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A mixed methods systematic review of interprofessional education and collaborative practice in rural healthcare settings

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ABSTRACT

Interprofessional Education and Collaborative Practice (IPECP) involves healthcare workers and/or students from at least two professions working alongside patients, to improve the quality of healthcare provided. IPECP implementation in rural areas, however, lags due to limited resources and workforce shortages. This systematic review was undertaken to identify the enablers and barriers to the implementation of IPECP initiatives in rural healthcare settings. The JBI mixed methods review methodology and PRISMA guidelines were followed. Studies included peer-reviewed articles of IPECP initiatives implemented in rural healthcare settings identified in PubMed, Scopus, Embase, and Web of Science, alongside gray literature searches. Following screening, data were extracted and critically appraised using the Mixed Methods Appraisal Tool. Forty-eight papers were included in the final review. Enablers of IPECP in rural settings were student factors, supervisor and clinician factors, and strength of the community. Barriers included funding, resources and time constraints, lack of trained IPECP facilitators, and low prioritization of IPECP initiatives. The identified enablers and barriers of IPECP implementation in rural settings can inform further policy and practice developments. Future researchers could investigate strategies to aid IPECP implementation and use of longitudinal designs to assess their long-term impact.

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rural health; rural healthcare

Introduction

Interprofessional Education (IPE) occurs when learners from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes (World Health Organization, 2010). Effective IPE training can contribute to enhanced interprofessional collaborative practice of healthcare workers. Interprofessional care has been shown to improve team working environments, improving client health outcomes, therefore such Interprofessional Education and Collaborative Practice (IPECP) has been increasingly embedded in healthcare and educational contexts (Khalili et al., 2021). Over the past decade, research into IPECP has grown exponentially, alongside its increased adoption and incorporation into various healthcare and education settings (Khalili et al., 2021). However, there remains a gap in evaluating the implementation and efficacy of IPECP initiatives within rural and remote settings (Cragg et al., 2010). Trends in research suggest that rural and remote regions are under-researched compared to metropolitan settings despite rural and remote regions experiencing poorer healthcare efficiency

and client health outcomes (Wakerman et al., 2008). Incorporating IPECP more rigorously in clinical and educational healthcare settings could play a positive role in the overall efficacy of rural healthcare and provide a solution to common challenges faced by current and future generations of healthcare workers (Cragg et al., 2010).

Background

In practice, implementing and evaluating IPECP initiatives in rural environments is challenging due to many issues. In general, the healthcare services available to clients in rural and remote areas are affected by barriers such as lack of resources, fewer staff, practitioner burnout and mental health issues, isolation, transport issues, and poorer health literacy (Thorn & Olley, 2023). Although IPECP has the potential to improve healthcare in these settings, there is limited evidence of the enablers and barriers to its implementation. Staff retention issues stemming from high workloads and poor flexibility, limited financial support, and lack of resources can negatively affect the implementation of IPECP in these settings

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(McCarthy et al., 2016; Warburton et al., 2014). The onset of the COVID-19 pandemic put a strain on rural healthcare, as resources were directed to frontline services, stalling some IPECP initiatives (Xyrichis et al., 2018). More generally, healthcare workers are poor on time, resources, and funding to implement, evaluate, and report these initiatives where they exist (Martin, 2022). Therefore, it is vital to understand the enablers and barriers toward the implementation of IPECP to improve rural healthcare delivery.

Extensive literature exists on the enablers and barriers to IPECP in metropolitan healthcare settings. For example, a literature review (Lawlis et al., 2014) on the multi-level enablers and barriers of educational influences in IPECP found that faculty funding, staff or facilitator commitment, understanding, and enthusiasm were common enablers of the efficacy of IPECP in healthcare education. Conversely, they found that a lack of financial resources and institutional support, rigid and condensed curriculums, faculty attitudes, high workloads, and a lack of perceived value were significant barriers to IPECP implementation in higher education institutions. Similarly, researchers have identified institutional support, dedicated training programs, effective leadership, and a culture of interdisciplinary teamwork and collaboration as common enablers (abu-Rish Blakeney et al., 2012; Reeves et al., 2017). However, barriers such as rigid hierarchical structures, professional silos, and limited time and resources were also reported (Dow et al., 2017). Although extensive research exists on the enablers and barriers of IPECP implementation in metropolitan settings, rural healthcare settings have different service delivery contexts and processes, hence need to be examined separately.

Review aims

The aim of this systematic review was to identify the enablers and barriers to the implementation of IPECP in rural healthcare settings.

Methods

The review's conduct was guided by the JBI (previously Joanna Briggs Institute) methodology for mixed methods systematic review (Lizarondo et al., 2024). The review's reporting was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021) and via a checklist to demonstrate quality assurance of this systematic review (Online Supplementary Table S1). A protocol was developed and registered on Open Science Framework (Nihardeen et al., 2024).

Eligibility criteria

Detailed PICO (Population, Investigated phenomena, and Context) domains were used to create inclusion and exclusion criteria. Studies were included if they involved students or healthcare workers from medicine, nursing and midwifery, allied health, and dentistry, involving an IPECP initiative implemented in a rural healthcare setting. As this review included international literature, papers were

considered eligible to meet the rural criteria if they stated "rural" or "remote" as shown in the search strategy (Online Supplementary Table S2). Primary research studies including quantitative, qualitative, and mixed methods designs were included. Papers published since 2012 (to ensure relevancy) until August 2024 in the English language were included. Table 1 has further details on the inclusion and exclusion criteria.

Search strategy and data sources

The databases searched for this review were PubMed, EMBASE, Scopus, and Web of Science. This decision was made following a preliminary scoping search to identify sources with most relevant citations of the review topic, and via consultation with an information specialist (MR). Grey literature was searched through Google, ProQuest Dissertations, and Theses Global. The first 30 pages of Google search results were screened. Google Search was carried out using the advanced search function. Search terms included *interprofessional education and collaborative practice* and *rural or remote*. ProQuest Dissertations and Theses Global search included Abstract (interprofessional education OR collaborative practice) AND abstract (rural health OR remote health). Online Supplementary Table S2 contains search strategies for all four included databases. Initial search was in August 2022 (PubMed and EMBASE), and in April 2023 (Scopus and WoS), and updated for all databases in August 2024.

Study selection

All citations retrieved from the search were imported into Endnote X9™ (The EndNote Team, 2013) and de-duplicated. Screening of titles and abstracts against the inclusion criteria was conducted using Covidence™ (www.covidence.org, n.d.). For the title and abstract screening stage, 30 articles were dual screened independently by three reviewers (from AN, MF, NN, PM) as a pilot exercise. Subsequently, at the full-text screening stage, two reviewers (from AN, MF, NN, PM) independently dual screened all the full text articles. During screening, conflict resolution was provided by a third reviewer (LL). Articles that met inclusion criteria were progressed to data extraction.

Quality assessment

Two reviewers (from AN, NN, PM) assessed the methodological quality of the included studies using the Mixed Methods Appraisal Tool (Hong et al., 2018), which is widely used in similar reviews. All conflicts were resolved through discussions among three reviewers (AN, NN, PM). All studies, after being assessed for methodological quality, underwent data extraction and synthesis. The quality assessment was undertaken to aid interpretation of findings.

Table 1. Inclusion and exclusion criteria.

	Inclusion criteria	Exclusion criteria
Population	Post-registration/qualification healthcare workers (all levels of work experience, education, and position classification, and pre-registration healthcare students): • Dentistry • Exercise physiology • Medicine • Nursing and midwifery • Nutrition and Dietetics • Occupational Therapy • Pharmacy • Physiotherapy • Podiatry • Psychology • Speech pathology • Social work	Post-registration/qualification healthcare workers and pre-registration students from other disciplines not listed in the inclusion criteria
Investigated phenomena	IPECP initiative that includes an evaluation or research component (See Appendix A for definitions)	Non-IPECP initiatives (those that do not meet the definitions of IPE and Collaborative Practice. Conditions where the IPECP initiative did not have an evaluation or research component.
Context	Rural healthcare settings: This will include all healthcare settings that are outside metropolitan/urban/larger centers; as such will include regional healthcare settings also, as well as studies classified as rural by the authors of included studies	Metropolitan healthcare settings Non-healthcare settings (e.g., schools, prisons etc.)
Study design	Primary research studies: • Quantitative designs (including RCTs, cohort, pre-post, cross-sectional studies) • Qualitative designs (including interviews, focus groups, case studies) • Mixed methods designs	Non-primary research studies: • Secondary research (systematic reviews, other reviews) • Editorials • Opinion pieces • Commentaries • Position papers • Conference abstracts • Research protocols
Other	English language literature Publications dated 2012–2024 Full texts	Non-English literature Non-published studies (e.g., gray literature, thesis, and dissertation manuscripts)

IPECP = Interprofessional Education and Collaborative Practice, RCT = Randomized Control Trial, IPE = Interprofessional Education.

Data extraction

Data extraction was conducted independently by two reviewers (from AN, NN, PM) using a customized data extraction form (see Online Supplementary Table 3). Any disagreements that arose between the reviewers were resolved through discussion.

Data synthesis

Following data extraction from quantitative, qualitative, and mixed methods studies, a convergent integrated approach to synthesizing the data was undertaken, consistent with JBI methodology for mixed methods systematic reviews. Quantitative data were first qualified through descriptive narratives of the extracted quantitative results, converting statistical findings into a format that could be integrated with the qualitative data. This allowed for a deeper, context-specific understanding of the findings. Qualitative data, including participant experiences and perceptions, were then coded inductively to identify emerging patterns related to the implementation of IPECP initiatives in rural healthcare settings. Mixed methods findings were classified based on their dominant methodological component and aligned accordingly

with either qualitative or quantitative datasets. A constant comparison approach was then used to integrate the findings across study types, identifying patterns and similarities in how barriers and enablers were reported. This iterative process of coding and refinement allowed for the collapsing of initial codes into higher-order themes, ensuring a cohesive and comprehensive synthesis of the evidence. By systematically integrating data from different study designs, this approach provided a holistic understanding of the factors influencing the implementation of IPECP, while maintaining the integrity of both qualitative and quantitative contributions (Lizarondo et al., 2024).

Results

A total of 5,155 studies were extracted from the database search. Following the removal of 3,110 duplicates, 2,045 articles were progressed to title and abstract screening. Subsequently, 388 studies were progressed for full-text screening. Of these, 388 studies were excluded based on wrong setting ($n = 64$) such as in urban settings, wrong investigated phenomena ($n = 141$), such as a non-IPECP intervention or no intervention implemented, wrong study design ($n = 97$) such as other systematic reviews or editorials, wrong study

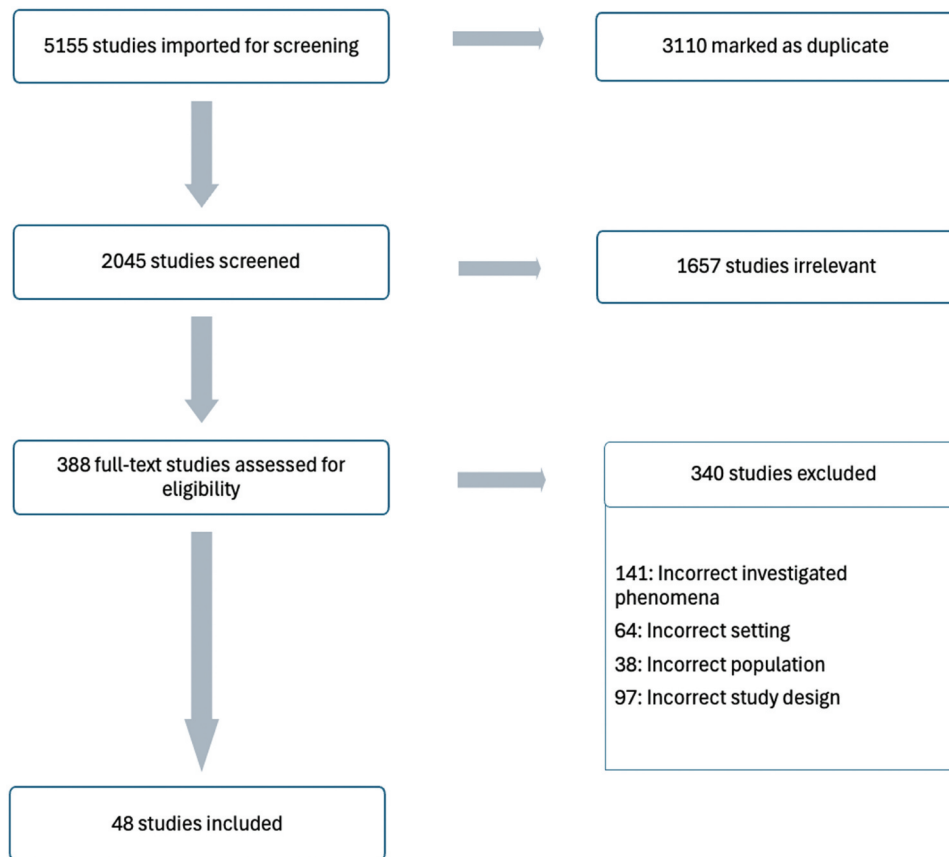


Figure 1. PRISMA flowchart of included studies.

population ($n = 38$) such as non-healthcare settings like in schools, leaving 48 studies. (Includes the updated search that yielded 7 studies that met criteria). Grey literature search yielded no further studies for inclusion. Therefore, the final number of included studies in the review was 48. A flow diagram of included studies has been provided in Figure 1. Further information on excluded studies with reasons is available in Online Supplementary Table 4.

Study characteristics

Table 2 contains information on study characteristics and the numbering in that Table is referred to in-text subsequently. The included studies ($n = 48$) were published from 2013 to 2023. There were 23 studies that were qualitative in their design (Studies 1–23 in Table 2), 16 were mixed methods studies (studies 24–39), and nine were quantitative studies (studies 40–48). Qualitative studies mostly included focus group interviews ($n = 8$) individual interviews ($n = 13$), and diaries or reflections. Mixed methods studies predominantly used surveys and focus group discussions. Quantitative studies predominantly investigated perceptions and beliefs through closed-ended items in surveys.

Most studies were conducted in Australia ($n = 18$) or the United States ($n = 18$), followed by New Zealand ($n = 4$), South Africa ($n = 3$) and Botswana ($n = 2$). Other countries involved in the studies include Scotland, Cambodia, Sweden, Kenya, Canada, Lesotho, Ethiopia, Malawi, Uganda, Vietnam, Ghana, Zambia, Zimbabwe, Nigeria and the Philippines. Thirty-one

studies were in a health or community clinic, a further 17 were set in a primary healthcare setting such as a hospital, and four were involved with an education or university setting.

Participants across the included studies mostly involved medical and health students ($n = 38$), with some studies additionally involving medical and health staff ($n = 14$). Nursing students most commonly were involved in IPECP studies ($n = 26$), followed by medical students ($n = 22$) and pharmacy students ($n = 16$). Concurrently, in studies that included qualified healthcare staff, nursing staff were most commonly involved ($n = 10$), followed by physicians ($n = 9$) and pharmacists ($n = 4$). The participant engagement across studies varied greatly, with the largest sample size was 3,023 in a multi-national study (Kiguli-Malwadde et al., 2022), and the smallest sample size was 5 in two interview studies (Gum et al., 2013; Gupta & Howden, 2022).

Of the included studies in this review, most implemented and evaluated bespoke IPECP initiatives. Forty-three researchers developed their own IPECP initiative, and five implemented and evaluated previously established interprofessional learning (IPL) programs (P. Craig et al., 2016a; Prochnow & Tschannen, 2022; Pullon et al., 2021; Pullon et al., 2016; Schentrup et al., 2018). Of the initiatives reported by the authors, Integrated Longitudinal Clerkships (ILC; Connolly et al., 2014; Gupta & Howden, 2022), IPL initiatives based on TeamSTEPPs (Gum et al., 2020; Prochnow & Tschannen, 2022; Schentrup et al., 2018), the “Hubs and Spokes” model (P. L. Craig et al., 2014, 2016, 2016b) and programs based on the Tairāwhiti Interprofessional Education (TIPE) program

Table 2. Study characteristics.

No.	Author and Year	Design and data collection measures	Country	Setting	Participants	Results
1	Aggar et al. (2020)	Qualitative – focus group interviews	Australia, Vietnam, Cambodia	Primary healthcare settings	Total = 62 Nursing students ($n = 32$) and allied health students (speech pathology, occupational therapy and podiatry) ($n = 30$)	Improvement of perceptions and attitudes, scope of practice, teamwork, and preparation for future placement and practice.
2	Bridgman et al. (2021)	Qualitative – individual interviews, diaries or reflections, free-text surveys	Australia	Health clinic	Students (Nursing, medicine, psychology, pharmacy, exercise physiology, physiotherapy and nutrition) ($n = 22$), supervisors ($n = 8$), patients ($n = 12$), carers ($n = 1$) Community chronic pain patients ($n = 12$)	The study demonstrated the importance of IPL including working and learning with multidisciplinary teams and understanding ones' role within that. Patients had improved physical and psychological pain outcomes.
3	Browne et al., 2021	Qualitative – individual interviews, diaries or reflections, free-text surveys	United States	Health clinic	Pharmacy, social worker, nurse practitioner and public health students ($n = 44$) and staff ($n = 4$)	Improvements in team skills, individual roles and responsibilities as well their own scope of practice.
4	Connolly et al. (2014)	Qualitative – focus group interviews, individual interviews, diaries or reflections	Australia	Primary healthcare settings	Total ($n = 15$) medical staff. $n = 11$ nurses and $n = 4$ physicians.	Supervisors who undertook responsibilities over students led to more vibrant learning environments, enhanced interprofessional education and teamwork. Patient care improved, knowledge gaps were filled, and hospital governance, policy and procedures were challenged in positive ways.
5	Craig et al., 2016a	Qualitative – Semi-structured interviews and document review	Australia	Primary healthcare settings	Senior medical students from Australian National University (ANU; $n = 45$) and pharmacy, nursing and allied health students from University of South Australia (UniSA; $n = 63$)	Initial evaluation demonstrated positive student reaction (Level 1), attitude change and collaborative skills (Level 2). While the follow-up study failed to show significant changes in the size of expected professional networks, qualitative exploration of transfer of learning to professional practice (Level 3) and impact of IPL placements in rural locations (Level 4) suggest a positive impact on participants and on healthcare delivery.
6	Craig et al., 2016b	Qualitative – semi-structured interviews and document review	Australia	Healthcare setting	Total ($n = 89$). $n = 38$ medical students, $n = 26$ pharmacy students, $n = 8$ physiotherapy students, $n = 8$ nursing students, $n = 9$ occupational therapy students	Improved communication, teamwork, understanding and use of local health service to strengthen interprofessional relationships and build local service capital.
7	Davis et al. (2015)	Qualitative – individual interviews, diaries or reflections, free-text surveys	Botswana	Health clinic	Total ($n = 16$). $n = 5$ pharmacy students, $n = 11$ nursing students	Improved appreciation of different health needs and values which improved student interest in serving underserved populations. Improved understanding and perception of other roles in healthcare.
8	Gum et al. (2013)	Qualitative – focus group interviews, individual interviews, diaries or reflections	Australia	Health clinic	Total ($n = 5$) students. $n = 2$ nutrition and dietetics students; $n = 1$ speech pathology students and $n = 2$ paramedicine students	Improvement in interprofessional interactions with other students, health professionals and the community. Students had a new level of respect for multidisciplinary health professionals and learnt how to work in teams.
9	Gum et al. (2020)	Qualitative – focus group interviews, individual interviews, diaries or reflections	Australia	Primary healthcare settings	Total $n = 59$ participants. Participants included medical practitioners, nursing and midwifery professionals, physiotherapists, paramedics, social workers and administrative staff.	The major finding was that profession-based communities of practice and education were a barrier to collaboration in rural practice. There was little collaborative practice evident in this study due to geographical and systemic related factors. Findings showed strong profession-based education practices which limited collaborative practice. The prominent mechanisms underlying the positive IPL experience include general practice setting and longitudinality afforded interprofessional relationships, nurturing clinical teams, absence of hierarchy, flexibility and autonomy, and intent expressed toward the LIC programme.
10	Gupta and Howden (2022)	Qualitative – individual interviews, diaries or reflections	Scotland	Primary healthcare settings	$n = 5$ medical students	

(Continued)

Table 2. (Continued).

No.	Author and Year	Design and data collection measures	Country	Setting	Participants	Results
11	Gutenstein et al. (2019)	Qualitative – surveys, free-text feedback	New Zealand	Primary healthcare settings	Total ($n = 60$) consisting of trauma and emergency physicians and staff. $n = 27$ physicians and $n = 33$ nurses	This was an overall effective learning experience for participants. Major improvements were found in increased personal confidence and competence, improved teamwork, management and procedural skills. The students' post-treat assessments suggest a relationship between TRUST learning activities and learning objectives, indicating improved competencies with current and emerging health issues, ethics and cultural sensitivity, barriers to care and working in interprofessional teams.
12	Klosko et al. (2023)	Qualitative – free-text surveys	United States	Health clinic	Graduate medical, nursing, and pharmacy students; undergraduate and graduate social work students.	Major themes for an effective interprofessional training approach include a strong interprofessional education focus, structured interprofessional training, building collaborative learning environment and culturally appropriate care practice. Interprofessional supervision was identified as a key enabler for collaboration and care in areas with limited health workforce.
13	Mangiameli et al. (2021)	Qualitative – focus group interviews	Australia	Health clinic	Total ($n = 10$) participants inter-professional clinical educators, registered nurses, speech pathologists, mental health workers, occupational therapists, Aboriginal health worker and health students	Findings indicate that the RITES model was valuable to students and clinical educators, with flow-on effects to patient care and work units and rural areas. However, there were concerns about tension between uni-professional and IPE components, and sustainability considerations.
14	Martin et al. (2022)	Qualitative – multi-methods, however only qualitative focus group interviews reported	Australia	Primary healthcare settings, Health clinic	Total ($n = 58$) participants consisting of clinical educators and health students from four professions: dietetics, occupational therapy, physiotherapy, and speech pathology.	IPECP resulted in improvements in facilitating care through teamwork, gaining mutual respect, gaining confidence, understanding dental role in overall health, and relieving suffering. The overarching theme was that everyone had a part to play in ensuring the best patient care.
15	Nierenberg et al. (2018)	Qualitative – free-text surveys	United States	Health clinic	$n = 23$ nursing and dental students	Findings suggested that participating in an interprofessional IPL experience with a physiotherapy cohort encourages consideration of non-pharmacological methods to treat pain, including referral to PT to address musculoskeletal pain, and empowering patients to prevent or self-manage pain.
16	Noonan et al. (2018)	Qualitative – free-text surveys	United States	Health clinic	There were two cohorts of participants: 2015 ($Y1$, $n = 15$) and 2016 ($Y2$, $n = 24$) consisting of physiotherapy, pharmacy and osteopathy students.	Key factors to the success of the program included dedicated time for preceptor development, communication between the rural practices and the academic health center, and concerns about billing revenue.
17	Osborne et al. (2023)	Qualitative – free-text surveys	United States	Health clinic	"Total $n = 51$ preceptors $n = 31$ physicians $n = 7$ nurse practitioners $n = 6$ physician assistants $n = 2$ registered pharmacists $n = 2$ licensed marriage and family therapists $n = 1$ dentist $n = 1$ pharmacist"	Benefits included improved interprofessional collaboration, improved engagement between students and providers, better patient-centered care, particularly with Māori and whānau peoples; and positive outcomes from student community projects. Although additional costs on time and pressure on staff and extra workloads were identified barrier, the benefits from the project far outweighed the costs.
18	Pelham et al. (2016)	Qualitative – individual interviews, diaries or reflections	New Zealand	Health clinic	Total ($n = 16$) clinical workplace providers from dentistry, dietetics, medicine, nursing, occupational therapy, pharmacy and physiotherapy	

(Continued)

Table 2. (Continued).

No.	Author and Year	Design and data collection measures	Country	Setting	Participants	Results
19	Schuller et al. (2017)	Qualitative – individual interviews, diaries or reflections	United States	Health clinic	Total (<i>n</i> = 181) students from medicine, nurse practitioner, social work, physician assistant studies, psychology, counseling psychology, and dentistry.	Improved knowledge of healthcare issues in rural areas in North Dakota and improved knowledge about interprofessional teams were identified. Overall, students valued this interprofessional experience, learned how to work in collaborative teams, and reported having a better understanding of the needs and problems in rural healthcare. Continued support for these programmes is necessary to sustain the delivery of interprofessional healthcare education in rural areas. The findings indicated that most students had a limited experience of interprofessional collaborative practice (IPEC) before the study. The main improvements after IPEC included increased knowledge about own and other roles within interprofessional teams and a realization of the importance of IPEC. Enhanced student competencies in IPEC depended on students' profession, attitude and insight, contact with service users in the community and additional interprofessional clinical activities
20	Snyman and Donald (2019)	Qualitative – focus group interviews	South Africa	Health clinic	Total (<i>n</i> = 45) students. <i>n</i> = 15 Dietetic students, <i>n</i> = 24 Medical students, <i>n</i> = 6 Occupational therapy students	Major improvements were found in the appreciation of the role of other health disciplines, collaborative approach to patient care, competency, skills and relevance for future rural and remote practice. Students acknowledged the simulated IPL sessions for improving their understanding of multidisciplinary practice in rural healthcare. The SCiPE program led to improvements in students' communication and awareness of interprofessional collaboration, leading to a more holistic approach to client interviewing. Further acknowledgment of the role of facilitators to build positive contact conditions and coordination from a central site facilitated quality assurance for all elements of the program and enabled better program delivery. Physician engagement in efforts to improve IPEC was influenced primarily by employment arrangements, scheduling, competing priorities, leadership and infrastructure, and aimed to improve upon building on existing infrastructure, attending to logistics, strengthening interpersonal relationships, taking physicians' perspective into account, engagement with leadership, and better communication. Findings indicate virtual and in-person IPL are comparable in interprofessional team functioning and performance, with students feeling satisfied with the experience independent of platform. Virtual IPL programs mitigate barriers to rural workforce development and stands to benefit individuals in geographically isolated communities.
21	Taylor et al. (2017)	Qualitative – focus group interviews	Australia	Health clinic	Total (<i>n</i> = 22) participants including pre-registration medical, pharmacy, and allied health students.	Interprofessional education demonstrated positive short-term outcomes suggesting benefits in preparing students to work interprofessionally.
22	Waller and Nestel (2019)	Qualitative – individual interviews, diaries or reflections	Australia	Health clinic	Total (<i>n</i> = 40) participants. <i>n</i> = 18 medical students, <i>n</i> = 13 nursing students and <i>n</i> = 9 from students coming from Aboriginal health liaison, physiotherapy, exercise physiology, allied health assistance, occupational therapy and podiatry.	
23	Wilson et al. (2018)	Qualitative – individual interviews, diaries or reflections	United States	Primary healthcare settings	Total (<i>n</i> = 12) staff including ED physicians and nurses	
24	Collin et al. (2024)	Mixed methods – Survey with closed-ended and free text questions.	United States	Education setting	The study sample (<i>n</i> =127) was composed of Master of Social Work (<i>n</i> = 48) and Master of Science in Nursing (<i>n</i> = 79) students	
25	P. L. Craig et al. (2014)	Mixed methods – Quantitative surveys and a free text questionnaire	Australia	Health clinic	Total (<i>n</i> = 79) students. <i>n</i> = 34 medicine, <i>n</i> = 23 pharmacy, <i>n</i> = 6 physiotherapy, <i>n</i> = 7 occupational therapy, <i>n</i> = 2 podiatry and <i>n</i> = 7 nursing students.	

(Continued)

Table 2. (Continued).

No.	Author and Year	Design and data collection measures	Country	Setting	Participants	Results
26	Flores et al. (2023)	Mixed methods – Surveys including a mixed-methods survey	United States	Health clinic	Total $n = 188$ Allied health $n = 4$ audiology $n = 2$ medicine $n = 40$ nursing $n = 6$ pharmacy $n = 104$ PT $n = 5$ public health $n = 13$ speech pathology $n = 3$ other $n = 10$	Students participating in interprofessional teams showed improved attitudes toward the interprofessional approach to care, improved collaboration, and a positive impact on patient care interventions.
27	Grace and Courts (2017)	Mixed methods – Survey and focus groups	Australia	Health clinic	Total ($n = 26$) students, $n = 8$ nursing, $n = 16$ osteopathy, and $n = 2$ exercise science students	Results indicated that students had improved interprofessional communication, problem-solving and team skills, while identifying a need to understand one's own role better. The program also showcased improved patient care with the use of interprofessional teams. There were improvements in relationship initiation, trustworthiness, and role specification with interprofessional collaborations. The interviews demonstrated how communication, collaboration and joint knowledge-exchange in the intervention changed and developed over time and provided good conditions for creating new ways to achieve professional working relationships.
28	Håkansson Lindqvist et al. (2019)	Mixed methods – Semi-structured interview and survey	Sweden	Primary healthcare settings	Total ($n = 17$) hospital staff, $n = 9$ medical physicians, $n = 5$ nurses and $n = 3$ pharmacists.	Improvements were noted in perceptions about the need for interprofessional collaboration, knowledge and confidence and Intended Practice Change. Some participants implemented IPECP changes in practice at a 6-month follow-up.
29	O. Heath et al. (2013)	Mixed methods – Quantitative survey and a mixed methods follow-up survey	Canada	Primary healthcare settings	Total ($n = 41$) workshop participants: $n = 11$ social workers, $n = 7$ nurses, $n = 7$ physicians, $n = 6$ psychologists, $n = 10$ other.	Results indicated a perceived increase in knowledge and understanding of population health needs, reflecting insight into the importance of interprofessional communication and collaboration for quality and completeness of care.
30	J. Heath et al. (2019)	Mixed methods – Survey with closed and free text questions	United States	Primary healthcare settings	Students ($n = 113$) from seven colleges: $n = 65$ Dentistry; $n = 33$ Nursing; $n = 6$ Pharmacy; $n = 4$ Social Work; $n = 2$ Public Health; $n = 2$ Health Sciences (Physical Therapy)	Improvements were found in understanding remote practice, understanding Aboriginal culture, teamwork and learning from each other, and ongoing opportunities. Feedback from students and staff was overwhelmingly positive, with relationship building and embedding Aboriginal and Torres Strait Islander culture being seen as invaluable components.
31	Lenthall et al. (2022)	Mixed methods – Survey, semi-structured interviews, talking circles and written feedback	Australia	Health clinic	Medical students formed the largest profession ($n = 58$, 39%), followed by allied health students ($n = 23$, 16%), Aboriginal and Torres Strait Islander health practitioner students ($n = 18$, 13%), nursing students ($n = 17$, 12%), pharmacy students ($n = 17$, 12%) and clinical science students ($n = 5$, 4%). Seven staff members completed the 2020 staff evaluation survey and 14 staff members (including three Aboriginal staff members) participated in interviews	Results indicated improvements in participants' attitudes, beliefs and behaviors regarding interprofessional practice, as well as increased confidence in own and other professional roles, increased collaboration with others, improved patient outcomes and improved networking with colleagues.
32	Martin et al. (2016)	Mixed methods – Survey and reflective summary	Australia	Hospital setting	Total ($n = 21$) allied health graduates, representing nine health professions including clinical measurements, medical imaging, nutrition and dietetics, occupational therapy, pharmacy, physiotherapy, podiatry, psychology, and speech pathology.	

(Continued)

Table 2. (Continued).

No.	Author and Year	Design and data collection measures	Country	Setting	Participants	Results
33	Mpofu et al. (2014)	Mixed methods – survey and focus groups	South Africa	Health clinic	Total ($n = 17$) health science students. $n = 10$ Natural Medicine, $n = 3$ Physiotherapy and $n = 4$ Nursing.	Majority of students had improved their knowledge base, procedural and healthcare practice presentation skills, along with preparing written community health histories. Student willingness to practise in rural areas was improved due to resource and community factors. Some barriers to the program include concerns that some community members had “own agendas” and some students felt that their educational experience did not go as far as expected due to a lack of structured student placement and limited staff supervision of students. Improvements were found for learning about collaboration, appreciation of roles, holistic care, community service, and unique learning experiences. Concerns were raised about coordination requirements, patient management, program structure, and community setting limitations. Recommendations included improvements in communication, orientation, and available resources and supervision.
34	Opina-Tan (2013)	Mixed methods – Survey with closed and open-ended questions	Philippines	Health clinic	Total ($n = 19$) students. $n = 5$ medical, $n = 8$ physical therapy, $n = 2$ OT, $n = 2$ speech pathology and $n = 2$ nursing students.	Students reported being significantly better prepared regarding their understanding of and knowledge IPECP, with further satisfaction increased in the second year.
35	Pullon et al. (2016)	Mixed methods – Quasi-experimental- surveys with closed and free text questions	New Zealand	Education setting, Health clinic	Total ($n = 131$) students. $n = 111$ students who completed the start and end surveys.	Majority of students described positive influences on their clinical practice as health professionals or their subsequent career choices, including improved perceptions in being a better clinician, considering rural/regional work, and improved collaborating for care.
36	Pullon et al. (2021)	Mixed-methods – survey with closed and open-ended questions	New Zealand	Health clinic	Total ($n = 64$) students. $n = 6$ dietetics, $n = 10$ dentistry, $n = 14$ medicine, $n = 12$ nursing, $n = 14$ physiotherapy and $n = 8$ pharmacy.	Increased understanding of the roles of other disciplines in enhancing patient care, teamwork, cross-discipline communication and a need to engage in collaborative care in future practice.
37	Reed et al. (2021)	Mixed methods – surveys and focus group interviews	Australia	Primary healthcare settings	Total ($n = 99$) students. $n = 53$ medical, $n = 19$ nursing, $n = 21$ paramedicine and $n = 6$ other.	Significant improvements were found for teamwork, collaboration and professional identity. Several themes emerged from interviews, including that face-to-face interaction promotes collaboration; limited resources improved team problem-solving; time together outside of work strengthens interprofessional connections; participating in another profession's patient care activities fosters appreciation differing roles; interprofessional care takes time; and participants felt a greater desire to pursue interprofessional practice in the future.
38	Rotundo et al. (2021)	Mixed methods – survey and semi-structured interviews	United States	Health clinic	Total ($n = 19$) staff and students. $n = 6$ medical students, $n = 6$ pharmacy students, $n = 5$ medical residents, $n = 2$ pharmacy residents.	The results demonstrated statistically significant gains in the development of interprofessional competencies and practical significance of IPECP. Participants had an enhanced understanding of other health professional roles, improved teamwork and communication, and quality content (online didactic modules and transitions of care literature). A key enabler was that the in-person orientation session was valuable learning and establishing rapport with other team members.
39	Woltenberg et al. (2021)	Mixed methods – survey and open-ended questions	United States	Health clinic	Total ($n = 113$) students. $n = 60$ physician assistants, $n = 24$ imaging sciences, $n = 5$ medicine and $n = 25$ social work students.	

(Continued)

Table 2. (Continued).

No.	Author and Year	Design and data collection measures	Country	Setting	Participants	Results
40	Collins et al. (2019)	Quantitative – surveys	United States	Education setting	Total $n = 10$. $n = 5$ medical students, $n = 2$ osteopathic students, $n = 3$ pharmacy student.	This study suggests that tele-simulation, is effective in providing interprofessional education, although still scored lower than physical alternative. A potential barrier to rural users having less value in this simulation is differences in device availability.
41	Cox et al. (2014)	Quantitative -Surveys	United States	Education setting, Health clinic	Total ($n = 25$) students. $n = 18$ pharmacy students, $n = 7$ social work students	Student perceptions about interprofessional collaboration was positive pre- and post-survey, however there was a negative impact with the perceived quality of the course, and student interest in working with underserved populations.
42	Dressel et al. (2017)	Quantitative – Quasi-experimental, pre-post surveys	United States	Health clinic	Total $n = 9$ students: $n = 5$ senior level nursing, $n = 2$ OT graduate, $n = 1$ PT graduate, $n = 1$ speech and language student	There was a significant increase in understanding the values and ethics for interprofessional practice, roles and responsibilities, and teamwork. However, student's understanding of interprofessional communication was not statistically significant.
43	Kiguli-Malwaddle et al. (2022)	Quantitative – surveys	Botswana, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Nigeria, South Africa, Uganda, Zambia, Zimbabwe	Health clinic	Total = 3023 preservice and in-service trainee participants: Medical, $n = 902$ Nursing, $n = 1145$ Pharmacy, $n = 312$ Laboratory, $n = 365$ Other, $n = 299$	There was significant improvement in knowledge, self-reported confidence to work as part of an interprofessional team and to employ QI tools in clinical practice.
44	MacDowell et al. (2014)	Quantitative – surveys	United States	Primary healthcare settings	Total ($n = 52$) students from programs in medicine, physician assistants, nursing, pharmacy, public health	Positive changes from the pre to the posttests were observed in relation to interaction with other professions, assessment of their professional skills and students' understanding of the roles of other professions. Students also reported greater experience working as part of an interprofessional team and an increase in their support for IPE in rural settings for all health professions students.
45	Martin et al. (2023)	Quantitative study from a multi-methods project	Australia	Primary healthcare settings	$n = 13$ speech pathology students, $n = 8$ physiotherapy students, $n = 6$ occupational therapy students, $n = 6$ dietetics students, $n = 7$ speech path staff, $n = 8$ physiotherapy staff, $n = 6$ OT staff, $n = 3$ dietetics staff	The RIPES model resulted in significant improvement in students' beliefs, behaviors, and attitudes of interprofessional collaborative practice in healthcare settings. Students were able to benefit from the RIPES learning activities without compromising their contact time with patients, and clinical educators spent more time with non-patient contact activities.
46	Prochnow and Tschannen (2022)	Quantitative – Survey (including two free text questions)	United States	Primary healthcare settings	Total sample size ($n = 164$). $n = 70$ clinical staff members who were an Registered Nurses (RN), Licensed Practical Nurses (LPN), paramedic, $n = 49$ nonclinical staff associates, $n = 19$ leaders/management personnel and, $n = 26$ other direct patient care providers.	Overall, there were no significant changes, however there was some mild improvement in leadership support, increased awareness of effective team behaviors and utilization of communication tools from the teamSTEPPS initiative.
47	Schentrup et al. (2018)	Quantitative – Surveys	United States	Health clinic	Total ($n = 37$) nursing staff and students.	Improvements in goals, relationships, leadership, autonomy, communication, patient involvement, situation monitoring, and mutual support were highlighted.
48	Wakely et al. (2013)	Quantitative -Surveys	Australia	Health clinic	Total ($n = 38$) students. $n = 17$ nursing, $n = 7$ physiotherapy, $n = 6$ occupational therapy, $n = 4$ nutrition and dietetics, $n = 3$ medicine and $n = 1$ medical radiation science students.	The results showed some positive changes in student attitudes to interprofessional practice, significant improvements in teamwork and collaboration, and professional identity domains. No change was observed in the perceptions of roles and responsibilities.

IPECP = Interprofessional Education and Collaborative Practice, IPE = Interprofessional Education, IPL = Interprofessional Learning, RIPES model = Rural Interprofessional Education and Supervision, IPCP = Interprofessional Collaborative Practice, SCPE = Simulated Client Interprofessional Education.

(Pelham et al., 2016; Pullon et al., 2016, 2021) were the most commonly examined initiatives. Measured outcomes were primarily focused on improved understanding of roles and skills in interprofessional teams, as well as improved perceptions of teamwork and collaboration in rural settings. Three studies exclusively explored enablers and barriers toward implementing IPECP interventions in rural healthcare settings (Collins et al., 2019; Gum et al., 2020; Wilson et al., 2018). Only one researcher examined improved client outcomes through their involvement in the study (Bridgman et al., 2021).

Methodological quality

A quality assessment completed using the Mixed Methods Appraisal Tool (MMAT) can be found in Online Supplementary Tables 5a-c. All included studies had a clear research question, and the corresponding data collected enabled the research question to be addressed appropriately. Of the 23 qualitative studies, all approaches and collection methods were adequate to address the research question. Two were unable to adequately derive findings from their data, and three were unable to sufficiently substantiate the interpretation of their results through their data (Online supplementary Table 5a). Of the 16 mixed-methods papers, 9 did not have an adequate rationale for using a mixed methods design to address the research question (see supplementary Table 5b). Fewer than half of the included mixed methods studies ($n = 7$) effectively integrated the quantitative and qualitative components (Online Supplementary Table 5b).

Enablers and barriers to implementing and evaluating IPECP in rural health care settings

Data extracted highlight that IPECP in rural healthcare settings benefitted students, clinicians, and clients in several areas including improved perceptions and attitudes toward IPECP, improved IPECP competencies, increased understanding of own role and scope of practice, value added to client care, and improved healthcare outcomes. Further information on the benefits of IPECP to rural healthcare settings has been provided in Online Supplementary Table 6.

Enablers

Enablers of IPECP in rural healthcare settings reported in included studies were broadly classified into three categories: (a) student factors, (b) supervisor and clinician factors, and (c) community factors.

Student factors

Students who were most engaged in IPECP were those with a rural interest or background, in their senior years of study, and from professions other than medicine. A significant number of students in the included studies had a rural interest or background, which aided positive IPECP experiences (P. L. Craig et al., 2014; Noonan et al., 2018; Pelham et al., 2016; Pullon et al., 2021; Taylor et al., 2017). Students in their senior years of study were also more receptive, compared to students in their earlier years of their study, as they had a greater understanding of their

clinical identity and competencies (Wakely et al., 2013). Participants who were enthusiastic and embraced the interprofessional teaching and practical components perceived these to be useful for their future as healthcare professionals (Taylor et al., 2017). Those who valued IPE initiatives as complementary to their uni-professional student placement engaged more with the initiative (Martin et al., 2022; Opina-Tan, 2013). Students who were motivated and provided active input enabled staff to drive research efficiently (Connolly et al., 2014; Mangiameli et al., 2021). Similarly, students were more receptive to interprofessional care for underserved populations and were more likely to volunteer to participate in IPECP studies (Nierenberg et al., 2018; Pelham et al., 2016). Many students also connected with each other due to their similar backgrounds or interests, facilitating interprofessional relationships both within a clinical setting and beyond in a social setting (P. L. Craig et al., 2014). Feedback from student participants and flexibility to make changes to the delivery of the program fed into higher engagement with IPE competencies (O. Heath et al., 2013; Pelham et al., 2016).

Supervisor and clinician factors

Supervisors who were inclusive and modeled collaborative practice were enablers of IPECP. Meticulous logistical planning and coordination from a central site were enablers for launching IPECP initiatives (Browne et al., 2021; Waller & Nestel, 2019). IPE facilitators who were consistently supportive, flexible, and solutions-focused, enabled student research engagement (Connolly et al., 2014; P. L. Craig et al., 2014; Pullon et al., 2016). Additionally, enthusiasm from highly organized facilitators and those who provided consistent supervision delivered similar results (P. L. Craig et al., 2016b; Dressel et al., 2017; Grace & Coutts, 2017; Mangiameli et al., 2021; Pelham et al., 2016; Taylor et al., 2017; Wilson et al., 2018). Facilitators who worked collaboratively to develop learning plans, used clinical cases, and who consistently met up to debrief and reflect on experiences also enabled student engagement (Reed et al., 2021). Simulation-based strategies (e.g. roleplay and computer simulators) helped to facilitate student learning and boosted engagement (Taylor et al., 2017).

Community factors

Communities that were close-knit, where members participated in student learning through role-play scenarios and took students on placement “under their wings,” enabled IPECP (P. Craig et al., 2016a; Woltenberg et al., 2021). Having community involvement in the form of direct family and friends of the IPE facilitators, or non-clinical team members ensured better involvement in the debrief sessions and overall participant engagement (Reed et al., 2021; Schentrup et al., 2018). Seeing clients in a new community setting enabled broader understanding of their healthcare and management, and immersed students in local or indigenous interest and enthusiasm for the program (J. Heath et al., 2019; O. Heath et al., 2013; Mpofu et al., 2014; Pelham et al., 2016; Pullon et al., 2016; Snyman & Donald, 2019). Some students believed the value of the IPL initiative was so great within their community

setting that they made an ongoing commitment to continued involvement (Pelham et al., 2016).

Barriers

Barriers to IPECP mirrored barriers well-known in resource-constrained settings, summarized under four major themes including (a) funding, resources and time constraints, (b) lack of trained IPECP facilitators, (c) lack of structure, and (d) a perceived lack of value. These barriers also impacted the evaluation and research of IPECP initiatives in rural areas.

Funding, resources and time constraints

A lack of funding, equipment, trainers, and facilitators was identified as an issue in many rural settings undertaking IPECP (Collins et al., 2019; Reed et al., 2021; Schentrup et al., 2018; Schuller et al., 2017). Time pressures inhibited students from completing clinical loads alongside IPECP expectations (Connolly et al., 2014). Due to high participant dropout rates, high staff turnover rates, and attendance concerns, a longer timeframe was an inhibiting factor toward IPE engagement and longer-term or follow-up data collection (Martin et al., 2016; Wakely et al., 2013). On the other hand, too short a timeframe for the program, due to a lack of resources, limited the amount of interprofessional interactions and experiences participants were able to achieve in some instances (Nierenberg et al., 2018). Low morale and changes in leadership were identified as reasons for staff not engaging with IPECP in practice, resulting in poor physician engagement with the program (Prochnow & Tschannen, 2022; Wilson et al., 2018). Small rural hospitals initiated organization-wide quality improvement initiatives and faced many challenges in setting up their project (Prochnow & Tschannen, 2022; Woltenberg et al., 2021). Poor funding for administration, teaching time, community engagement, and partnership were barriers in setting up sustainable learning programs (Pullon et al., 2021). In some instances where placement was set in an extremely far or overseas location, costs and travel logistics made international experiences inaccessible for many participants (Rotundo et al., 2021). Health workers in different settings, or who were geographically distanced, revealed a disconnect in interprofessional interaction, reducing overall efficacy and implementation (Gum et al., 2020).

Lack of trained IPECP facilitators in established roles

A lack of trained staff to supervise students was a significant barrier to IPECP (Mpofu et al., 2014). Technological barriers in IPECP initiatives that involved online modules or telehealth were noted as barriers toward engagement (Browne, McKinney, Duck, Baliko, et al., 2021). Lack of education regarding other professions and healthcare provision also inhibited the overall success of programs (Noonan et al., 2018). A lack of interprofessional teaching and modeling inhibited some students from following an interprofessional, client-centered approach to care (Snyman & Donald, 2019).

IPECP opportunities lacking structure and clarity

Poor study design and lack of structure and clarity led to participants feeling confused and lost (Davis et al., 2015). Comprehensive pre-placement preparation was identified as an area for improvement to ensure participants felt more prepared and understood placement expectations (Aggar et al., 2020). Scheduling logistics sometimes did not allow students to engage in IPECP opportunities as they occurred alongside other placement priorities (Cox et al., 2014). The lack of clarity of profession-specific roles created confusion in some participants, and they felt undervalued in IPECP settings (J. Heath et al., 2019). An overall lack of structured student placement, coordination and client management within IPECP initiatives occurring while on placement was an inhibitor as it compromised the quality of learning (Mpofu et al., 2014; Opina-Tan, 2013).

IPE seen as a low priority during placement

Most participants were students who completed IPECP interventions alongside placement. However, with the long hours and workload of placement, many viewed IPE teaching, training sessions, and projects to be a low priority compared to other placements (Bridgman et al., 2021; Cox et al., 2014; P. L. Craig et al., 2014; Taylor et al., 2017). Some participants with a strong focus on service-level or community-level engagement did not interact much with interprofessional teams, due to their workload and contexts (P. L. Craig et al., 2016b). Some participants noted a tension between uni-professional placement requirements and IPL initiatives, resulting in a detraction from their overall experiences (Martin, 2022).

Discussion

The included studies varied in design, interventions utilized, and follow-up periods, focusing predominantly on student initiatives in specific locations. Qualitative methodologies were primarily employed, perhaps due to the comparative ease of setup and execution in resource-constrained settings where long-term quantitative measurements may be challenging as noted in the broader literature (Tenny et al., 2024). The results predominantly centered on student experiences, with nursing, medical, and allied health students making up most participants, and a limited number of participants in clinical or supervisory roles. Included studies predominantly examined participant experiences through interviews, short-answer questions, and surveys. Participant journals were found to be an effective method of recording participant experiences and perceptions, rather than solely relying on interviews or surveys, as students were able to write more extensive thoughts and reflections (Schuller et al., 2017). Quantitative studies were limited in exploring the markers of successful IPECP implementation, such as healthcare processes and outcomes. Findings were often derived from cross-sectional analyses, with follow-ups insufficient to identify the longer-term impacts of IPECP. Although these studies provide a useful baseline for IPECP implementation, particularly in educational clinical settings, there is a need for a greater focus on the longer-term impacts post-qualification.

The included research primarily originated from Western-centric, well-resourced rural settings in Australia and the United States, possibly reflecting the greater emphasis on rural immersion for healthcare students in these countries. More action is needed to promote the implementation and/or reporting of rural IPECP initiatives from developing countries to achieve the United Nation's Sustainable Development Goal of universal health coverage for all (United Nations, 2015). In Australia, most universities incorporate rural immersion opportunities as part of their health and medical curricula, which is evident in the higher number of studies exploring IPECP in Australian health students in rural and remote settings (O'Sullivan et al., 2018). Although each study explored IPECP outcomes in participants, few identified key enablers and barriers to initiate implementation. There is expanding evidence of the benefits of IPECP in healthcare workplace efficacy and collaboration, with growing interest in IPECP implementation in rural settings; however, significant gaps remain in understanding the enablers of and barriers to these initiatives (Wakeman et al., 2008).

Student factors significantly influence the facilitation of IPECP initiatives in rural and remote settings. A specific interest in rural healthcare or previous background in this setting appears to enhance perceived participation and outcomes for healthcare students involved in IPECP programs (P. L. Craig et al., 2014; Noonan et al., 2018; Pelham et al., 2016; Pullon et al., 2021; Taylor et al., 2017). Students with an innate interest or understanding of rural healthcare and its challenges were more engaged and motivated to participate in rural placements and IPECP initiatives (Connolly et al., 2014; Mangiameli et al., 2021; Nierenberg et al., 2018; Pelham et al., 2016). This trend is corroborated by research indicating that health students with a rural interest or background are more likely to participate in rural placements and subsequently join the rural healthcare workforce (Clark et al., 2013; Kirschbaum et al., 2016). These students tend to connect with each other, creating a positive feedback loop that promotes interprofessional relationships and enhances learning outcomes (P. L. Craig et al., 2014). Additionally, senior students, who have advanced further in their degree programs and thus possess a deeper understanding of their individual roles in the hospital, exhibit greater comprehension of clinical identities and competencies. Consequently, they embrace interprofessional teaching, recognizing its utility for their future roles as healthcare workers (Taylor et al., 2017; Wakely et al., 2013). This theme is corroborated by studies showing that student confidence, likely gained through years of experience, positively impacts their engagement during placements and IPECP (McLean et al., 2018; Pollard, 2009).

Some students perceived IPECP interventions as having lower priority compared to other placement requirements (Bridgman et al., 2021; Cox et al., 2014; P. L. Craig et al., 2014; Taylor et al., 2017). This perception was exacerbated when scheduling conflicts arose between placement requirements and IPL initiatives, detracting from their overall experiences (Bridgman et al., 2021; P. L. Craig et al., 2014; Martin, 2022). These findings underscore the importance of student engagement in enabling IPECP initiatives and promoting positive outcomes. Although having a rural background or interest

is a significant influencing factor, improving student engagement by promoting the perceived value of IPECP and including more final year students in these initiatives could enhance the efficacy of IPECP in future research.

We found that effective implementation of IPECP in rural healthcare settings is significantly facilitated by supervisors who are well-prepared, organized, and model collaborative practice while demonstrating inclusive behavior. Staff involvement and engagement are known to be crucial to student engagement in IPECP initiatives in rural and remote educational and healthcare settings (Lawlis et al., 2014). Supportive, flexible, and solution-focused IPE facilitators are essential for fostering student engagement in IPECP research (Connolly et al., 2014; P. L. Craig et al., 2014; Pullon et al., 2016). Enthusiastic facilitators who provide consistent supervision have been shown to significantly contribute to positive outcomes (P. L. Craig et al., 2016b; Dressel et al., 2017; Grace & Coutts, 2017; Mangiameli et al., 2021; Pelham et al., 2016; Taylor et al., 2017; Wilson et al., 2018). Facilitators who collaboratively develop learning plans, use clinical cases, and regularly debrief with students can further enhance engagement (Reed et al., 2021). Conversely, insufficient knowledge about other professions and their roles in healthcare provision hamper program success (Noonan et al., 2018). A lack of interprofessional teaching and modeling has been shown to prevent students from adopting an interprofessional, client-centered approach to care (Snyman & Donald, 2019).

A literature review (Lawlis et al., 2014), highlighted that the skills, enthusiasm, understanding, and model behavior of staff and facilitators are significant enablers of IPECP participation, particularly in educational settings involving students. The academic enthusiasm to act as champions, combined with the dedication and ethics of these staff members, fosters high student engagement and promotes positive IPECP outcomes, skills, and knowledge (Lawlis et al., 2014). This was similarly demonstrated in a 2014 scoping review that examined facilitators for an effective IPECP curriculum for students and stated that knowledgeable and enthusiastic facilitators who contribute to students' positive attitudes to future interprofessional collaboration are vital for promoting IPECP engagement (Gilligan et al., 2014).

The findings of this review reveal several further enablers and barriers to IPECP in rural healthcare settings, especially for student-focused initiatives. Meticulous logistical planning and coordination from a central institutional site significantly promoted engagement and efficacy of IPECP programs (Browne, McKinney, Duck, Baliko, et al., 2021; Waller & Nestel, 2019). Streamlined study designs enhancing time efficiency in managing participant accounts were also strong enablers of program engagement (Gupta & Howden, 2022; Woltenberg et al., 2021). Additionally, innovative program designs involving simulation-based strategies, such as roleplay and computer simulators, effectively facilitated student learning and boosted engagement (Taylor et al., 2017). Conversely, a lack of structure in IPE placements and unclear learning objectives were significant barriers (Browne, McKinney, Duck, Baliko, et al., 2021; Cox et al., 2014; Mpofu et al., 2014).

The broader IPECP literature indicates that these discrepancies can compromise the quality of learning and lead to

negative emotions, conflicting norms and a lack of knowledge of team participants and responsibilities, which can hinder teamwork (Etherington et al., 2021). Our findings are echoed in previous research. For example, insufficient funding and support from institutions were shown to lead to unfocused and poorly designed programs, resulting in reduced engagement from participants and staff (Lawlis et al., 2014). Promoting staff retention in healthcare settings and enthusiasm in similar programs is essential to achieving more positive results, especially in rural and remote settings.

Numerous health system barriers, more prominent in rural healthcare, hinder IPECP implementation, as identified in this review. These barriers often reflect broader rural challenges, such as insufficient funding, equipment, trainers, and facilitators (Collins et al., 2019; Reed et al., 2021; Schentrup et al., 2018; Schuller et al., 2017). These limitations also affect the quality of healthcare available to rural and remote clients (Thorn & Olley, 2023). High turnover rates in rural workforces, driven by inadequate compensation, isolation, and lack of support, further hamper IPECP initiatives. These turnover rates extend IPECP research timeframes and reduce participant engagement (Chisholm et al., 2011; Cosgrave, 2020; Gum et al., 2020; Martin et al., 2016; Wakely et al., 2013). Leadership changes and poor interpersonal connections lower morale and clinician engagement (Prochnow & Tschannen, 2022; Wilson et al., 2018), while short program durations detract from participant experiences (Nierenberg et al., 2018). These issues, exacerbated in resource-poor rural settings, highlight the need to address systemic problems in rural healthcare to facilitate effective IPECP initiatives (Lawlis et al., 2014; Thorn & Olley, 2023).

Strengths and limitations

The conduct of this systematic review was guided by the JBI guidelines and reported following the PRISMA guidelines. The review team consisted of experts in IPECP (MM, AX, PM), rural health (MM, MMcG, PM), and review methodologies (LL, MR, PM). They were from three Australian states and the United Kingdom; and from several professions including medicine (NN, AN), nursing (AX), occupational therapy (MM, PM), physiotherapy (LL), psychology (MF), statistics (MMcG), and an information specialist (MR), thereby providing an interprofessional perspective to assist with the interpretation of findings. Limitations of studies included within the review include small sample sizes and lack of long-term follow-up, broadly reflecting the issues seen in the rural health literature. Studies were also predominantly western-centric and student-focused, which may limit applicability of findings to non-student groups and non-western contexts. Studies overall had a limited evaluation of the enablers and barriers of their IPECP implementation, providing limited data for interpretation and assessment for the purposes of this review. Although we considered the international literature, only English language publications were included, which could be a potential limitation. Although not a limitation of this review, it is worth noting that many studies required screening at the full-text stage of the review because the titles and abstracts often lacked information on whether enablers and barriers to

the implementation of IPECP were discussed, thus necessitating full text-retrieval to confirm relevance.

Implications for practice, policy and research

The findings of this review have several implications for practice, policy and research. For practice, IPECP in rural healthcare settings can be enhanced by improved funding, staff training, more supportive leadership and communities, and promoting rural healthcare interest in students. Further strategies to attract and support students on placements in rural healthcare settings is crucial. A framework can be developed to provide tools and resources to healthcare workers and students in rural settings to embrace and facilitate IPECP. Policy implications include implementation of strategies addressing the wider rural health challenges such as resource constraints and workforce retention and promoting shared governance between the healthcare and academic sectors to implement IPECP initiatives. Organizations can further drive collaborative care and interprofessional work in rural settings and provide protected time to staff to invest in IPECP. Future researchers should seek to develop and evaluate solutions to barriers mentioned in this review. Researchers could explore strategies such as integrating digital tools in rural healthcare settings. Research is needed to investigate the longitudinal impacts of IPE programs on graduate retention rates in rural healthcare services (Martin et al., 2016; Woltenberg et al., 2021). Measures to enhance follow-up and increased sample sizes are needed (Wakely et al., 2013).

Conclusion

Based on a systematic identification and analysis of 48 peer-reviewed research studies of IPECP implementation in rural areas, we concluded that there are various enablers and barriers toward its implementation. Most barriers for IPECP implementation parallel those that rural healthcare settings in general face, including funding, resource and time constraints, and a lack of trained staff. However, enablers toward the sustained use of IPECP include student, supervisor, and clinician factors, with a great emphasis on enthusiasm, commitment, and planning yielding positive learning environments that facilitate participant engagement with IPECP initiatives. The identified enablers and barriers of IPECP implementation in rural settings can inform further policy and practice developments, especially for funding and training of staff in rural healthcare settings. Future researchers could investigate interventions to aid IPECP implementation aimed at tackling the identified barriers and longitudinal studies to assess their longer-term impact.

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Appendix A: Definitions

(1) Interprofessional education (IPE)

Interprofessional education occurs when members (or students) of two or more health and/or social care professions engage in learning with, from and about each other to improve collaboration and the delivery of care (Journal of Interprofessional Care, n.d.)

(2) Interprofessional collaboration (IPC)

Interprofessional collaboration involves different health and social care professions who regularly come together to negotiate and agree on how to solve complex care problems or provide services. It differs from interprofessional teamwork as colleagues do not share a team identity and work together in a less integrated and interdependent manner (Journal of Interprofessional Care, n.d.).