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Longitudinal Interprofessional Education in Undergraduate Health Profession Education: A Scoping Review Protocol

Bulan Kakanita Hermasari[1,2], Gandes Retno Rahayu[3], Eti Poncorini Pamungkasari[2]

[1]*Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, INDONESIA*

[2]*Medical Education Unit, Faculty of Medicine, Universitas Sebelas Maret, Surakarta, INDONESIA*

[3]*Department of Medical Education and Bioethics, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, INDONESIA*

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ABSTRACT

Interprofessional education (IPE) is essentially applied in the medical professions curriculum to produce graduates ready for collaborative practice. Globally, competency frameworks and guidelines have been developed to guide the integration and implementation of IPE into formal curriculum. Developing student competencies to become collaborative-ready health professionals takes a long time. This is also influenced by the formation and development of an interprofessional team's maturity, which is a time-consuming process. Therefore, repetitive exposure to interprofessional learning throughout the curriculum (longitudinal education) should be implemented, since undergraduate level. This scoping review aims to explore the breadth of the longitudinal literature related to IPE. This article explores the global literature to identify, characterise, and summarise evidence from the published literature on longitudinal IPE. This scoping review considers the longitudinal activities of IPE in various contexts. The papers included report on the learning experiences of two or more types of students in a healthcare profession programme. This scoping review was conducted in accordance with the scoping review guidelines of the Joanna Briggs Institute (JBI). The PubMed, Scopus, ProQuest, EBSCOhost, and ScienceDirect databases were searched. The results were limited to papers published in the English language from 2016 to the present. Two independent reviewers screened the titles and abstracts, and extracted data from the full-text articles. The results are presented descriptively in diagrams, tables, or other relevant formats, followed by narrative summaries.

Keywords: *Interprofessional education, Longitudinal, Protocol, Scoping review, Undergraduate*

CORRESPONDING AUTHOR

Bulan Kakanita Hermasari, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Farmako Sekip Utara Road, Yogyakarta 55281, Indonesia

Email: dr.bulan.kakanita@staff.uns.ac.id

INTRODUCTION

The increasing complexity of healthcare systems requires healthcare personnel to be prepared for collaborative practice (1). It promotes educational innovation in the curriculum of medicine and health professions through interprofessional education (IPE). The World Health Organization (WHO) (1) defines IPE as "students of two or more professions learning about, from, and with each other to create effective collaboration and improve health degrees" (p. 13). Accreditation bodies in various healthcare professions' education have emphasised the importance of IPE and developed a consensus and guidelines related to standards and guidance to develop and implement them (2).

In 2011, the Interprofessional Education Collaborative (IPEC) published an interprofessional competence framework and it was updated in 2016 (3). This framework brings changes to programme-level accreditation standards that drive the integration of IPE into the curriculum of the healthcare profession. Healthcare education institutions face the challenge of creating meaningful inter-professional learning experiences for students to develop collaborative skills. In 2019, the Health Professions Accreditors Collaborative (HPAC) (2) published recommendations on curriculum characteristics for the development of optimal interprofessional competence. IPE learning that supports competence development should be developed longitudinally, covering a variety of learning activities integrated into the curriculum sequentially, and spanning the entire programme length. The instructional content and format should be in accordance with the student's level and outcome-based goals.

Slay and Smith (4) explained that long-term, longitudinal and integrated IPE programmes would be more successful than short-term learning experiences in developing sustainable interprofessional identities, which would eventually be demonstrated in clinical practice. Repeated interprofessional participation over a long period has been shown to have a protective effect against the decline in interprofessional skills and attitudes (5). Riskiyana et al. (6) explained that combining various learning methods in a longitudinal interprofessional curriculum facilitated the optimal development of interprofessional competence. Weiss et al. (7) stated that IPE should facilitate interprofessional teams' maturation as they learn. At least 15 months is recommended as the minimum learning time to produce a mature and efficiently functioning inter-professional team. Polansky et al. (8) pointed out that a gradual, sustained IPE programme throughout healthcare education should support interprofessional socialisation. However, the longer the interprofessional learning is implemented in the curriculum, the more complex the factors that affect the implementation of IPE, such as logistical challenges, scheduling, lecturer development needs, and learning systems (9–11). These factors influence the success of IPE and the achievement of interprofessional competence. On the other hand, IPE has been advocated as a significant complement to the undergraduate curriculum, because it has been suggested to be delivered in the initial stages of training to nurture collaborative competencies (10).

A scoping review of the published literature related to longitudinal IPE that includes various healthcare professional programmes can identify commonly used topics and settings, interprofessional partners, learning outcome-related competencies, and factors that influence success. This review is internationally comprehensive because the WHO and IPEC have interprofessional implications (1, 3). The information obtained from this review will be used to develop longitudinal IPE, knowing how interprofessional competence develops longitudinally and in accordance with the HPAC guidelines, to help identify opportunities for advancing longitudinal IPE across academic institutions in health professions. Through

the outcomes of this scoping review, this article endeavours to provide a comprehensive overview of the various learning models implemented in the context of longitudinal IPE. The analysis encompasses the identification of outcome domains that have garnered attention and highlights the areas that require further investigation. This exploration is expected to lay a solid foundation for the development of knowledge and practices in future IPE initiatives by identifying research designs that require specific attention. Therefore, this contribution can help guide future research and development directions, enhance our understanding of longitudinal IPE, and improve the effectiveness of interprofessional learning in various educational contexts.

Early-stage searches of various databases, such as PROSPERO, Cochrane, PubMed, and JBI Evidence Synthesis, were conducted. However, to the best of the authors' knowledge, there were no systematic or scoping reviews conducted on longitudinal IPE. This scoping review identified, characterised, and summarised various pieces of evidence on longitudinal IPE through a comprehensive literature review.

Review Questions

Main question: What is the evidence of the implementation of longitudinal IPE in various undergraduate health profession education contexts?

1. What does longitudinal IPE in undergraduate health profession education literature reveal regarding participants, settings, duration, and educational strategies?
2. What student learning outcomes have been measured in undergraduate longitudinal IPE, and which methods and tools have been used?
3. What IPEC Competencies for Interprofessional Collaborative Practice (IPCP) have been targeted in developing and implementing undergraduate longitudinal IPE?
4. What are the facilitators of and barriers to undergraduate longitudinal IPE?

METHODS

The protocol was developed in accordance with the Joanna Briggs Institute (JBI) Guideline for Scoping Review (12). The review team comprised medical educationalists with over five years of experience as IPE course developers and facilitators. One reviewer is a professor of medical education, while the second reviewer is a doctoral student in medical education and the third reviewer has a doctoral degree in medical education. The review process began in December 2023 and ended in April 2024.

Inclusion Criteria

Participants

This review considered primary studies involving undergraduate students in two or more health professions. Articles involving resident students, fellows, or healthcare professionals were included, provided at least one pre-licensure programme exists. Table 1 illustrates the inclusion and exclusion criteria for included studies.

Table 1: Inclusion and exclusion criteria

	Population	Concept	Context	Type of studies
Inclusion criteria	Undergraduate/ pre-licensure/bachelor, pre-clinical and/or clinical phase	IPE programme comprises two sequential activities carried out in the curriculum with a minimum duration of one semester.	Academic settings (e.g., classrooms, laboratories, or simulation centres); clinical settings; community settings (e.g., schools); or other settings. Studies will not be excluded based on setting, health topic, or skill taught.	Peer-reviewed, published quantitative, qualitative and mixed-methods study designs. English language articles.
Exclusion criteria	Postgraduate health professionals	Multidisciplinary education activities that do not require learners to learn "with", "from", and "about" each other as per the WHO and CAIPE definitions.		Grey literature, short communication, all types of reviews, unpublished materials, editorials, letters and opinion pieces.

Note: CAIPE = Centre for the Advancement of Interprofessional Education.

Challenges in Diagnosing Brain Death

This review considered peer-reviewed studies that examined the longitudinal concept of IPE in health profession education. IPE, as defined by the Centre for the Advancement of Interprofessional Education (CAIPE), seeks to enhance patient care by utilising an interactive learning approach and learning process: "IPE occurs when two or more professions learn with, from, and about each other to improve collaboration and the quality of care" (13, p. 4). Non-interactive shared learning among healthcare students which do not attempt to enhance their understanding across different disciplines was excluded. Uniprofessional studies were included unless there was a clear intention to assess preparedness for IPE or to enhance interprofessional practice skills. Longitudinal IPE is defined as inter-professional learning activities that are sequentially and repeatedly integrated into a healthcare education curriculum (2, 14, 15). Thus, the operational definition of a longitudinal IPE programme in this review is that the IPE programme comprises two sequential activities conducted in the curriculum with a minimum duration of one semester.

Context

Longitudinal IPE activities can be conducted in any setting, including academic environments (classrooms, labs, and dedicated simulation centres), clinical settings, or community settings, such as places of worship, villages, or other settings. Studies are not rejected based on location, health subject, or specific skills taught in longitudinal IPE activities.

Type of sources

Only studies published in peer-reviewed journals employing quantitative, qualitative, or mixed approaches were eligible for inclusion. This scoping review exclusively encompassed research published in English because the team has constraints in their language skills. Short communications, unpublished materials, editorials, letters, and opinions were excluded. A grey literature search was not performed.

Search Strategy

The search strategy focused on primary studies published in peer-reviewed journals. A preliminary and restricted search was conducted on PubMed from May to August 2023 by the authors, in collaboration with medical librarians, to locate articles related to the population, concept, and context of this review. Initial keywords were identified based on the HPAC guidelines for longitudinal IPE. Several keywords derived from HPAC (2), such as "longitudinal", "integrated", and "sequence", were included in the search terms. Search terms and keywords were tested through multiple search queries using Boolean logic. Subsequent refinements were made based on the outcomes of the various test searches. The text expressions found in the titles and abstracts of relevant articles and the index terms employed to characterise these articles were used to formulate a comprehensive search strategy for PubMed.

The initial keywords for the preliminary search were ("interprofessional education", OR "ipe" OR "interprofessional learning" OR "interprofessional health education" OR "interprofessional" OR "inter-professional" OR "interdisciplinary" OR "inter-disciplinary") AND ("longitudinal" OR "longitudinal education" OR "longitudinal curriculum" OR "longitudinal learning" OR "longitudinal integrat*" OR sequen*) AND (competenc* OR outcome OR ability OR skill OR impact OR knowledge OR behaviour OR attitude) AND (student OR learner). This search strategy was customised for each database explored, encompassing all identified keywords and index terms. Furthermore, the reference lists of the articles in the review were examined to identify supplementary papers.

Articles published in English from 2016 to February 2024 were incorporated into the search. The year 2016 was selected as the initial point for the research because it was in this year that the IPCP Expert Panel updated its IPE competency framework (3). The IPEC framework is the most employed competency framework for creating, executing, and evaluating IPE activities. It significantly emphasises the values, ethics, roles and responsibilities, interprofessional communication, and competencies related to teams and teamwork, all of which fall under the unified domain of interprofessional collaboration. The 2016 IPEC framework serves as a collective taxonomy embraced by health professionals and educators committed to promoting IPE advancement.

The databases explored include PubMed, Scopus, ProQuest, EBSCOhost, and Science Direct. Unpublished studies, short communications, and grey literature sources were not included in the search, as they do not align with the inclusion criteria for this review. Only English-language articles were considered for this review because of language limitations.

Study Selection

After the search, all identified records were imported into Covidence (a web-based software platform designed to streamline the process of conducting systematic reviews) and duplicates were eliminated. Pilot testing was performed before the selection procedure, during which two authors (BKH and EPP) independently evaluated the titles and abstracts of the included records. All disagreements were resolved through discussion among the research team members. After the reviewers became acquainted with the selection procedure, they evaluated the titles, abstracts, and full-text articles of the included records based on the inclusion criteria. Records that do not meet the specified criteria for inclusion were omitted from this study, and the rationale for their deletion was recorded. Any conflicts among the reviewers during each phase of the study selection process were handled by deliberation or involving a third reviewer. The complete findings of the search were documented in detail in the final scoping review and displayed using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) flow diagram (12). All study selection processes until data extraction were conducted using Covidence.

Data Extraction

The data extraction process involved two independent reviewers using a data extraction tool specifically developed by the reviewers to extract information from the publications included in the scoping review. The collected data encompassed accurate information regarding the population, concept, context, study methodologies, and significant discoveries pertaining to the objectives of the review. The extracted data included specific details, such as the types of health profession learners, setting, IPE course duration, topic/health problems, educational strategies, targeted IPEC core competencies, learning outcomes, Kirkpatrick learning level, instruments used, and types of facilitators and barriers reported by the authors. To mitigate the possibility of errors, the two reviewers performed the data extraction separately. To ensure the consistency and reliability of the data extraction procedure, the reviewers discussed their extraction strategy and conducted a pilot data extraction process on the five records. Appendix 1 provides a draft of the data extraction tool. The final review thoroughly documented all modifications made to the data extraction components during the review process, including the rationale for these changes. Any disagreement was resolved through conversations or by a third reviewer. If appropriate, authors of the respective studies were approached to seek missing or extra data.

Data Analysis and Presentation

The extracted data were presented descriptively in both tabular and narrative formats. The narrative summary elucidates the utilisation of these data components to fulfil the purpose of the scoping review and address the review questions. The learning theories used, descriptions of longitudinal IPE programmes, and factors supporting and inhibiting longitudinal IPE were analysed and presented thematically. If required, an additional online appendix contains a table of the results from the data extraction process and its headings.

CONCLUSION

A scoping review of the existing literature on IPE across different healthcare professional programmes can reveal commonly addressed topics and settings, interprofessional collaborations, learning outcomes, and success factors. The results of this scoping review provide information gaps in the published literature that encompass future studies and improvement in IPE teaching learning.

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APPENDIX 1

Data Extraction Tool

Please list the first author's last name, the year of publication, and the first five words of the title (e.g., Smith 2020).

1. Please summarise the longitudinal IPE programme in 4–5 sentences. Mention the duration and stages/phases of the longitudinal IPE.
2. Where did the study take place? (alternatively, where do most of the authors reside?)
    - North America
    - Central and South America
    - Europe
    - Africa
    - Asia
    - Others
3. The duration of the IPE programme.
    - 1 semester – 1 year
    - 1–2 years
    - 2–3 years
    - Throughout the curriculum
4. What professions were involved in longitudinal IPE as a LEARNER? (choose all that apply and add clarifying comments as applicable; learner–undergraduate student still in training)
    - Athletic training
    - Audiology and hearing
    - Dentistry
    - Dental hygiene
    - Dietetics and nutrition
    - Genetic counselling
    - Medicine
    - Medical laboratory sciences
    - Midwifery
    - Nursing
    - Occupational therapy

- Optometry
- Pharmacy
- Physical therapy
- Podiatry
- Psychology
- Public health
- Respiratory therapy
- Social work
- Speech-language pathology
- Veterinary medicine
- Others, please specify

5. Where did this longitudinal IPE activity take place? Check all that apply or add setting directly if option is not listed.
    - Academic setting
    - Community setting
    - Clinical setting
    - Global health or global education setting
    - Other settings, please specify
6. Which of these educational activities/components were included in the longitudinal IPE activity? Choose all that apply.
    - Large group lecture
    - Team-based learning (TBL)
    - Problem-based learning small groups (PBL)
    - Simulation exercise (e.g., high fidelity, role play)
    - Peer teaching
    - Workshops
    - Case studies
    - Group project
    - Social gathering/team building exercise
    - Pre-work/flipped classroom
    - Others

7. Which IPEC core competencies did authors attempt to address with this IPE activity (i.e., authors prospectively designed the activity to address these core competencies)? Check all that apply.

    - Teams and teamwork
    - Roles and responsibilities
    - Interprofessional communication
    - Values/ethics for interprofessional practice

8. Did the authors report outcomes from the IPE activity? If yes, reply to Q8A and Q8A.1. If not, proceed to Q9.

    - Yes
    - No

    8A. What levels of learning outcomes did the authors report? Check all that apply (briefly describe as applicable in text boxes).

        - Learner reaction: Modified Kirkpatrick Level 1 (e.g., student satisfaction)
        - Modification of attitudes/perceptions: Modified Kirkpatrick Level 2a (e.g., opinion of teamwork)
        - Acquisition of knowledge/skills: Modified Kirkpatrick Level 2b [e.g., multiple-choice questions (MCQs), short answer tests, objective structured clinical examination (OSCE)]
        - Behavioural change: Modified Kirkpatrick Level 3 – Learner reported learner behavioural change
        - Behavioural change: Modified Kirkpatrick Level 3 – Observed behavioural change
        - Results: Modified Kirkpatrick Level 4 – Self/patient/learner reported
        - Results: Modified Kirkpatrick Level 4 – Patient or organisational data

    8A.1. What other outcomes did the authors report? Check all that apply and/or specify any not listed. Select all that apply.

        - Educator-related outcomes, please describe
        - Patient-related outcomes, please describe
        - Community-related outcomes, please describe
        - Organisation-related outcomes, please describe
        - Other outcomes, please describe

    8B. Did the authors report quantitative IPE data in their outcomes assessment? If yes, please reply to Q8B.1 and Q8B.2 If not, proceed to Q9.

        - Yes
        - No

8B.1. Did the authors use a validated IPE measurement instrument to generate quantitative outcomes data? If yes, please reply to Q8B.2. If not, proceed to Q8B.3.

- Yes
- No

8B.2. Which of the following IPE measurement instruments did the authors use? Check all that apply and/or specify any not listed.

- Assessment of Interprofessional Team Collaboration Scale (AITCS)
- Attitudes Toward Health Care Team Scale (ATHCT)
- Communication and Teamwork Skills (CATS)
- Collaborative Practice Assessment Tool (CPAT)
- Collaboration and Satisfaction About Care Decisions (CSACD)
- Dual Identity Scale (DIS)
- Extended Professional Identity Scale (EPIS)
- Interprofessional Collaborator Assessment Rubric (ICAR)
- Interprofessional Collaborative Competency Attainment Survey (ICCAS)
- Interprofessional Collaboration Scale (ICS)
- Index of Interdisciplinary Collaboration (IIC)
- Interprofessional Professionalism Assessment (IPA)
- Interprofessional Attitudes Scale (IPAS)
- Interprofessional Collaboration (IPC)
- Interprofessional Education Collaborative Competency Self-Assessment Tool (IPEC)
- Interprofessional Socialisation and Valuing Scale (ISVS)
- The Individual Teamwork Observation and Feedback Tool (iTOFT)
- Interdisciplinary Team Process and Performance Survey (ITPPS)
- McMaster-Ottawa Scale
- Performance Assessment for Communication and Teamwork (PACT)
- Patient's Insights and Views Observing Teams Questionnaire (PIVOT)
- The Readiness for Interprofessional Learning Scale (RIPLS)
- Student Perceptions of Physician-Pharmacist Interprofessional Clinical Education (SPICE or SPICE-2)
- The Student Perceptions of Interprofessional Clinical Education–Revised (SPICE-R or SPICE-R2)
- Teamwork Assessment Scale (TAS)

- Team Observed Structured Clinical Encounter (TOSCE)
- Team Performance Scale (TPS)
- Team Assessment Questionnaire (T-TAQ)
- Team Performance Questionnaire (T-TPQ)
- The Team Skills Scale (TSS)
- Others, please specify

8B.3. Please describe the method used to capture quantitative data related to IPE learning outcomes if the authors did not use a validated measurement tool.

9. Did the authors report qualitative data in their IPE outcomes assessment? If yes, please reply to Q9A. If not, proceed to Q10.

- Yes
- No

9A. What formal methodology did the authors use to analyse qualitative data? Check all that apply, or specify the methodology used if not listed.

- Content analysis
- Narrative analysis
- Discourse analysis
- Framework analysis
- Grounded theory
- Thematic analysis
- Not adequately described
- Others

10. What method did the authors use to capture or collect the qualitative data they reported? Check all that apply or add other methods if not listed.

- Focus groups
- Key informant interviews
- Written reflection/reflective writing
- Written responses to open-ended questions
- Direct observation of learners or teams
- None
- Others, please specify

11. Did the authors report anything that could be described as facilitators for the longitudinal IPE activity? If yes, reply to Q11A. If not, proceed to Q12.

    - Yes
    - No

    11A. Describe facilitators reported by the authors.

12. Did the authors report anything that could be described as barriers to the longitudinal IPE activity? If yes, reply to Q12A.

    - Yes
    - No

    12A. Please describe barriers reported by authors.