

2024

Perceived Interprofessional Learning Readiness in Healthcare Profession: A Cross-sectional Study

Shashidhara YN

Professor and Head, Department of Community Health Nursing, Manipal College of Nursing, Manipal, Manipal Academy of Higher Education, Manipal, India

Siva N

Senior Research Fellow ICMR, Department of Child Health Nursing, Manipal College of Nursing, Manipal Manipal Academy of Higher Education, Manipal, India., siva.n@learner.manipal.edu

Elissa Ladd

Professor at MGH Institute of Health Professions, School of Nursing, MGH Institute of Health Professions, Boston

Selvam Ramachandran

Department of Physiotherapy, Manipal College of Health Professions, Manipal Academy of Higher Education, Manipal, Udupi Dist, Karnataka - 576104.

Baby S Nayak

Professor, Head, Department of Child Health Nursing, Manipal College of Nursing, Manipal Academy of Higher Education. Manipal

See next page for additional authors

Follow this and additional works at: <https://hpe.researchcommons.org/journal>

Recommended Citation

YN, Shashidhara; N, Siva; Ladd, Elissa; Ramachandran, Selvam; Nayak, Baby S; and Velayudhan, Binil (2024) "Perceived Interprofessional Learning Readiness in Healthcare Profession: A Cross-sectional Study," *Health Professions Education*: Vol. 10: Iss. 3, Article 9.

DOI: 10.55890/2452-3011.1290

Available at: <https://hpe.researchcommons.org/journal/vol10/iss3/9>

This Original Research Reports is brought to you for free and open access by Health Professions Education. It has been accepted for inclusion in Health Professions Education by an authorized editor of Health Professions Education.

Perceived Interprofessional Learning Readiness in Healthcare Profession: A Cross-sectional Study

Authors

Shashidhara YN, Siva N, Elissa Ladd, Selvam Ramachandran, Baby S Nayak, and Binil Velayudhan

ORIGINAL RESEARCH REPORTS

Perceived Interprofessional Learning Readiness in Healthcare Profession: A Cross-sectional Study

Y.N. Shashidhara^a, N. Siva^{b,*}, Elissa Ladd^c, Selvam Ramachandran^d,
Baby S. Nayak^e, Binil Velayudhan^f

^a Department of Community Health Nursing, Manipal College of Nursing, Manipal Academy of Higher Education, Manipal, India

^b Department of Child Health Nursing, Manipal College of Nursing, Manipal Academy of Higher Education, Manipal, India

^c MGH Institute of Health Professions, School of Nursing, Boston, USA

^d Department of Physiotherapy, Manipal College of Health Professions, Manipal Academy of Higher Education, Manipal, India

^e Department of Child Health Nursing, Manipal College of Nursing, Manipal Academy of Higher Education, Manipal, India

^f Department of Mental Health Nursing, Manipal College of Nursing, Manipal Academy of Higher Education, Manipal, India

Abstract

Introduction: Interprofessional education has gained considerable attention as a practical approach to enhancing collaborative and patient-centered care in healthcare. To effectively prepare future healthcare professionals for successful interprofessional collaboration, assessing their readiness and identifying improvement areas is essential. This research aims to investigate the readiness of health profession students for interprofessional learning.

Methods: A cross-sectional study was conducted among health profession students from multiple disciplines, including medicine, nursing, pharmacy, physiotherapy, and occupational therapy. The demographic proforma and standardized Readiness for Interprofessional Learning Scale (RIPLS) were used in the study to collect the data. The data were analyzed using descriptive and inferential statistics.

Results: The questionnaire was administered to 286 students. Most students (72%) were female, 35.3% were from medicine, 29.4% were from nursing, 16.8% were physiotherapy students, 10.5% were from occupational therapy, and 8% were from pharmacy. The majority (86.3%) of health profession students had never been exposed to the principles of interprofessional education and practice. The overall willingness to work collaboratively and respect the other professions was reported in nursing 73.9 (7.19), physiotherapy 73.1 (5.19), medicine 69.6 (8.64), pharmacy 73.6 (4.2), and occupational therapy 73.1 (4.4). There was a significant mean difference among the healthcare professions in readiness for interprofessional learning. This was tested using a one-way ANOVA and demonstrated a substantial difference between the healthcare professions $F(1,285) 5.18, p < 0.001$, with partial $\eta_p^2 = 0.166$.

Conclusion: The study reveals that students from various healthcare professions demonstrated readiness toward interprofessional education. The results of this study shed light on the current state of interprofessional readiness among health profession students and offer effective intervention strategies for enhancing their preparedness in a diverse and evolving healthcare landscape.

Keywords: Healthcare, Interprofessional education, Readiness, Teamwork, Collaboration professional identity, Health professions and learning

1. Introduction

Interprofessional learning (IPL) is a didactic approach that brings students from related healthcare professions to learn and collaborate as a

team [1]. IPL prepares future healthcare professionals for effective teamwork, communication, and collaboration in real-world healthcare settings [2]. In recent years, the healthcare landscape has witnessed a paradigm shift towards a collaborative

Received 3 October 2023; revised 25 July 2024; accepted 30 July 2024.
Available online 9 October 2024

* Corresponding author: Department of Child Health Nursing, Manipal College of Nursing, Manipal Academy of Higher Education, Manipal, Udipi District, Karnataka, 576104, India.

E-mail addresses: shashidhara.yn@manipal.edu (Y.N. Shashidhara), siva.n@learner.manipal.edu (N. Siva), eladd@mghihp.edu (E. Ladd), selvam.ram@manipal.edu (S. Ramachandran), baby.s@manipal.edu (B.S. Nayak), vp.binil@manipal.edu (B. Velayudhan).

<https://doi.org/10.55890/2452-3011.1290>

2452-3011/© 2024 Association of Medical Education in the Eastern Mediterranean Region (AMEEMR). This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>). Sponsored by King Saud bin Abdulaziz University for Health Sciences.

and patient-centered care approach to address the complexities of modern medical challenges [3]. This transformation demands that health professionals from various disciplines work together seamlessly, combining their unique expertise to deliver high-quality, integrated care [2,3]. Interprofessional education (IPE) has emerged as a critical component of modern healthcare education, emphasizing the importance of collaborative practice among diverse health professions [4]. Working effectively as part of a cohesive team is no longer merely a desirable trait; it is now an essential competency that healthcare providers must possess to deliver comprehensive, patient-centered care [5]. As the complexity of medical challenges grows, the need for seamless interprofessional collaboration becomes increasingly evident [5,6].

Statistics reveal a growing demand for interprofessional collaboration in healthcare settings [7]. According to a survey conducted by the World Health Organization, over 50% of patient safety failures happen due to communication breakdown among health care workers, within health care teams, with patients and their families, ineffective teamwork, fatigue, burnout, and cognitive bias [8]. This highlights the urgency of fostering effective communication and teamwork skills among health profession students during their formative years of education [9]. Furthermore, a systematic review findings revealed that interprofessional education can positively impact patient outcomes [10]. Similarly another systematic review of IPE interventions reported that interprofessional collaboration programs improved patient satisfaction, reduced healthcare costs, and enhanced patient safety [11].

The literature has proposed several integrative methods to improve readiness for interprofessional learning, such as (i) integrated curriculum design throughout the medical curriculum to ensure that students from various health professions regularly come together to learn and collaborate [12]. (ii) Incorporate simulated interprofessional scenarios into medical training by utilizing simulation centers to provide students with realistic patient care scenarios where they must work collaboratively with other healthcare professionals to address complex medical cases [13]. (iii) Develop interprofessional case studies and problem-based learning activities that require students to work in teams to diagnose and manage patient cases [14]. (iv) Organize regular interprofessional and grand rounds where students from different health professions participate together to discuss complex patient cases [15]. (v) Facilitate joint clinical rotations for students from different health professions in various healthcare

settings [16]. (vi) Organize interprofessional competitions where students collaborate in teams to solve healthcare-related challenges [17]. These methods provide an opportunity for interdisciplinary learning, exchanging ideas through fostering teamwork, innovation, and problem-solving skills while promoting a supportive and collaborative learning environment [11,18,19].

By employing these methods, medical education can enhance interprofessional learning readiness, preparing future healthcare providers to collaborate and deliver patient-centered care in an increasingly complex and interdisciplinary healthcare landscape [4,6,11,17]. The diagnosis, treatment, management, and prevention of chronic and acute diseases require collaborative efforts from various healthcare workers [20]. Therefore, undergraduate institutions focused on healthcare education must train students to adapt to challenges and respond to patients' needs effectively [21]. Globally, undergraduate educational activities are often conducted independently by each profession, leading to graduates with limited knowledge of other professions and underdeveloped communication, collaboration, and teamwork skills [22]. Consequently, they must wait until they enter the workforce to interact with other professions [23]. Extant literature identifies four interprofessional competency frameworks: the UK's interprofessional capability framework (2004), Canada's national interprofessional competency framework (2010), the US's core competencies for interprofessional collaborative practice (2011), and Curtin University's interprofessional capability framework in Australia (2011) [24]. These frameworks share domains related to interprofessional communication, role clarification, and team functioning, which are crucial for IPE-based curricula [22].

IPE activities, grounded in adult learning principles and transformative learning theory, enhance these competencies by adjusting team members' beliefs about their and others' professions [25]. Despite similarities in competency domains, frameworks focus on different aspects of outcomes and processes at individual or team levels [13]. The UK and Australian capability frameworks and the US core competencies focus on individual-level outcomes, while Canada's framework emphasizes team-level processes [24]. Additionally, the University of British Columbia (UBC) developed an IPE model with three phases: exposure, immersion, and mastery [22]. The exposure phase fosters understanding of one's own and other professions' roles [10]. The immersion phase involves gaining core knowledge and clinical exposure to other professions. The mastery phase targets practitioners

mastering interprofessional concepts in daily practice. Despite the growing recognition of the importance of interprofessional collaboration, challenges persist in implementing effective IPE initiatives [22]. A published study reported that only 20% of healthcare institutions had fully integrated interprofessional education into their curricula. Additionally, faculty resistance, logistical constraints, and the need for standardized assessment tools remain barriers to the widespread adoption of interprofessional learning approaches [4,26].

In the Indian situation, every student of a health profession studies many standard courses but does not have the opportunity to connect with other health professions. Furthermore, the professional hierarchy is essential in the educational process [27]. Students can communicate with various jobs throughout their clinical practice; however, this is a practice that is not a usual practice [28]. Therefore, to address these challenges and pave the way for improved interprofessional learning readiness, an explorative cross-sectional study was conducted to explore the willingness of health profession students to engage in interprofessional collaborative learning in the Indian context by capturing students' perceptions of interprofessional collaboration, their understanding of team dynamics. The findings of this study are anticipated to have significant implications for healthcare education, curriculum development, and policymaking. Educators and healthcare institutions can tailor their programs to foster the necessary skills and attitudes for effective collaboration by pinpointing the key factors influencing students' readiness for interprofessional learning. Ultimately, our collective efforts to enhance interprofessional learning readiness will contribute to the transformation of healthcare delivery, resulting in safer, more efficient, and patient-centric care.

2. Methods

2.1. Study design

A descriptive cross-sectional study design was adopted to assess the perceived interprofessional learning readiness of undergraduate students in healthcare professions.

2.2. Context

This study is conducted with undergraduate students from selected institutions within a deemed university located in Udupi district, Karnataka, India.

2.3. Sample size and type

A total of 286 s-year undergraduate students from medicine, nursing, physiotherapy, occupational therapy, and pharmacy were recruited using a non-probability convenience sampling technique. The purpose and nature of the study were explained to all participants during scheduled appointments with each cohort.

2.4. Data collection tool

The data were collected by a demographic proforma comprising variables such as gender, age, profession, and experience with interprofessional education and practice. A standardized Readiness for Interprofessional Learning Scale (RIPLS) was used in the study to collect the data [23]. This tool consisted of 19 items with five-point self-reporting elements, which can assess the healthcare students' perception of readiness to learn from and with other healthcare professionals. The RIPLS consisted of four subscales, which included items on teamwork/collaboration (1–9), negative professional identity (10–12- Negative statements), positive professional identity (13–16), and roles and responsibilities (17–19). It was a 5-point rating scale with a score of 1–5 for each item, one being 'Strongly disagree' and 5 'Strongly agree,' with the total expected score ranging from a minimum of 5 to a maximum of 95. The validity and reliability of the English version of the tool were established and reported by the primary author. The internal consistency was measured at $r = 0.72$ and the overall reliability at $r = 0.95$ [23].

2.5. Data collection timing

Data were collected during college hours through face-to-face interactions with students at their convenience, during pre-scheduled meetings. Each student took approximately 10 min to complete the survey. To avoid errors and confusion during data entry into SPSS, each tool was coded with numbers corresponding to the student's field of study. The response rate from the participants was 100%; none of the participants refused to participate or left any questions unanswered.

2.6. Data analysis

Statistical analysis was conducted using the Statistical Package for the Social Sciences version 18 (IBM) to describe the readiness for interprofessional learning among students of the healthcare

profession. Descriptive statistics like percentage, frequency, mean, and standard deviation were used to describe sample characteristics. Inferential statistics such as one-way ANOVA were used to determine whether there were any statistically significant differences among students' means of RIPLS.

2.7. Ethical approval

Before conducting the survey, participants were informed regarding the purpose of the study, and the proposed research was voluntary. The study was conducted using ethical research principles involving human subjects based on the principles of the Declaration of Helsinki and with all applicable guidelines of the profession's code of ethics. Approval was obtained from the heads of the institutions and the departments of medical, pharmacy, physiotherapy, nursing, and occupational therapy and also researcher received ethical approval from the Institutional Ethics Committee to conduct this study (IEC:926/2017).

3. Results

A total of 286 participants were recruited in the cross-sectional study, and participants were 2nd-year undergraduate students of medicine, nursing, physiotherapy, occupational therapy, and pharmacy in the 2018 and 2019 academic years.

Table 1 describes the characteristics of the students. Of 286 participants, 72% were female, 28% were male, 35.3% were students of Bachelor of Medicine/Bachelor of Surgery (MBBS), 29.4% were nursing students, 16.8% were physiotherapy students, 10.5% were occupational therapy students, and 8% were pharmacy students. The majority (86.3%) of health profession students had never been exposed to the principles of interprofessional education and practice.

Table 1. Description of sample characteristics.

Variable	Number of participants	Frequency
Profession		
Nursing	84	29.4
Physiotherapy	48	16.8
Occupational Therapy	30	10.5
Medicine	101	35.3
Pharma-D	23	8.0
Gender		
Male	79	27.6
Female	207	72.4
Exposure to IPE/P		
Yes	39	13.6
No	247	86.3

Table 2 depicts the students' mean score of the Readiness for Interprofessional Learning. The obtained mean score for the scale was 72.19 (7.26).

Table 3 demonstrates the area-wise mean and standard deviation of the RIPL. The tool Items 1 to 9 for teamwork and collaboration had a maximum possible score of 45. The mean scores on team collaboration were 40 and 34.1 for the students of Pharm D and the medical school, respectively. The higher score reflects the great extent to which the students value cooperative learning and respect those students from other professions. Items 10 to 12 correlate with negative professional identity, and items 13 to 16 correlate with positive professional identity. Both ranges measure the values and benefits of interprofessional learning. The highest mean score for the study participants for the students of MBBS was 8.5, representing, and low value indicating that the students needed a higher value for cooperative interprofessional learning.

There is a subtle divergence in students' understanding of their professional roles based on the differences in agreement levels between the subscales measuring positive and negative professional identity. Even while the majority of students show a strong positive professional identity, some students may still be struggling with some parts of their professional self-concept, based on the range in responses indicating negative professional identity. The variations brought about by educational experiences, the impact of conventional hierarchical healthcare institutions, and the disparities in exposure to interprofessional practices can all directly contribute to this disparity.

Higher mean scores were observed for positive professional identity among the students of Pharma D (17.3) and nursing (17). The scores reflected that the IPE was helpful to these students in terms of communication and problem-solving. Under roles and responsibilities, they had higher scores, implying an unclear or distorted perception of one's position and others.

Table 2. Mean and standard deviation scores of RIPLS scores of the students of interprofession.

Scale Subscale	Minimum	Maximum	Mean	Std. Deviation
Teamwork	9.00	45.00	37.8	6.1
Collaboration				
Negative Professional Identity	3.00	15.00	6.9	2.6
Positive Professional Identity	4.00	20.00	16.12	2.93
Role and Responsibilities	3.00	15.00	9.04	1.89
Total score	28.00	93.00	72.19	7.26

Table 3. Mean difference among the students of interprofession.

Profession		Total score	Teamwork Collaboration	Negative professional identity	Positive professional Identity	Roles and responsibilities
Nursing	Mean	73.9	39.8	5.7	17	9.3
	N	84	84	84	84	84
	SD	7.19	4.97	2.21	2.64	1.78
Physio	Mean	73.1	39.6	6.4	16.5	8.3
	N	48	48	48	48	48
	SD	5.19	4.02	2.2	2.54	2.22
Occupational therapy	Mean	73.1	39.5	6.36	16.6	8.4
	N	30	30	30	30	30
	SD	4.4	3.5	1.6	1.8	1.7
Medical	Mean	69.6	34.1	8.5	14.73	9.3
	N	101	101	101	101	101
	SD	8.64	7.37	2.87	3.2	1.8
Pharma D	Mean	73.6	40	5.6	17.3	8.6
	N	23	23	23	23	23
	SD	4.2	3	1.6	2.29	1.3
Total	Mean	72.2	37.8	6.9	16.1	9.04
	SD	7.26	6.1	2.66	2.93	1.89

Table 4 and Fig. 1 exhibit a notable mean difference in readiness for interprofessional learning among the various healthcare professions, as indicated by the statistical analysis ($F(1, 285) = 5.18$, $p < 0.001$). The results underscore a substantial main effect attributable to the groups (p -value $< .001$, displaying a large effect size: partial $\eta_p^2 = 0.166$). This main effect signifies significant disparities in scores across the different groups. Additionally, the estimated marginal means, standard errors, and 95% confidence intervals for the total score exhibit a substantial impact on these group differences.

4. Discussion

The present research study aimed to investigate healthcare profession students' readiness for interprofessional learning. The findings shed light on several important aspects that contribute to developing effective interprofessional teams and have implications for healthcare education and practice. There was a statistically significant difference in RIPLS scores among students from different study programs, supporting previous research suggesting that attitudes towards IPL vary by professional

background, contradicting [29], who found differences in other RIPLS subscales. High mean scores for "I'm not sure what my professional role will be" further highlight this role confusion. This may be due to respondents' lack of professional experience, indicating a need for better awareness and orientation during undergraduate studies to prepare students for practical life and minimize workplace conflicts. This remains a considerable challenge for educators, mainly if it was not addressed during the design and implementation of curricula [21]. Similarly systematic review findings revealed that Simulation-based learning, e-learning and PBL were the most frequently reported teaching and learning approaches for IPE. Based on the literature, simulation can be used as a learning approach in IPE to promote effective communication and collaboration in healthcare profession students [22].

In this study, most students were willing to work in interdisciplinary teams, recognizing the potential benefits of diverse perspectives and expertise in patient care. The RIPL comprises the components of teamwork collaboration, negative professional identity, positive professional identity, roles, and responsibilities [30]. This study found that the

Table 4. One-way ANOVA results of mean differences of RIPLS between the groups.

Profession	Number of participants	M (SD)	Minimum	Maximum	df	F	p	η_p^2
Nursing	84	73.9 (7.1)	40	93	1285	5.189	0.001	0.166
Physiotherapy	48	73.1 (5.1)	61	86				
Occupational therapy	30	73.1 (4.4)	66	87				
MBBS	101	69.6 (8.6)	28	88				
Pharma D	23	73.6 (4.2)	63	81				
Total	286	72.1 (7.2)	28	93				

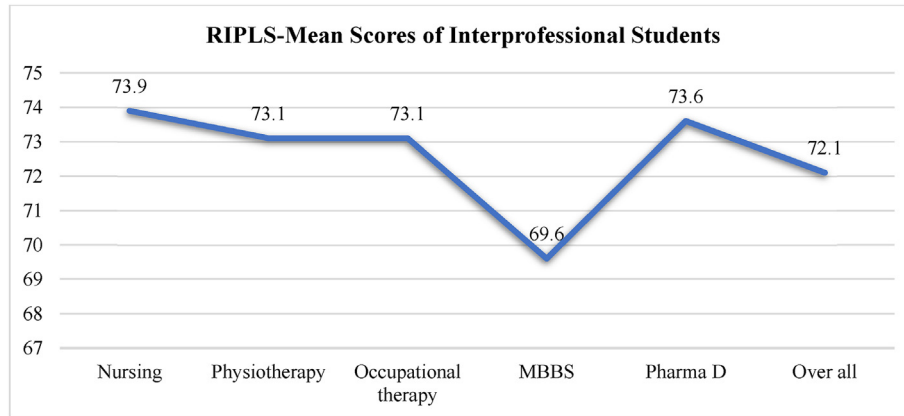


Fig. 1. Readiness for interprofessional learning. Difference in mean score among health care professionals.

various professionals responded to readiness for interprofessional cooperation and reported that teamwork collaboration response was more positive in nursing students and pharmacy students, negative professional identity was observed higher among medicine and physiotherapy students, positive professional identity was higher among nursing and pharmacy students, and role and responsibility were higher in nursing and medicine students in patient care and collaboration activities. The similar study findings was reported at an Norway university, reported that there nursing students scored significantly higher than physician associate and medical students [31].

Similarly studies have reported that students are unaware of the advantages, roles, and responsibilities of the other professions in patient care. These findings corroborate other studies that have noted that some works negatively perceive IPE concerning lower academic levels and practice and believe that their engagement in the process may diminish or change the students' progress in their programs [13,25,32]. It is necessary to build a culture of interprofessional learning to create awareness about the other professional and to understand their competencies [22].

Collaborative interprofessional education and practice is a critical pedagogy that can contribute to quality patient care [27]. Similarly, an integrative review has reported a correlation between IPE and measurable teamwork and collaborative practice changes [18]. While our study did not directly report on the outcomes of IPE concerning future collaborative practice by health professional students, it did confirm the readiness for interprofessional education and practice among five groups of health professional students. These outcomes can communicate the capacity of students to handle challenging medical and nonmedical problems in interprofessional

teams. This, in turn, may enhance healthcare system outcomes [4,11,17].

However, communication emerged as a critical area of concern, with some students informally expressing difficulty in effectively communicating with peers from different health professions. This finding underscores the importance of incorporating communication skill development in interprofessional education initiatives [33]. Introducing communication training early in the curriculum and providing ongoing opportunities for practice and feedback may help students become more adept at interprofessional communication [34]. The study also recommends the influence of faculty support and institutional culture on interprofessional learning readiness. Students who perceived more fantastic faculty encouragement and institutional support for interprofessional collaboration exhibited higher readiness levels. Hence, investing in faculty development and fostering a culture that values and promotes collaborative practice can significantly impact students' preparedness for interprofessional learning [35]. The findings of this research study align with previous literature emphasizing the importance of interprofessional education in healthcare [11,35]. Collaborative practice has improved patient outcomes, enhanced patient satisfaction, and reduced healthcare costs. Therefore, enhancing interprofessional learning readiness is crucial for students' professional development and holds significant potential for improving the quality of the healthcare delivery system [30,36].

5. Conclusion

This research study contributes valuable insights into enhancing interprofessional learning readiness among health profession students. There is need for addressing the challenges, such as communication

barriers and role understanding, through targeted educational interventions and faculty support will be instrumental in fostering effective interprofessional teams in future healthcare professionals.

5.1. Strengths

The significance of our research is underscored by several strengths. First, our unique cross-sectional survey methodology, combined with a convenient sampling technique, effectively engaged healthcare professional students during their clinical postings and classes, ensuring their participation without significant time commitment. Second, we utilized the standardized RIPLS scale, a widely used instrument, to assess students' readiness for interprofessional learning. Finally, by including participants from various healthcare professions, we were able to gather diverse opinions based on their clinical exposure, providing a comprehensive view of interprofessional learning readiness across different healthcare disciplines.

5.2. Limitation

There are a few limitations of the study that should be acknowledged. First, the study was conducted at one private university, limiting the generalizability of the findings to other universities. Future research should include a more diverse sample of students from various healthcare disciplines and institutions to better understand interprofessional learning readiness. Additionally, the study primarily relied on self-report measures to assess interprofessional learning readiness. Incorporating objective criteria, such as observational assessments of interprofessional communication and teamwork, and qualitative themes could provide a more comprehensive evaluation of students' preparedness for interprofessional learning and care.

Consent for publication

All authors consent to the publication of this manuscript.

Data availability

The datasets analyzed in the current study can be obtained from the corresponding author upon request.

Conflict of interest

None.

Acknowledgment

We are thankful to all the heads of institutions for their approval to conduct this study and all the participants who actively participated in providing the data for this study. We are grateful to the Manipal Academy of Higher Education, Manipal, for technical assistance and the resources provided.

References

- [1] Garnweidner-Holme L, Almendingen K. Is interprofessional learning only meant for professions within healthcare? - a qualitative analysis of associations with the term interprofessional collaborative learning among professional students. *J Multidiscip Healthc* 2022;15:1945–54. <https://doi.org/10.2147/JMDH.S376074>.
- [2] Kauff M, Bührmann T, Gözl F, Simon L, Lüers G, van Kampen S, et al. Teaching interprofessional collaboration among future healthcare professionals. *Front Psychol* 2023; 14:1185730. <https://doi.org/10.3389/fpsyg.2023.1185730>.
- [3] Haleem A, Javaid M, Singh RP, Suman R, Rab S. Blockchain technology applications in healthcare: an overview. *Int J Intellig Netw* 2021;2:130–9. <https://doi.org/10.1016/j.ijin.2021.09.005>.
- [4] Zechariah S, Ansa BE, Johnson SW, Gates AM, Leo GD. Interprofessional education and collaboration in healthcare: an exploratory study of the perspectives of medical students in the United States. *Healthcare* 2019;7(4):117. <https://doi.org/10.3390/healthcare7040117>.
- [5] Houle SKD, Charrois TL. Enhancing skills in patient care documentation and transfer of care: an example of intra-professional collaboration across pharmacy schools through video-conferencing. *Health Profession Edu* 2019;5(3):248–52. <https://doi.org/10.1016/j.hpe.2018.12.001>.
- [6] Zaher S, Otaki F, Zary N, Al Marzouqi A, Radhakrishnan R. Effect of introducing interprofessional education concepts on students of various healthcare disciplines: a pre-post study in the United Arab Emirates. *BMC Med Educ* 2022;22(1):517. <https://doi.org/10.1186/s12909-022-03571-9>.
- [7] Pomare C, Long JC, Churrua K, Ellis LA, Braithwaite J. Interprofessional collaboration in hospitals: a critical, broad-based review of the literature. *J Interprof Care* 2020;34(4):509–19. <https://doi.org/10.1080/13561820.2019.1702515>.
- [8] WHO. Patient safety. Patient safety. 2023. <https://www.who.int/news-room/fact-sheets/detail/patient-safety>.
- [9] Zajac S, Woods A, Tannenbaum S, Salas E, Holladay CL. Overcoming challenges to teamwork in healthcare: a team effectiveness framework and evidence-based guidance. *Front Commun* 2021;6. <https://doi.org/10.3389/fcomm.2021.606445>.
- [10] Buljac-Samardzic M, Doekhie KD, van Wijngaarden JDH. Interventions to improve team effectiveness within health care: a systematic review of the past decade. *Hum Resour Health* 2020;18:2. <https://doi.org/10.1186/s12960-019-0411-3>.
- [11] Spaulding EM, Marvel FA, Jacob E, Rahman A, Hansen BR, Hanyok LA, et al. Interprofessional education and collaboration among healthcare students and professionals: a systematic review and call for action. *J Interprof Care* 2021;35(4): 612–21. <https://doi.org/10.1080/13561820.2019.1697214>.
- [12] Matinho D, Pietrandrea M, Echeverria C, Helderma R, Masters M, Regan D, et al. A systematic review of integrated learning definitions, frameworks, and practices in recent health professions education literature. *Educ Sci* 2022;12(3). <https://doi.org/10.3390/educsci12030165>. Article 3.
- [13] Lunde L, Moen A, Jakobsen RB, Rosvold EO, Brænd AM. Exploring healthcare students' interprofessional teamwork in primary care simulation scenarios: collaboration to create a

- shared treatment plan. *BMC Med Educ* 2021;21(1):416. <https://doi.org/10.1186/s12909-021-02852-z>.
- [14] Ho JM-C, Wong AY-L, Schoeb V, Chan AS-W, Tang PM-K, Wong FK-Y. Interprofessional team-based learning: a qualitative study on the experiences of nursing and physiotherapy students. *Front Public Health* 2022;9:706346. <https://doi.org/10.3389/fpubh.2021.706346>.
- [15] Geese F, Schmitt K-U. Interprofessional collaboration in complex patient care transition: a qualitative multi-perspective analysis. *Healthcare* 2023;11(3). <https://doi.org/10.3390/healthcare11030359>. Article 3.
- [16] Conte H, Wihlborg J, Lindström V. Developing new possibilities for interprofessional learning- students' experience of learning together in the ambulance service. *BMC Med Educ* 2022;22(1):192. <https://doi.org/10.1186/s12909-022-03251-8>.
- [17] Shakhman LM, Al Omari O, Arulappan J, Wynaden D. Interprofessional education and collaboration: strategies for implementation. *Oman Med J* 2020;35(4):e160. <https://doi.org/10.5001/omj.2020.83>.
- [18] Au S. The outcomes of interprofessional education in prelicensure nursing education: an integrative review. *Nurse Educ Today* 2023;121:105703. <https://doi.org/10.1016/j.nedt.2022.105703>.
- [19] Vuurberg G, Vos JAM, Christoph LH, de Vos R. The effectiveness of interprofessional classroom-based education in medical curricula: a systematic review. *J Interprofession Edu Pract* 2019;15:157–67. <https://doi.org/10.1016/j.xjep.2019.01.007>.
- [20] van Gessel E, Picchiotto P, Doureradjam R, Nendaz M, Mèche P. Interprofessional training: start with the youngest! A program for undergraduate healthcare students in Geneva, Switzerland. *Med Teach* 2018;40(6):595–9. <https://doi.org/10.1080/0142159X.2018.1445207>.
- [21] D'Costa MP, Jahan F, Al Shidi A. Health professions students' attitude, perception, and readiness toward interprofessional education and practice in Oman. *J Taibah Univ Med Sci* 2021;17(2):248–55. <https://doi.org/10.1016/j.jtumed.2021.10.004>.
- [22] Aldriwesh MG, Alyousif SM, Alharbi NS. Undergraduate-level teaching and learning approaches for interprofessional education in the health professions: a systematic review. *BMC Med Educ* 2022;22(1):13. <https://doi.org/10.1186/s12909-021-03073-0>.
- [23] Reid R, Bruce D, Allstaff K, McLernon D. Validating the Readiness for Interprofessional Learning Scale (RIPLS) in the postgraduate context: are health care professionals ready for IPL? *Med Educ* 2006;40(5):415–22. <https://doi.org/10.1111/j.1365-2929.2006.02442.x>.
- [24] Thistlethwaite JE, Forman D, Matthews LR, Rogers GD, Steketee C, Yassine T. Competencies and frameworks in interprofessional education: a comparative analysis. *Acad Med* 2014;89(6):869. <https://doi.org/10.1097/ACM.0000000000000249>.
- [25] Ahmady S, Mirmoghtadaie Z, Rasouli D. Challenges to the implementation of interprofessional education in health profession education in Iran. *Adv Med Educ Pract* 2020;11:227–36. <https://doi.org/10.2147/AMEP.S236645>.
- [26] Bridges DR, Davidson RA, Odegard PS, Maki IV, Tomkowiak J. Interprofessional collaboration: three best practice models of interprofessional education. *Med Educ Online* 2011;16. <https://doi.org/10.3402/meo.v16i0.6035>.
- [27] Sreedharan JK, AlRabeeh SM, Subbarayalu AV, AlZahrani EM, AlQahtani JS, AlAhmari MD, et al. Quality improvement in allied healthcare: key recommendations for educational institutions. *Inform Med Unlocked* 2023;43:101412. <https://doi.org/10.1016/j.imu.2023.101412>.
- [28] Yasin H, Palaian S, Shankar PR, Nallamilli S. Readiness for interprofessional education among health profession students in a university in the United Arab Emirates. *J Multidiscip Healthc* 2023;16:1141–9. <https://doi.org/10.2147/JMDH.S395320>.
- [29] Alzamil H, Meo SA. Medical students' readiness and perceptions about Interprofessional Education: a cross sectional study. *Pakistan J Med Sci* 2020;36(4):693–8. <https://doi.org/10.12669/pjms.36.4.2214>.
- [30] Jha N, Palaian S, Shankar PR, Poudyal S. Readiness for interprofessional learning among first year medical and dental students in Nepal. *Adv Med Educ Pract* 2022;13:495–505. <https://doi.org/10.2147/AMEP.S354210>.
- [31] Egilsdottir HÖ, Heyn LG, Falk RS, Brembo EA, Byermoen KR, Moen A, et al. Factors associated with changes in students' self-reported nursing competence after clinical rotations: a quantitative cohort study. *BMC Med Educ* 2023;23:107. <https://doi.org/10.1186/s12909-023-04078-7>.
- [32] Berger-Estilita J, Chiang H, Stricker D, Fuchs A, Greif R, McAleer S. Attitudes of medical students towards interprofessional education: a mixed-methods study. *PLoS One* 2020;15(10):e0240835. <https://doi.org/10.1371/journal.pone.0240835>.
- [33] Zajac S, Woods A, Tannenbaum S, Salas E, Holladay CL. Overcoming challenges to teamwork in healthcare: a team effectiveness framework and evidence-based guidance. *Front Commun* 2021;6. <https://www.frontiersin.org/articles/10.3389/fcomm.2021.606445>.
- [34] Bok C, Ng CH, Koh JWH, Ong ZH, Ghazali HZB, Tan LHE, et al. Interprofessional communication (IPC) for medical students: a scoping review. *BMC Med Educ* 2020;20(1):372. <https://doi.org/10.1186/s12909-020-02296-x>.
- [35] Bogossian F, New K, George K, Barr N, Dodd N, Hamilton AL, et al. The implementation of interprofessional education: a scoping review. *Adv Health Sci Educ* 2023;28(1):243–77. <https://doi.org/10.1007/s10459-022-10128-4>.
- [36] Marcussen M, Nørgaard B, Borgnakke K, Arnfred S. Improved patient-reported outcomes after interprofessional training in mental health: a nonrandomized intervention study. *BMC Psychiatr* 2020;20. <https://doi.org/10.1186/s12888-020-02616-x>.