (1)	10 (5.1)	

\* $p < 0.05$

The Mann-Whitney U test was used to see if RIPLS scores varied depending on sex and whether the student had done IPE implementation activity during clinical rotations. According to the results, female students had considerably higher RIPLS scores than male students ( $z = -2.014$ ,  $p = 0.044$ ). A study in the nursing student population found that male students score lower in the “professional identity” subscale than female colleagues (33).

**Table 4. RIPLS Scores.**

Variables	RIPLS Score Category (N, %)			p-value (Mann-Whitney U)
	Bad	Intermediate	Good	
Sex	Male	0 (0)	12 (19.7)	0.044*
	Female	0 (0)	17 (12.4)	
IPE Implementation	No	0 (0)	11 (12.2)	0.462

Yes	0 (0)	18 (16.7)	90 (83.3%)
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\*p <0.05

This study has shown a moderate correlation between IEPS-modified and RIPLS scores (correlation coefficient 0.381,  $p = <0.001$ ). This finding is similar to a similar study done in the population of three health professional students (31).

This study's limitation, which should be considered when generalizing its findings, is that it only collected data from one time at one university. However, findings from this study can be used to improve the IPE curriculum in medical schools, primarily to enrich the IPE experience in the clinical rotations done by the clinical medical students (2).

#### 4 Conclusion

This study has shown that the medical students' perceptions of the implementation of IPE at the Faculty of Medicine, Universitas Muhammadiyah Surakarta are generally good. It is found that female students generally have higher IEPS and RIPLS scores. Results from this study can be used for improvement and development of the curriculum in medical schools, whether for undergraduate or clinical professional students.

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