

## **Interprofessionalism in the Clinical Clerkship of the Medical Profession**

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### **Abstract**

*Interprofessional Education (IPE) has become an essential component of healthcare education, aiming to prepare future health professionals for collaborative practice and improved patient care. Clinical clerkship provides a unique environment in which medical students can develop interprofessional competencies through direct interaction with healthcare teams. However, evidence regarding the effectiveness, learning mechanisms, and implementation challenges of IPE during clinical clerkships remains scattered across the literature. This review aimed to synthesize current evidence on interprofessional education in clinical clerkships, focusing on learning mechanisms, competency development, implementation barriers and facilitators, and educational outcomes. A literature review was conducted using PubMed, Google Scholar, and ScienceDirect databases. Articles published between 2016 and 2026 were searched using keywords related to interprofessional education, interprofessional learning, medical education, and clinical clerkship. Eligible studies included original research, qualitative studies, mixed-methods studies, systematic reviews, and scoping reviews involving clinical clerkship students. Data were analyzed descriptively and comparatively to identify recurring themes and patterns across studies. Ten key studies were included in the review. The findings indicate that interprofessional learning during clinical clerkships occurs through three developmental phases: entering unfamiliar territory, sensemaking, and meaningful participation. Teamwork and communication emerged as the most consistently developed competencies, whereas understanding roles and responsibilities remained a persistent challenge. Facilitators of successful IPE implementation included institutional support, faculty commitment, and structured learning activities, while barriers included professional stereotypes, limited resources, and logistical constraints. Although most studies reported positive educational outcomes, evidence was predominantly concentrated at lower Kirkpatrick levels, with limited evidence demonstrating organizational or patient-level benefits. IPE in clinical clerkships contributes positively to the development of collaborative competencies among medical students. However, further longitudinal research employing objective assessments and patient-centered outcome measures is required to establish its long-term impact on healthcare practice and patient outcomes.*

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### **Introduction**

Clinical clerkship represents one of the most important stages in medical education, serving as the bridge between theoretical learning and professional practice. During this phase, medical students transition from classroom-based instruction to direct participation in patient care within hospitals and healthcare facilities. Through clinical exposure, students are expected not only to apply biomedical knowledge and clinical reasoning skills but also to develop professional attitudes, communication competencies, and collaborative abilities required in modern healthcare environments (Miller et al., 2025; Lave & Wenger, 1991). Clinical clerkship

therefore plays a critical role in shaping students' professional identity and preparing them for future responsibilities as physicians.

The contemporary healthcare system is increasingly characterized by complexity, specialization, and multidisciplinary approaches to patient care. Healthcare delivery is no longer performed by a single profession but rather involves coordinated contributions from physicians, nurses, pharmacists, nutritionists, physiotherapists, laboratory personnel, and other healthcare professionals (World Health Organization [WHO], 2010; Schmitt & Gilbert, 2019). As patient conditions become more complex and healthcare needs continue to expand, effective collaboration among healthcare professionals has become a fundamental requirement for ensuring patient safety, quality of care, and positive health outcomes (Reeves et al., 2016; Fox et al., 2018).

Interprofessional collaboration refers to the process through which professionals from different disciplines work together, share expertise, communicate effectively, and make collective decisions to provide comprehensive patient-centered care (IPEC, 2023; WHO, 2010). Numerous studies have demonstrated that successful interprofessional collaboration contributes to improved patient satisfaction, enhanced care coordination, reduced medical errors, and more efficient healthcare delivery systems (Reeves et al., 2017; Homeyer et al., 2022). Consequently, healthcare education institutions are increasingly expected to prepare students for collaborative practice before they enter professional practice settings.

To address this need, Interprofessional Education (IPE) has emerged as a globally recognized educational strategy. The World Health Organization defines IPE as a process in which two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes (WHO, 2010). This definition highlights that interprofessional learning extends beyond merely understanding other professions; it involves active engagement, mutual learning, and the development of collaborative competencies that can be applied in clinical practice (Buring et al., 2019; IPEC, 2023).

Over the past decade, IPE has become a central component of healthcare education curricula worldwide. Educational institutions have implemented various forms of interprofessional learning activities, including simulation-based training, case-based discussions, team-based learning, collaborative clinical placements, and interprofessional training wards (Fox et al., 2018; Homeyer et al., 2022). Evidence suggests that these initiatives can improve students' attitudes toward teamwork, strengthen communication skills, enhance mutual respect among professions, and foster collaborative behaviors that are essential for safe patient care (Reeves et al., 2016; Hewitt et al., 2021).

Despite the growing emphasis on IPE, the transition from educational interventions to authentic collaborative practice remains challenging. Clinical clerkship provides a unique environment where students encounter real-world opportunities to interact with healthcare professionals from various disciplines. However, learning to collaborate effectively in clinical settings is often a complex and gradual process rather than an automatic outcome of clinical exposure (Miller et al., 2025). Students frequently enter clinical environments with limited understanding of professional roles, organizational structures, and interprofessional dynamics, making collaboration a significant learning challenge.

Research by Miller et al. (2025) demonstrated that interprofessional learning during clinical clerkship develops through several stages. Students initially experience uncertainty when entering unfamiliar professional environments, particularly when interacting with nurses, pharmacists, and other healthcare providers. As they gain exposure, students begin to make

sense of different professional roles and gradually develop the competence required for meaningful participation in healthcare teams. This developmental process indicates that collaborative competence is not acquired instantaneously but evolves through repeated interactions and guided learning experiences (Miller et al., 2025; Wenger-Trayner & Wenger-Trayner, 2015).

Another important issue concerns students' understanding of the roles and responsibilities of other healthcare professions. Although many students recognize the value of teamwork, they often possess incomplete or inaccurate perceptions regarding the scope of practice and expertise of other professions (Patel et al., 2025). Such misunderstandings may contribute to professional stereotypes, communication barriers, and ineffective collaboration. The persistence of these challenges suggests that exposure to clinical environments alone may not be sufficient to foster comprehensive interprofessional competence (Nguyen et al., 2025; Paradis & Whitehead, 2018).

The importance of role clarification has been emphasized by several studies examining interprofessional competencies. Patel et al. (2025) reported that competencies related to teamwork and communication are frequently achieved in IPE initiatives, whereas understanding roles and responsibilities remains one of the least developed domains. Similarly, Reeves et al. (2017) identified role ambiguity as a significant obstacle to effective interprofessional collaboration. These findings indicate that healthcare education programs should place greater emphasis on helping students understand the contributions, expertise, and professional boundaries of different healthcare disciplines.

In Indonesia, efforts to integrate IPE into medical education have gained increasing attention. Several medical schools have incorporated interprofessional learning activities into their curricula to prepare graduates for collaborative healthcare practice. Nevertheless, implementation remains inconsistent and faces various institutional, cultural, and logistical challenges (Purnama Sari, 2023). Differences in academic schedules, limited faculty expertise, resource constraints, and traditional professional hierarchies often hinder the successful implementation of interprofessional learning activities (Nguyen et al., 2025; Schmitt & Gilbert, 2019).

Evidence from Indonesian medical education highlights both progress and continuing challenges. A study conducted among clinical clerkship students at the Faculty of Medicine, Universitas Andalas reported that although most students demonstrated positive perceptions toward IPE, their understanding of other healthcare professions remained relatively limited (Purnama Sari, 2023). This finding reflects a discrepancy between students' recognition of the importance of collaboration and their actual knowledge of how collaborative practice functions within healthcare teams. Such gaps may affect students' readiness to engage effectively in interprofessional environments and may ultimately influence the quality of patient care.

Given the increasing demand for collaborative healthcare delivery, understanding interprofessionalism within clinical clerkship has become an important area of medical education research. Clinical clerkship offers a valuable context for examining how students develop collaborative competencies, interact with other professions, and navigate the complexities of healthcare teamwork. Exploring interprofessional experiences during this stage is essential for identifying educational strategies that can strengthen communication, teamwork, role understanding, and professional collaboration. Ultimately, fostering effective interprofessionalism among medical students is expected to contribute not only to professional competence but also to safer, higher-quality, and more patient-centered healthcare services in the future (WHO, 2010; IPEC, 2023; Reeves et al., 2016).

## **Method**

### **Research Design**

This study employed a literature review design with a systematic and analytical approach to synthesize existing evidence regarding interprofessional education (IPE) and interprofessional collaboration during medical clinical clerkships. The review aimed to identify, evaluate, and integrate findings from previous studies examining the implementation of IPE, the development of interprofessional competencies, factors influencing collaborative learning, and the outcomes associated with interprofessional educational interventions in clinical settings. By synthesizing evidence from diverse research designs, this review provides a comprehensive understanding of how interprofessional learning occurs during clinical clerkship and its implications for medical education.

### **Literature Search Strategy**

A comprehensive literature search was conducted using three major electronic databases: PubMed, ScienceDirect, and Google Scholar. These databases were selected because they provide extensive coverage of medical education, health professions education, interprofessional practice, and clinical training research. The search was conducted to identify relevant studies published between January 2016 and March 2026.

The search strategy combined keywords and Boolean operators to maximize retrieval of relevant studies. The primary search terms included “interprofessional education,” “interprofessional learning,” “interprofessional collaboration,” “clinical clerkship,” “medical education,” “medical students,” and “clinical training.” Various combinations of these keywords were used across databases according to their specific search requirements. Reference lists of selected articles were also manually screened to identify additional relevant studies that may not have been captured through database searching.

### **Study Selection Process**

The study selection process was conducted in several stages. First, all records retrieved from the databases were compiled and duplicate publications were removed. Second, titles and abstracts were screened to assess their relevance to the review objectives. Articles that clearly did not address interprofessional education, collaborative practice, or clinical clerkship were excluded during this stage.

The remaining articles underwent full-text assessment to determine eligibility. Full-text screening focused on the relevance of the study population, educational setting, intervention characteristics, and reported outcomes related to interprofessional learning or collaboration. Only studies meeting all inclusion criteria were retained for final analysis. The selection process was conducted systematically to ensure transparency and minimize selection bias.

### **Eligibility Criteria**

Studies were included if they met the following criteria: (1) involved medical students participating in clinical clerkship or equivalent clinical training; (2) examined interprofessional education, interprofessional learning, or interprofessional collaboration involving at least one additional healthcare profession; (3) employed qualitative, quantitative, mixed-methods, quasi-experimental, observational, systematic review, or scoping review designs; (4) were published

in peer-reviewed journals; (5) were available in English or Indonesian; and (6) were published between 2016 and 2026.

Studies were excluded if they: (1) focused exclusively on preclinical education without clinical exposure; (2) involved only a single profession without an interprofessional component; (3) consisted solely of editorials, commentaries, conference abstracts, opinion papers, or letters to the editor; (4) lacked sufficient methodological information; or (5) did not report outcomes relevant to interprofessional learning, collaboration, or competency development.

### **Data Extraction**

Data extraction was conducted systematically using a standardized extraction form developed for this review. Information collected from each study included author, publication year, country, study design, participant characteristics, sample size, educational setting, type of interprofessional intervention or learning activity, data collection methods, key findings, and reported outcomes.

Particular attention was given to identifying evidence related to the development of interprofessional competencies, communication skills, teamwork, role clarification, collaborative behavior, and barriers or facilitators influencing the implementation of interprofessional education. Extracted data were organized into summary tables to facilitate comparison across studies.

### **Data Synthesis and Analysis**

A narrative synthesis approach was used to analyze and integrate findings from the included studies. Due to the heterogeneity of study designs, interventions, outcome measures, and educational contexts, quantitative meta-analysis was not considered appropriate. Instead, findings were synthesized descriptively and comparatively to identify recurring themes, patterns, and areas of agreement or divergence across studies.

The analysis focused on four major areas: (1) mechanisms of interprofessional learning during clinical clerkship; (2) development of interprofessional competencies among medical students; (3) barriers and facilitators affecting the implementation of interprofessional education; and (4) educational and clinical outcomes associated with interprofessional learning experiences. Similar findings across studies were grouped into thematic categories, while contradictory findings were examined to identify contextual factors that might explain observed differences.

### **Quality Considerations**

To enhance the credibility of the review, only peer-reviewed publications were included. Studies were evaluated based on the clarity of their objectives, methodological rigor, relevance to the review topic, and adequacy of reported findings. Consideration was also given to the consistency of evidence across studies and the extent to which findings contributed to understanding interprofessional learning in clinical clerkship settings. This approach helped ensure that the synthesized conclusions were grounded in reliable and relevant evidence.

## **Result and Discussion**

### **Overview of Reviewed Studies**

The literature search identified ten articles that met the inclusion criteria and were included in the final review. These studies consisted of qualitative studies, quasi-experimental research, mixed-methods studies, longitudinal observational studies, instrument development studies, systematic reviews, and scoping reviews. Collectively, the studies provide a comprehensive overview of interprofessional education (IPE) implementation in clinical clerkships across

different healthcare and educational contexts. Evidence from a large systematic review involving 256 studies showed that 77.3% of studies reported positive outcomes associated with IPE interventions, while 21.1% reported mixed outcomes and only a small proportion reported negative findings. However, the distribution of outcomes across Kirkpatrick levels suggests that most evidence remains concentrated at lower educational levels, particularly attitudes and perceptions (Level 2a) and knowledge acquisition (Level 2b), whereas evidence regarding organizational change and patient outcomes remains limited.

Table 1. Distribution of Study Outcomes Based on Kirkpatrick Levels

<b>Kirkpatrick Level</b>	<b>Proportion (%)</b>	<b>Interpretation</b>
Level 1 (Reaction)	17.6	A relatively small proportion of studies focused on learner satisfaction and immediate reactions to IPE activities. This suggests that recent IPE research has moved beyond simple participant satisfaction and increasingly evaluates educational outcomes.
Level 2a (Attitudes and Perceptions)	81.3	This was the most frequently reported outcome, indicating strong evidence that IPE positively influences students' attitudes toward teamwork, collaboration, and interprofessional practice. However, positive attitudes do not necessarily translate into observable behavioral changes.
Level 2b (Knowledge and Skills)	61.3	More than half of the studies reported improvements in collaborative knowledge and skills, suggesting that IPE effectively supports competency development. Nevertheless, variations in assessment methods may affect the comparability of findings across studies.
Level 3 (Behavior Change)	30.5	Less than one-third of studies demonstrated changes in clinical behavior, indicating that translating learning outcomes into actual workplace practice remains a significant challenge. Sustained and longitudinal educational interventions may be required to achieve behavioral change.
Level 4a (Organizational Outcomes)	4.7	Very few studies examined organizational impacts, such as changes in workplace culture, interprofessional policies, or healthcare system performance. This indicates an important gap in the current evidence base.
Level 4b (Patient Outcomes)	9.0	Patient-level outcomes were reported infrequently, suggesting limited evidence regarding the direct impact of IPE on patient care. Although some studies reported improvements in patient satisfaction and safety, the available evidence remains insufficient to establish strong causal relationships.

The distribution of outcomes across Kirkpatrick levels demonstrates that the strongest evidence for interprofessional education is concentrated at the educational level, particularly in improving learners' attitudes, perceptions, knowledge, and collaborative skills. The high proportions observed at Levels 2a (81.3%) and 2b (61.3%) indicate that IPE consistently enhances students' readiness for collaborative practice and contributes to competency

development. However, the proportion of studies reporting behavioral change (30.5%) is substantially lower than those reporting attitudinal or knowledge-based outcomes. This gap suggests that positive perceptions and increased knowledge do not automatically translate into improved collaborative behavior in clinical practice. Additional support through structured clinical experiences, supervision, and repeated interprofessional interactions may be necessary to facilitate behavioral change.

Furthermore, the very low proportions reported for organizational outcomes (4.7%) and patient outcomes (9.0%) highlight a major limitation within the current literature. Most studies focus on educational outcomes rather than evaluating whether IPE produces measurable improvements in healthcare delivery or patient care. Consequently, while there is strong evidence supporting the educational benefits of IPE, evidence regarding its long-term clinical and organizational impact remains limited. Taken together, these findings suggest that current IPE research provides robust support for improvements in learner attitudes and competencies, but further longitudinal and outcome-focused studies are needed to establish whether these educational gains ultimately lead to sustained improvements in healthcare systems and patient outcomes. The findings indicate that IPE is particularly effective in improving learners' attitudes, perceptions, and collaborative skills. Nevertheless, only a small proportion of studies demonstrated improvements at the organizational level or direct benefits for patients. This suggests that while educational outcomes are well supported, stronger evidence is still needed regarding the long-term clinical impact of IPE interventions.

### **Interprofessional Learning and Competency Development in Clinical Clerkships**

One of the most important findings identified in this review is that interprofessional learning during clinical clerkship occurs as a developmental process through which students gradually acquire collaborative competencies. Miller et al. (2025) proposed a three-phase framework consisting of entering unfamiliar territory, sensemaking, and meaningful participation. This framework provides a useful explanation of how medical students progress from initial uncertainty to effective participation within interprofessional healthcare teams.

The first phase, entering unfamiliar territory, is characterized by uncertainty and discomfort when students first interact with healthcare professionals from other disciplines. Clinical environments expose students to unfamiliar professional roles, communication patterns, and organizational structures. As newcomers to a complex healthcare system, students often lack a clear understanding of expectations, responsibilities, and appropriate forms of interprofessional interaction. Similar findings were reported in Indonesia by Purnama Sari (2023), who found that although 89.5% of clinical clerkship students expressed positive perceptions toward interprofessional education, only 62.4% demonstrated adequate understanding of other health professions. This finding suggests that students may recognize the importance of collaboration while still lacking sufficient knowledge regarding the roles and expertise of other professions. However, because the study employed a cross-sectional design, these findings should not be interpreted as definitive evidence that students are positioned within a particular developmental phase. Rather, they indicate that role understanding remains a significant challenge during clinical training.

As students gain experience in clinical settings, they enter the second phase, sensemaking, during which they attempt to understand the behaviors, responsibilities, and contributions of other healthcare professionals. Miller et al. (2025) identified "intraprofessional lore" as a key mechanism underlying this process. Students frequently rely on stories, assumptions, and informal guidance from peers and supervisors to interpret interactions with other professions. While this process may help reduce uncertainty, it also carries the risk of reinforcing

stereotypes and inaccurate perceptions. For example, students may adopt simplified assumptions regarding the responsibilities of nurses, pharmacists, or allied health professionals, potentially limiting their appreciation of the expertise contributed by these professions. This interpretation is consistent with Nguyen et al. (2025), who identified professional stereotypes as a major barrier to effective interprofessional education implementation. Their findings suggest that stereotypes are often embedded within educational and clinical cultures and therefore require deliberate institutional efforts to overcome.

The final phase, meaningful participation, occurs when students develop sufficient understanding and confidence to contribute effectively within interprofessional teams. At this stage, students possess greater awareness of both their own professional responsibilities and the roles of other healthcare disciplines. Consequently, they are able to engage more actively in collaborative decision-making, communication, and patient management. Evidence from Goodrich et al. (2024) demonstrated that students who participated in structured interprofessional activities within psychiatric clerkships reported high competency ratings across all interprofessional domains. Nevertheless, these findings should be interpreted cautiously because they were primarily based on self-assessment measures. High self-reported competency scores may not necessarily reflect actual clinical performance, as they can be influenced by subjective perceptions and social desirability bias. Therefore, objective assessment methods such as direct observation, supervisor evaluations, and multisource feedback remain essential for evaluating the effectiveness of interprofessional learning experiences.

The reviewed literature further demonstrates that interprofessional competencies do not develop equally across all domains. Competencies related to Teams and Teamwork and Interprofessional Communication were reported most consistently, whereas Roles and Responsibilities and Values and Ethics showed comparatively lower levels of achievement. This pattern may be explained by the nature of clinical clerkship itself, which routinely exposes students to team-based activities such as ward rounds, case discussions, patient handovers, and collaborative care planning. Through repeated participation in these activities, students naturally develop communication and teamwork skills. Supporting this interpretation, Visser et al. (2024) found that communication competency demonstrated the greatest improvement throughout clinical clerkship ( $p < 0.001$ ), highlighting the importance of frequent interpersonal interaction in competency development.

Despite these positive findings, the persistent weakness observed in the Roles and Responsibilities domain remains a notable concern. Although students increasingly learn how to work within healthcare teams, they often demonstrate limited understanding of the specific expertise, responsibilities, and decision-making authority of other professions. This finding was consistently reported across international studies and was similarly reflected in the Indonesian context. The persistence of this gap suggests that exposure to collaborative environments alone is insufficient to promote comprehensive interprofessional competence. Educational programs may therefore need to implement explicit role-clarification strategies, including profession-shadowing experiences, interprofessional case discussions, and structured learning activities designed to increase students' understanding of the unique contributions of each healthcare profession.

Overall, the evidence suggests that interprofessional learning during clinical clerkship is a gradual developmental process that contributes positively to teamwork, communication, and collaborative practice competencies. However, challenges remain in achieving deeper understanding of professional roles and responsibilities. While existing evidence strongly

supports improvements in educational outcomes and learner perceptions, further research using objective assessments and longitudinal designs is required to determine whether these competencies translate into sustained collaborative behaviors and improved patient outcomes.

Table 2. Outcomes Associated with Interprofessional Education

Output Type	Level of Evidence	Interpretation
Patient Satisfaction	Moderate	Evidence suggests that interprofessional care contributes positively to patient experiences by improving communication, coordination, and continuity of care. However, patient satisfaction is influenced by multiple factors beyond interprofessional collaboration alone.
Patient Safety	Low–Moderate	Several studies reported reductions in adverse events, indicating potential benefits of collaborative practice for patient safety. Nevertheless, the evidence remains limited due to methodological differences and challenges in attributing safety improvements solely to IPE interventions.
Clinical Outcomes	Moderate	Improvements in chronic disease management suggest that interprofessional collaboration may enhance treatment effectiveness and care coordination. However, variations in patient populations, healthcare settings, and intervention designs limit generalizability.
Cost Efficiency	Low	Evidence regarding economic benefits remains insufficient. Although some studies reported reduced hospital length of stay and more efficient resource utilization, the findings are inconsistent and require further investigation through economic evaluation studies.
Team Collaboration	Moderate	Improved teamwork is one of the most consistently reported outcomes, indicating that IPE successfully strengthens communication, role recognition, and collaborative decision-making among healthcare professionals.
Staff Retention	Low	Limited evidence suggests that collaborative work environments may contribute to higher staff retention and job satisfaction. However, retention is influenced by numerous organizational and workforce factors, making causal relationships difficult to establish.

The findings demonstrate that the strongest evidence beyond educational outcomes is related to improvements in team collaboration. Studies consistently reported enhanced communication, stronger teamwork, and better coordination among healthcare professionals following participation in interprofessional education and collaborative practice initiatives. This finding supports the argument that IPE contributes to the development of a collaborative culture within healthcare settings. Moderate evidence was also observed for patient satisfaction and clinical outcomes. Patients receiving care from interprofessional teams generally reported more positive healthcare experiences, while improvements in chronic disease management suggest that collaborative approaches may enhance the quality of care.

Nevertheless, these outcomes should be interpreted cautiously because patient outcomes are influenced by numerous contextual factors, including healthcare infrastructure, staffing levels, organizational support, and patient characteristics. Evidence related to patient safety remains

less conclusive. Although reductions in adverse events were reported in several studies, methodological heterogeneity and differences in outcome measurement make it difficult to determine the exact contribution of interprofessional collaboration to safety improvements. Similar limitations apply to clinical outcomes, where improvements cannot always be attributed solely to IPE interventions. The weakest evidence was observed for cost efficiency and staff retention. While some studies reported shorter hospital stays, improved resource utilization, and higher workforce retention, the available evidence remains limited and inconsistent. Economic and workforce outcomes are influenced by broader organizational, financial, and policy factors that extend beyond educational interventions.

Overall, the findings suggest that interprofessional education demonstrates promising benefits not only for learners but also for healthcare teams and patients. However, the evidence is considerably stronger for collaborative and educational outcomes than for organizational performance, economic impact, or long-term patient outcomes. Future research should therefore prioritize longitudinal studies, cost-effectiveness analyses, and patient-centered evaluations to strengthen the evidence base regarding the broader impact of interprofessional education.

### **Challenges, Implementation Factors, and Future Directions of Interprofessional Education**

A recurring finding across the reviewed studies was the relatively weak achievement of competencies related to roles and responsibilities. Although students frequently developed teamwork and communication skills during clinical clerkships, they often demonstrated limited understanding of the specific expertise, scope of practice, and responsibilities of other healthcare professions. This pattern was observed consistently across both international and Indonesian studies. Purnama Sari (2023) reported relatively low levels of understanding regarding other health professions among clinical clerkship students, while Reeves et al. (2017) similarly identified role ambiguity as a major obstacle to effective interprofessional collaboration. These findings suggest that participation in multidisciplinary clinical environments alone may not be sufficient to foster comprehensive understanding of professional roles.

The persistence of this competency gap highlights the need for more explicit role clarification strategies within clinical education. Students may learn to work alongside other healthcare professionals without fully understanding the unique contributions each profession brings to patient care. Consequently, educational institutions should consider implementing structured activities such as profession-shadowing experiences, interprofessional case conferences, collaborative simulations, and facilitated discussions regarding professional boundaries and expertise. Such approaches may help students develop a deeper appreciation of the complementary roles that different healthcare professionals play within collaborative practice.

Beyond competency-related challenges, the literature identified several factors that either facilitate or hinder the implementation of interprofessional education during clinical clerkships. Facilitating factors commonly included strong institutional support, faculty commitment, structured learning activities, and faculty development initiatives. These elements contribute to creating educational environments that encourage collaboration and provide students with meaningful opportunities to engage in interprofessional learning. Studies consistently demonstrated that structured IPE interventions produced more positive outcomes than informal or incidental exposure to multidisciplinary teams.

Conversely, multiple barriers continue to limit the effectiveness of IPE implementation. Commonly reported challenges included limited educational resources, scheduling conflicts between professional programs, logistical constraints, and persistent professional stereotypes. However, a deeper analysis suggests that these practical barriers are often manifestations of broader structural and cultural issues. Professional hierarchies, discipline-specific educational traditions, and organizational silos may discourage meaningful collaboration even when formal IPE activities are available. Students and faculty may continue to operate within profession-centered cultures that prioritize disciplinary identity over collaborative practice, thereby limiting the effectiveness of interprofessional learning experiences.

These findings indicate that successful implementation of interprofessional education requires more than curriculum reform alone. Organizational and cultural transformation is equally important. Healthcare education institutions must create learning environments that support mutual respect, shared decision-making, and collaborative professional identities. Faculty development programs are particularly important because educators serve as role models whose attitudes and behaviors strongly influence students' perceptions of interprofessional collaboration.

Overall, the reviewed evidence demonstrates that interprofessional education contributes positively to students' attitudes, teamwork skills, communication abilities, and perceived readiness for collaborative practice. Nevertheless, the strongest evidence remains concentrated at lower Kirkpatrick levels, particularly attitudes, perceptions, and knowledge acquisition. Evidence supporting behavioral change, organizational transformation, and direct patient outcomes remains comparatively limited. This pattern suggests that while interprofessional education is effective in promoting positive educational outcomes, stronger evidence is still needed to establish its long-term impact on healthcare delivery and patient care.

Furthermore, the predominance of positive findings across the literature raises the possibility of publication bias, whereby studies reporting favorable outcomes are more likely to be published than studies reporting neutral or negative results. In addition, many studies rely heavily on self-reported measures of competence, which may overestimate actual performance due to social desirability bias and subjective interpretation. Therefore, future research should place greater emphasis on longitudinal designs, objective competency assessments, multisource evaluation methods, and patient-centered outcomes.

The available evidence strongly supports the educational value of interprofessional education in clinical clerkships. However, significant challenges remain regarding role clarification, implementation barriers, organizational support, and the limited availability of high-level evidence demonstrating sustained behavioral change and patient benefits. Addressing these challenges will be essential for ensuring that interprofessional education achieves its ultimate goal of improving collaborative healthcare practice and patient outcomes.

Table 3. Summary Table of Literature Review Results (10 Articles)

Code	Author (Year)	Design	Sample	Focus	Key Findings
A1	Miller et al. (2025)	Qualitative	17 students	Learning mechanisms	Three phases: unfamiliar territory, sensemaking, and meaningful participation.
A2	Spaulding et al. (2025)	Systematic Review	256 studies	IPE effectiveness	77.3% reported positive outcomes; teamwork competency most frequently achieved.
A3	Patel et al. (2025)	Scoping Review	256 studies	Competencies and challenges	Teamwork strongest; roles and responsibilities weakest.
A4	Nguyen et al. (2025)	Qualitative	25 lecturers	IPE implementation	Institutional support facilitates IPE; stereotypes and limited resources hinder implementation.
A5	Goodrich et al. (2024)	Quasi-experimental	82 students	Psychiatric clerkship IPE	High competency ratings and better understanding of team roles.
A6	Purnama Sari (2023)	Cross-sectional	86 students	Perceptions of IPE	Positive overall perception, but limited understanding of other professions.
A7	Spaulding et al. (2025)	Validation Study	312 students	ICET development	Valid and reliable tool for assessing interprofessional competency.
A8	Reeves et al. (2017)	Systematic Review	15 RCTs	IPC effectiveness	Improved communication and patient satisfaction; limited patient outcome evidence.
A9	Homeyer et al. (2022)	Mixed-methods	124 students	Training wards	Improved collaboration, communication, and role understanding.
A10	Visser et al. (2024)	Longitudinal Study	189 students	Competency development	Significant improvement in interprofessional competencies during clerkship.

The reviewed studies demonstrate that interprofessional education (IPE) during clinical clerkship has been investigated using a variety of research designs, ranging from qualitative studies and observational research to systematic and scoping reviews. This methodological diversity provides a comprehensive understanding of how interprofessional learning occurs, how competencies develop, and which factors influence successful implementation.

Several studies consistently reported positive outcomes associated with IPE. Systematic and scoping reviews (Spaulding et al., 2025; Patel et al., 2025) found that most interventions improved teamwork, communication, and collaborative competencies. These findings suggest that IPE is effective in preparing students for collaborative healthcare practice. However, the strongest evidence remains concentrated on educational outcomes such as attitudes, perceptions, and competency development rather than patient-level outcomes.

The findings of Miller et al. (2025) provide an important theoretical contribution by explaining interprofessional learning as a developmental process consisting of entering unfamiliar territory, sensemaking, and meaningful participation. This framework helps explain why students often experience uncertainty when first encountering interprofessional environments and how they gradually develop collaborative competence through clinical experiences.

A recurring theme across multiple studies is the persistent challenge related to understanding professional roles and responsibilities. Although students generally demonstrate positive attitudes toward collaboration, studies from both international settings and Indonesia indicate that understanding of other professions remains comparatively weaker. This finding suggests that exposure to multidisciplinary teams alone may not be sufficient to achieve comprehensive interprofessional competence.

Several studies also identified important barriers to IPE implementation, including limited resources, scheduling difficulties, professional stereotypes, and logistical constraints. At the same time, institutional support, faculty commitment, and structured learning activities were consistently reported as key facilitators. These findings indicate that successful IPE implementation requires both curricular support and organizational commitment.

The evidence suggests that interprofessional education contributes positively to teamwork, communication, and collaborative practice competencies among clinical clerkship students. Nevertheless, further research is needed to evaluate long-term behavioral changes, organizational outcomes, and direct patient benefits, as these areas remain less frequently investigated within the current literature.

### **Interprofessional Learning and Competency Development in Clinical Clerkships**

The present review demonstrates that interprofessional education (IPE) within clinical clerkships functions not merely as an educational intervention but as a developmental process through which students acquire the social, cognitive, and professional capabilities required for collaborative healthcare practice. Across the reviewed studies, a consistent pattern emerged: clinical clerkships provide important opportunities for interprofessional interaction, yet the extent to which these experiences translate into meaningful collaborative competence depends heavily on the structure, quality, and intentionality of the learning environment. This finding challenges the longstanding assumption that exposure to multidisciplinary clinical teams alone is sufficient to foster interprofessional competence.

A particularly important contribution to the field is the framework proposed by Miller et al. (2025), which conceptualizes interprofessional learning as a progression through three stages: entering unfamiliar territory, sensemaking, and meaningful participation. The significance of

this framework extends beyond descriptive categorization. It provides a theoretical explanation for why many students struggle to engage effectively in interprofessional practice despite being physically embedded within collaborative healthcare environments. Clinical settings are often assumed to be inherently conducive to interprofessional learning; however, Miller et al.'s findings suggest that learning is neither automatic nor inevitable. Rather, students must actively negotiate unfamiliar professional cultures, understand complex social hierarchies, and develop a coherent interpretation of professional relationships before they can participate meaningfully (Seo, 2024; Becker, 2024; Conti, 2025).

This interpretation is consistent with broader sociocultural theories of workplace learning, particularly the concept of communities of practice. Students entering clinical clerkships occupy a position of legitimate peripheral participation, in which they observe and gradually engage in professional activities while developing an understanding of the norms governing collaborative practice. However, progression from peripheral participation to meaningful contribution is not guaranteed. The findings suggest that many students remain trapped within intermediate stages of development because opportunities for structured reflection and role clarification are often limited.

The Indonesian evidence reported by Purnama (2023) provides an illustrative example of this challenge. Although students overwhelmingly expressed positive attitudes toward interprofessional education, their understanding of the roles and responsibilities of other professions remained comparatively weak. Importantly, these findings should not be interpreted as evidence that Indonesian students are definitively situated within the sensemaking phase described by Miller et al. Such a conclusion would exceed the explanatory capacity of cross-sectional data. Nevertheless, the findings do suggest that positive attitudes toward collaboration do not necessarily imply adequate understanding of collaborative practice. This distinction is critical because many educational institutions continue to evaluate IPE success primarily through attitudinal measures rather than through assessments of role understanding or collaborative performance.

The discrepancy between attitudes and competence is reflected more broadly throughout the literature. The systematic review conducted by Spaulding et al. (2025) found that 77.3% of studies reported positive outcomes, while Patel et al. (2025) similarly concluded that teamwork and communication competencies were consistently achieved across diverse educational settings. At first glance, these findings appear to provide compelling evidence for the effectiveness of IPE. However, closer examination reveals a more nuanced picture. Most reported outcomes were concentrated at lower levels of the modified Kirkpatrick framework, particularly learner reactions, attitudes, perceptions, and knowledge acquisition. Evidence demonstrating sustained behavioral change, organizational transformation, or patient-level outcomes was considerably less common.

This pattern raises an important question regarding the maturity of the current evidence base. The predominance of Level 1 and Level 2 outcomes suggests that the field has become highly proficient at demonstrating that students enjoy interprofessional learning and perceive benefits from participation. However, considerably less evidence exists regarding whether these educational gains translate into meaningful changes in clinical practice. The distinction is not trivial. Educational interventions should ultimately be judged not only by their effects on learners but also by their contribution to healthcare quality and patient outcomes. The relatively small proportion of studies reporting Level 4 outcomes indicates that this objective remains insufficiently examined.

The development of interprofessional competencies also warrants closer scrutiny. Patel et al. (2025) reported that Teams and Teamwork represented the strongest competency domain, followed by Interprofessional Communication, whereas Roles and Responsibilities consistently demonstrated weaker performance. Similar patterns were observed across several studies included in this review. On the surface, these findings may appear paradoxical. How can students effectively collaborate without fully understanding the professional roles of their collaborators? The answer may lie in the distinction between procedural collaboration and conceptual collaboration. Students can learn the mechanics of teamwork participating in meetings, exchanging information, and coordinating tasks without necessarily developing a sophisticated understanding of the expertise, authority, and professional identity of other team members.

This interpretation has important implications for curriculum design. The persistent weakness in the Roles and Responsibilities domain suggests that many IPE initiatives prioritize interaction without adequately addressing professional identity formation (Khalili et al., 2024; Alotaibi et al., 2024; Gauthier et al., 2025). Exposure alone cannot be expected to resolve misunderstandings regarding professional roles. Rather, educational programs must deliberately create opportunities for students to explore how different professions conceptualize patient care, make decisions, and contribute unique expertise. Without such opportunities, collaboration risks becoming superficial, characterized by task-sharing rather than genuine integration of professional knowledge.

The strong performance observed in communication competencies deserves particular attention. Visser et al. (2024) found that communication demonstrated the greatest improvement throughout clinical clerkship. This finding is unsurprising given that communication represents the most frequently practiced aspect of interprofessional interaction. Every patient handover, ward round, case discussion, and referral creates opportunities for communication skill development. However, it would be erroneous to conclude that communication competency develops naturally through repeated exposure alone. The development and validation of assessment tools such as the Interprofessional Clinical Competency Evaluation Tool (ICET) demonstrate growing recognition that communication must be explicitly taught, observed, and evaluated. Effective interprofessional communication requires mastery of structured communication techniques, situational awareness, and mutual respect competencies that extend beyond routine interpersonal interaction.

The implementation literature further demonstrates that successful IPE depends on organizational factors as much as educational design. Nguyen et al. (2025) identified institutional support, faculty motivation, and faculty development as critical facilitators of implementation. These findings highlight the importance of viewing IPE not simply as a curriculum innovation but as an organizational change initiative. Educational interventions operate within broader institutional systems that shape opportunities for collaboration. When organizational structures reinforce professional silos, even well-designed IPE programs may struggle to achieve their objectives.

The barriers identified across studies including limited resources, scheduling challenges, logistical complexity, and professional stereotypes reflect deeper structural issues within healthcare education (Bahroun et al., 2024; Caliskan et al., 2025; Ruzieh et al., 2025). Professional hierarchies remain particularly significant. Although contemporary healthcare increasingly emphasizes collaborative practice, traditional power structures continue to influence interactions between professions. Students entering clinical environments inevitably encounter these hierarchies, which may undermine messages promoting equality and mutual

respect. Consequently, barriers to IPE should not be viewed merely as operational difficulties but as manifestations of longstanding institutional and cultural arrangements that shape professional identity and behavior.

The findings reported by Goodrich et al. (2024) provide additional insight into the relationship between educational design and competency development. Students participating in structured psychiatric clerkship activities reported exceptionally high competency ratings across all domains. While these findings are encouraging, they should be interpreted cautiously. Self-assessment measures capture perceptions of competence rather than competence itself. Educational research consistently demonstrates that self-reported confidence is an imperfect indicator of actual performance. Consequently, high ratings may reflect increased awareness, motivation, or confidence rather than objectively measurable improvements in collaborative behavior. Future studies should therefore prioritize multisource assessment approaches incorporating direct observation, supervisor evaluations, peer assessments, and patient feedback (McCarthy, 2022; Lockyer & Sargeant, 2022; Hatem, 2024).

A further limitation of the existing evidence concerns the possibility of publication bias. The overwhelmingly positive findings reported throughout the literature may not necessarily reflect the true effectiveness of IPE interventions (Price, 2022; Maddock et al., 2023; Versluis et al., 2025). Studies reporting favorable outcomes are more likely to be published, cited, and disseminated than studies reporting null or negative results. Consequently, the literature may overestimate the effectiveness of interprofessional education. This possibility does not invalidate existing findings, but it does require greater caution when interpreting the apparent consensus regarding IPE effectiveness.

Perhaps the most important gap identified in this review concerns patient outcomes. Reeves et al. (2017) reported improvements in communication processes and patient satisfaction, yet evidence linking IPE directly to patient-level outcomes remains limited. This limitation reflects a broader challenge within health professions education research (Ogundiya et al., 2024; Hill, et al., 2024; Swain et al., 2025). Educational interventions are often evaluated over relatively short timeframes, whereas improvements in patient care may emerge only after years of professional practice. Establishing causal relationships between educational experiences and patient outcomes therefore requires longitudinal, multisite research designs that remain relatively uncommon within the field.

Taken together, the evidence strongly supports the educational value of interprofessional education within clinical clerkships. IPE appears effective in improving attitudes, communication skills, teamwork, and perceptions of collaborative practice (Keshmiri & Ghelmani, 2023; Gautama et al., 2023; Saragih et al., 2024). Nevertheless, significant challenges remain regarding role clarification, competency assessment, organizational implementation, and the demonstration of patient-level benefits. The next stage of scholarship should therefore move beyond asking whether IPE works and instead focusses on understanding the conditions under which it works, for whom it works, and how its benefits can be sustained and translated into measurable improvements in healthcare delivery. Only through such a shift can the field develop a more mature and robust evidence base capable of informing educational policy and clinical practice.

## **Conclusion**

This review demonstrates that interprofessional education (IPE) during clinical clerkships plays a significant role in developing students' collaborative competencies, particularly in the domains of teamwork, communication, and readiness for interprofessional practice. The

evidence suggests that interprofessional learning is a developmental process through which students' progress from initial uncertainty toward meaningful participation within healthcare teams. Nevertheless, important challenges remain, particularly in achieving a comprehensive understanding of professional roles and responsibilities, which emerged as the weakest competency domain across multiple studies. Successful implementation of IPE is influenced by institutional support, faculty engagement, and structured learning opportunities, while barriers such as professional stereotypes, resource limitations, and organizational silos continue to impede progress. Although most studies report positive educational outcomes, the strongest evidence remains concentrated at lower Kirkpatrick levels, with limited evidence regarding long-term behavioral change, organizational transformation, and patient-level benefits. Therefore, while current findings support the educational value of IPE in clinical clerkships, future research should prioritize longitudinal designs, objective competency assessments, and patient-centered outcome measures to strengthen the evidence base and better establish the contribution of interprofessional education to healthcare quality and patient outcomes.

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