

A mixed-method study to determine the readiness of medical and health sciences students for interprofessional education in a Gulf university

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Research article

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Abstract

Background High-quality patient care is a complex phenomenon that requires collaboration among healthcare professionals. Research has shown that Interprofessional Education (IPE) carries promise to improve collaborative work and patient care. So far, collaboration among various medical disciplines remains a challenge. Several survey-based studies have reported attitudes about IPE, but very few mixed methods studies, particularly in Arabic-speaking countries, have been conducted to determine medical students' perspectives and readiness.

Methods A two-staged sequential mixed methods study was conducted among medical and health sciences students of University of [---],[country]. The perspectives of students toward IPE and collaborative practice were first gathered by administering a validated instrument; namely Readiness for Interprofessional Learning Scale (RIPLS). This was followed by detailed focused group discussions. Quantitative and qualitative data analysis were performed using SPSS and NVivo, respectively.

Results This study cohort included 282 students. All respondents showed readiness to adopt IPE as all statement of RIPLS survey scored high means. Highest mean of 5 was achieved for IPE elements of identifying and resolving patients' problems and small group work. Three main themes were generated; prior knowledge, need for IPE framework and its implementation. Information workload, lack of clarity and less focused teaching pedagogies of IPE were considered as perceived barriers.

Conclusion This study demonstrates substantial agreement of medical and health sciences students towards readiness and perceived effectiveness of IPE. Educators are urged to embed new IPE program into the existing curricular framework that can potentially enhance collaborative learning and improve quality of patient care.

Background

Historically, medical and allied health education have been delivered in isolated educational environments. This uni-professional education limits exposure of collaborative learning that is an essential element of Interprofessional Education (IPE) [1]. The IPE accreditation standards in the USA has urged all the US accrediting bodies to jointly collaborate for creating a common IPE accreditation standard [2]. In pursuit of further enhancement of IPE implementation in the medical field, the committee of Medical Education or "*Gesellschaft für medizinische Ausbildung (GMA)*" including experts from Germany, Austria and Switzerland has emphasized the need to systematically address and integrate IPE among other health professions [3]. Though in the last two decades, IPE has gathered momentum internationally in the USA, Australia, and the United Kingdom [4], IPE is still in its infancy in the Middle East and North Africa (MENA) region with little contribution on the global landscape [5] [6] [7] [8]. Recently, Courtenay et al., from the UK perspective, have proposed a protocol that can be designed to provide competencies for the national consensus on antimicrobial stewardship for undergraduate IPE [9]. Similarly, the Jefferson Teamwork Observation Guide® (JTOG®) was developed as a multi-source tool to

formatively assess IPE and collaborative practice competencies [10]. Educating the learners about salient characteristics of high functioning teams prompted the development of the JTOG®. In Japan, an interesting study investigated the impact of Japanese and Scottish experience of care of diabetes mellitus [11]. The investigators have found that the international standards of IPE set forth for this study were able to raise awareness of diabetes mellitus in terms of patient-centred focused care. In summary, globally there is a trend to inculcate a culture of multi-disciplinary collaboration and team-work.

A modified Delphi process will be used in which a panel of Experts, comprising members from across the United Kingdom, with expertise in prescribing and medicines management with regard to the education and practice of healthcare professionals, and antimicrobial prescribing and stewardship, will be invited to take part in two survey rounds.

IPE entails certain opportunities where two or more professionals learn with, from and about each other [12]. This integrated approach is in sharp contrast to multi-professional education that encourages health professionals to learn alongside each other in a parallel manner [13]. The outright benefits of IPE include promotion of interdisciplinary collaborative work [14], overcoming the obstacles and misconceptions among healthcare groups and strengthening professional competencies [15]. Inter-professional practice engaging healthcare professionals from multiple stakeholders such as patients, families and communities improves quality of patient care [16]. Unfortunately, literature shows conflicting narratives about a unified teaching framework that can be conveniently applied in achieving desired goals of IPE philosophy [17]. Some educators have suggested the delivery of IPE course during pre-qualification phase [18], while others have argued that IPE would be more effective if taught during both pre- and post-qualification phases [19].

The inter-woven and complex nature of instructional strategies in various healthcare disciplines hinders a smooth incorporation of IPE modules into the existing curricula [20]. Crowded timetables, logistical obligations requiring simultaneous movement of large numbers of students for undertaking similar classes, and lack of resources are some of the main challenges to IPE [21]. Freeth et al. have introduced a 5-point framework of IPE that is based on real-time scenarios, exchange of ideas, simulation, observation, and practice [22]. While such insights seem promising, before designing any program, educators must capture opinions and perceptions of key stakeholders such as students, faculty, administrators and community representatives. Analysis of needs and readiness for IPE curriculum is the first step in introducing a sustainable and relevant IPE program [23]. Based on a dearth of research in the MENA region about readiness and perspectives of medical students about IPE, this mixed-methods study was conducted. Consequently, educators would be able to effectively solicit and analyze such data for improving learning climate and in drawing students' motivation toward IPE.

Materials And Methods

Research Design

We chose a mixed method design and conducted the study in two phases: a cross-sectional questionnaire-based phase, followed by a deeper, focus group discussion-based phase. Students from the four colleges (Medicine, Dental Medicine, Pharmacy, and health Sciences) participated in both phases.

Study settings

The College of Medicine (CoM) at University of [—] runs a 6-year problem-based integrated MBBS program including a foundation year. This is a spiral curriculum that boasts on early clinical exposure and supports a student-led learning philosophy. A comprehensive assessment system utilizes a host of evaluation tools such as multiple choice questions (MCQs), Objective Structured Clinical Examination (OSCE), Direct Observation of Clinical Examination Encounter (DOCEE), Objective Structured Practical Examination (OSPE), clinical evaluation and e-portfolio. At the College of Dental Medicine, University of [—], a theme-based curriculum is employed that aims at building new knowledge and skills based on experience in a previous stream through a horizontal and vertical integration of the teaching-learning activities. This approach allows early understanding of pathophysiological principles for direct relevance of the practice of dentistry. The curriculum emphasizes the appropriate needs of dental medicine in the community with special interest in rural environment. The College of Pharmacy (CoP) at University of [—] strives to be a learning college of excellence that responds to market needs and prepares competent graduates who possess the scientific and technological competencies that are needed for their careers. The Bachelor of Pharmacy curriculum is a 5-year that embraces a diverse teaching approach focusing mainly on active learning, problem-based learning, and evidence-based learning, in addition to traditional teaching strategies. The CoP uses up-to-date laboratories, robust use of technology, and stresses on learning as a life-long activity. The College of Health Sciences (CHS) at University of [—] offers seven undergraduate bachelor programs (Medical Laboratory Sciences, Medical Diagnostic Imaging, Nursing, Health Services Administration, Physiotherapy, Environmental Health Science and Clinical Nutrition and Dietetics). The programs combine theory and practice (laboratory and clinical) to prepare health sciences graduates to work in a wide variety of settings, including hospitals, clinics, schools and communities. Different methods of teaching are implemented in the CHS programs ranging from traditional lecturing to problem-based learning, team-based learning and small group discussions.

Phase 1: Quantitative study

During October 2017, senior students from the four colleges of Medicine, Dental Medicine, Pharmacy and Health Sciences in the University of [—] were targeted to participate in this study. At the end of a senior course lecture, attendees were informed about the purpose of this quantitative study and their verbal consent was sought. Students who agreed to participate were asked to fill out an anonymous paper-based questionnaire. The questionnaire was divided into three parts. The first part inquired about some personal details including gender, age, college of enrollment and previous experience of IPE. The second part of the study questionnaire included a validated scale, Readiness for Interprofessional Learning Scale (RIPLS) [24]. The scale contains 19 close-ended statements about the readiness of medical students for interprofessional education and practice. The participants were instructed to respond on a 5-point-Likert

scale in numerical values: 5 (strongly agree), 4 (agree), 3 (neutral), 2 (disagree), and 1 (strongly disagree) for all statements. The responses to RIPLS statements are portrayed in Fig. 1. In the third part of the questionnaire, students were asked to specify whether they are “with” or “against” IPE and whether they would be interested to participate in a focus group discussion to share their opinion about Inter-professional education. Students who agreed were asked to state their names and contact details for further communication. Research was conducted after obtaining ethical approval from Research Ethics Committee.

Statistical analysis

Statistical Package for the Social Sciences (SPSS) version 20.0 was used for statistical analysis. Descriptive analysis was done by frequency distribution and pictorial representation was shown by clustered bar charts. As all statements were arranged in ordinal scale and inferential statistics were performed by non-parametric tests. The non-parametric Chi-square test was applied for the analysis of 19 statements (variables) that were arranged in categorical form. The Chi-square test was applied to explore the differences between observed frequencies and expected frequencies within each statement. A p value less than or equal to 0.05 was considered significant.

Phase 2: Qualitative study

During September 2018, students who, in the quantitative study, expressed an interest to participate in a focus group discussion were identified, contacted and invited to take part in the qualitative study. Students were briefed about IPE and the nature of the study both verbally and using a participant information sheet. In return, they expressed two different attitudes: being (1) with IPE or (2) against IPE.

The perceived behaviors were context based that prompted the researchers to create the focus groups for choosing appropriate group homogeneity. Exogenous homogeneity reflects shared group dynamics such as demographics or profession, while issue homogeneity denotes a shared response towards a particular issue. Consequently, we adopted issue homogeneity; grouping multiprofessional students with similar attitudes together that would encourage and facilitate self-disclosure. We prepared four focus groups, two containing students who were with IPE, and two groups with students against IPE. Consent was obtained verbally during recruitment and upon participation in the focus group discussions.

A set of unbiased and open-ended questions and probes (attached) were devised to elicit the following information from participants: experience with IPE; possible structure and implementation of IPE; and perceived advantages and disadvantages of IPE. Four faculty members with experience in moderating focus groups led the discussions in separate private classrooms. The moderators recorded discussions, and the confidential recordings were handed over to the research team.

Results

Empirical results

Of 300 invitees, we received 282 complete responses ($N = 282$, response rate of 94%). There were 237 (84.04%) female and 45 (15.96%) male students as shown in Table 1. The data showed that majority 251 (89.01%) of the students were from age group 20–24 years, while 16 (5.67%) students were less than 20 years and only 15 (5.32%) students were older than 24 years. As many as 93 (32.98%) students were from health sciences, 63 (22.34%) from Dental Medicine, 74 (26.24%) from pharmacy, and 52 (18.44%) from medicine. Regarding experience of IPE, majority 249 (88.30%) of the students have no prior experience of IPE, while 31 (10.99%) students had prior experience of IPE and only 2 (0.71%) students were unaware about IPE.

Table 1
Profile of the respondents in this study (N = 282)

Demographic	Frequency (percentage)
Gender (n = 282)	
Male	45 (15.96%)
Female	237 (84.04%)
Age (n = 282)	
< 20	16 (5.67%)
20–24	251 (89.01%)
> 24	15 (5.32%)
College (n = 282)	
Health Sciences	93 (32.98%)
Dental Medicine	63 (22.34%)
Pharmacy	74 (26.24%)
Medicine	52 (18.44%)
Previous Experience of IPE (n = 282)	
Yes	31 (10.99%)
No	249 (88.30%)
Don't know	2 (0.71%)

Figure 1 shows clustered bar chart of observed frequencies in responses to statements regarding the readiness of medical students for interprofessional education and practice. For S7 *'for small-group learning to work, students need to trust and respect each other'* 665 (62.32%) students strongly agreed that respect and trust are most effective tools for small-group learning to work (Fig. 1). One hundred and sixty six (58.86%) students agreed with S15 *'shared learning will help to clarify the nature of patient*

problems'. For S18, *'I am not sure what my professional role will be / is'* 94 (33.33%) students rated it as neutral.

The results of the Chi-square test showed that the participants' responses to all statements were statistically significant ($\chi^2 (4, N = 282) = 143.9 \sim 1440, p < 0.0001$) as shown in Table 2. This infers that observed frequencies of student's responses were statistically significant from expected frequencies within each category (Table 2).

Table 2

Chi-square test of independence for students' responses to Readiness for Interprofessional Learning Scale (RIPLS) in this study (N = 282)

Statements	Median	Chi-Square	P-value
S1. Learning with other students will help me become a more effective member of a healthcare team	4.00	311.37 ^a	0.00*
S2. Patients would ultimately benefit if healthcare students worked together to solve patient problems.	5.00	238.54 ^b	0.00*
S3. Shared learning with other healthcare students will increase my ability to understand clinical problems.	5.00	224.24 ^b	0.00*
S4. Learning between health and medical students before qualification would improve working relationships after qualification / collaborative practice	4.00	200.64 ^b	0.00*
S5. Communication skills should be learned with other healthcare students.	4.00	212.04 ^b	0.00*
S6. Shared learning will help me to think positively about other professionals	4.00	168.21 ^b	0.00*
S7. For small-group learning to work, students need to trust and respect each other.	5.00	310.28 ^b	0.00*
S8. Team-working skills are essential for all healthcare students to learn.	4.00	197.01 ^b	0.00*
S9. Shared learning will help me to understand my own professional limitations	4.00	261.97 ^a	0.00*
S10. I do not want to waste my time learning with other healthcare students.	2.00	185.66 ^a	0.00*
S11. It is not necessary for undergraduate healthcare students to learn together.	2.00	184.49 ^a	0.00*
S12. Clinical problem-solving skills can only be learned with students from my own department.	2.00	125.31 ^a	0.00*
S13. Shared learning with other healthcare students will help me to communicate better with patients and other professionals.	4.00	270.48 ^a	0.00*
S14. I would welcome the opportunity to work on small-group projects with other healthcare students.	4.00	259.99 ^a	0.00*
S15. Shared learning will help to clarify the nature of patient problems.	4.00	212.27 ^b	0.00*
S16. Shared learning before qualification will help me become a better team worker	4.00	174.94 ^b	0.00*
S17. I would welcome the opportunity to share some generic lectures, tutorials or workshops with other health and medical students	4.00	239.77 ^a	0.00*

Statements	Median	Chi-Square	<i>P</i> -value
S18. I am not sure what my professional role will be / is	3.00	105.19 ^a	0.00*
S19. I have to acquire much more knowledge and skill than other students in my own college	4.00	125.06 ^a	0.00*
Note: The minimum expected cell frequency: a = 56.4; and b = 70.5. * represents <i>p</i> value < 0.01.			

Qualitative results

Three broad domains were identified; prior knowledge of IPE, framework for IPE and implementation of IPE.

Experiences

Positive

1. Building friendships

During first year of foundation of sciences we were studying physics and chemistry and biology with other specialists, such as MDI, MLS, and nutrition, we were studying together, it was so fun we didn't differentiate between others. Another statement we know more about how our friends are, and how we built friendships?

2. Patients' needs and proactive

Comprehensive and overlapping treatment plans allow us to not only look at patients as one thing but allows us to look at all their needs and prevent future problems from happening, so if we do this with more peers from other majors, it will actually cause us to look and actually help the patient in more than just his chief complaint. IPE will allow us to look at everything and prevent future problems from happening.

3. Learning

Ph1F: Basically, we share different experiences and different ways of thinking, for example, for me in Pharmacy, we think about medicines, just the drugs used. In Nursing, they think about the patients more regardless of their medical problems. In Medicine, they think about diseases so everyone thinks in different ways so the way we act or react is different, so we are learning.

I believe it should be mostly problem based learning so that when get a piece of information, we do not only look at it from one perspective, but we have Pharmacy, Dentistry and so on. There they have different points of views that we may not consider and won't come to our mind at all.

Negative

1. Multiple things at once

Because we are focusing on multiple things at once but it wastes a lot of time while framing a holistic view, for example, for taking pharmacology of stroke or cardiovascular, if we are taking that at the same time, who would need it more.

2. Lose depth

You lose depth when you are studying although you would be gaining depth in other people's majors.

Discussion

This study illustrates a strong agreement of the participants about readiness for IPE as well as positive perspectives to implement this insightful educational model into the medical and health sciences curricula. The findings of our research endorse previous reports that validate the readiness to accept IPE program [25] [26]. The presence of positive attitude towards IPE signifies a clear understanding and mandates the incorporation of IPE initiatives within institutional frameworks. Kapur et al., have deduced that collaborative discussion and sharing of information offer the learners a unique chance for reflection and empower them to take crucial decisions [27]. The educational climate including IPE enlightens learning experience of the students that encourages them to respect and recognize roles and responsibilities amongst team members [28]. This approach certainly enables teamwork and collaboration with positive effect on the quality of patient care.

This study demonstrates a maximum agreement by the respondents for statements 2, 3, and 7 as shown by medians of 5 (Table 1). Statements 2 and 3 illustrate significance of IPE in understanding and solving patients' problems. This reaffirms significance of IPE and practice in that strives to manage a host of medical ailments when professionals from various disciplines join their hands together in medical field. By practicing multi-disciplinary teamwork, not only responsibilities are shared, but also the changes of medical errors are minimized [29]. Bartaw et al., have argued that a standardized approach by a specialized and multidisciplinary team can substantially reduce the incidence of complications and ends up with better patient outcomes [30]. Our study cohort has also shown a maximum agreement with the positive influence of IPE in small group learning that helps enhance trust and respect among the learners. Small group learning has been shown to enhance the acquisition of knowledge and professional skills of the students that leads to active life-long learning [31]. Interestingly, Laal and Ghodsi have introduced four major benefits of small group learning; social (inspirational environment for practicing cooperation), psychological (reduces stress and increases learner's self-esteem), academic (improves academic performance and critical thinking skills), and assessment (applying diverse assessment techniques for

holistic assessment) [32]. However, the authors have cautioned that such milestones need expertise and a positive attitude towards implementing IPE program in medical curricula.

Current study has identified three broad educational domains of IPE; prior knowledge, framework and implementation of IPE. In their review article, Hall and Zierler have provided a framework for developing and implementing IPE program [33]. To start with, the authors have suggested to secure a commitment by institutional leadership, followed by drafting context-based learning objectives. Then a well-structured faculty development program should be introduced. The authors have concluded that outcomes should be carefully measured during the process of implementing IPE and educators should be able to establish robust links between theory and practice. Employing diverse teaching pedagogies such as lecturing, small group work, immersion participation in IPE, embedding new IPE projects, and peer-assisted learning. Unfortunately, as of today, a number of practicing health professionals have little or no exposure to IPE exercises during their training. Consequently, faculty development program as well as work-place based education using technology are vital training tools that can facilitate successful embedding of new IPE module for effective teaching and learning [34] [35].

Key themes that emerged from our study included benefits of IPE such as better communication, elimination of hierarchy, inspiration from others and awareness of patients' needs (Fig. 3). However, lack of role clarity, information overload and less focused teaching strategies have been shown to be disadvantageous in IPE philosophy. In terms of positive perspectives of IPE, our study cohort has agreed on building friendships, patients' needs and proactive and active learning. These findings reinforce the perception that IPE strengthens professional ties, helps understand and resolve patient's problems and facilitates active learning [36]. In contrast, our cohort has also signaled some negative aspects of IPE; multiple things at once and losing depth. Competing interests from other professions, inclination of learners to learn more from their major topics and multi-tasking have been shown to undermine true essence of IPE practice [37] [38]. From educators' perspectives, embedding a new IPE into the existing curricula and increasing faculty workload also challenge a smooth induction of IPE program. Provision of adequate resources, rescheduling faculty time, institutional support and horizontal and vertical induction of IPE modules into the curriculum can overcome these shortcomings [39].

Study limitations

This study provides a comprehensive account of students' perceptions of IPE with a reasonably high response rate to RIPLS survey as well as focus group discussion. This provides a substantial insight into the opinions and viewpoints of the students. Nevertheless, since the findings of this study are self-reported perceptions and behaviors, the results cannot be interpreted in a context based situation. Furthermore, since the majority of the recruited population were female students, external validity of this research might have been compromised. Lastly, study on limited medical disciplines may limit validation of results of this study.

Conclusion

This study provides evidence about the readiness of medical students for IPE in a gulf university. A great majority of the students showed positive attitude and their readiness to adopt IPE. The students agreed about the effective role of IPE in collaborative work, in identifying and resolving patients' problems and in minimizing medical errors. However, the students also pointed out some challenges; information overload, lack of clarity and unnecessary competition. Carefully planned faculty development program, engaging institutional leadership, vertical and horizontal integration of new IPE course and institutional support can potentially facilitate its seamless integration.

List Of Abbreviations

CHP: College of Health Sciences

CoM: College of Medicine

CoP: College of Pharmacy

DOCEE: Direct Observation of Clinical Examination Encounter

GMA: Gesellschaft für medizinische Ausbildung

IPE: Interprofessional Education

JTOG®: Jefferson Teamwork Observation Guide®

MCQs: multiple choice questions

MDI: Medical Diagnostic Imaging

MENA: Middle East and North Africa

MLS: Medical Laboratory Sciences

OSCE: Objective Structured Clinical Examination

OSPE: Objective Structured Practical Examination

RIPLS: Readiness for Interprofessional Learning Scale

SPSS: Statistical Package for the Social Sciences

Declarations

Ethics approval and consent to participate

The Research Ethics Committee (REC) pertaining to the Office of Vice Chancellor for Research & Graduate Studies, University of Sharjah has approved conducting this study with the reference number REC-18-09-18-01.

Consent for publication

All subjects involved in both methods have provided consent for participation and publication, whether written for the questionnaires or verbal for the focus groups.

Availability of data and materials

Not applicable.

Competing interests

Not applicable.

Funding

Not applicable.

Authors' contributions

NS, AH, SYG, MSA, HA and YR made substantial contributions to the study's conception and design. YR, HA, SAK and HH helped invite and recruit participants. SYG, NS, YR and AH contributed to data acquisition, analysis and interpretation. All authors contributed to drafting, editing and revising the manuscript. All authors read and approved the final manuscript.

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References

1. Meleis AI. Interprofessional education: a summary of reports and barriers to recommendations. *J Nurs Scholarsh.* 2016;48(1):106–12.
2. Zorek J, Raehl C. Interprofessional education accreditation standards in the USA: a comparative analysis. *J Interprof Care.* 2013;27(2):123–30.
3. Walkenhorst U, Mahler C, Aistleithner R, Hahn EG, Kaap-Fröhlich S, Karstens S, et al. Position statement GMA Committee–“Interprofessional Education for the Health Care Professions”. *GMS Zeitschrift für medizinische Ausbildung.* 2015;32(2).

4. Reeves S, Fletcher S, Barr H, Birch I, Boet S, Davies N, et al. A BEME systematic review of the effects of interprofessional education: BEME Guide No. 39. *Med Teach*. 2016;38(7):656–68.
5. Al-Qahtani MF, Guraya SY. Measuring the attitudes of healthcare faculty members towards interprofessional education in KSA. *Journal of Taibah University Medical Sciences*. 2016;11(6):586–93.
6. Khan TM, Emeka PM, Aljadhey H, Haseeb A. Study investigating pharmacy students' interprofessional perceptions toward the pharmacy profession in Saudi Arabia. *Currents in Pharmacy Teaching Learning*. 2015;7(1):62–9.
7. Wilbur K, Kelly I. Interprofessional impressions among nursing and pharmacy students: a qualitative study to inform interprofessional education initiatives. *BMC medical education*. 2015;15(1):53.
8. Zeeni N, Zeenny R, Hasbini-Danawi T, Asmar N, Bassil M, Nasser S, et al. Student perceptions towards interprofessional education: Findings from a longitudinal study based in a Middle Eastern university. *J Interprof Care*. 2016;30(2):165–74.
9. Courtenay M, Castro-Sánchez E, Deslandes R, Hodson K, Lim R, Morris G, et al. Defining antimicrobial stewardship competencies for undergraduate health professional education in the United Kingdom: A study protocol. *J Interprof Care*. 2018;32(5):638–40.
10. Collins L, Sicks S, Umland E, Phillips JD. A tool for assessing interprofessional collaborative practice: evolution of the Jefferson Teamwork Observation Guide (JTOG)®. *Journal of interprofessional care*. 2019:1–4.
11. Suematsu M, Joseph S, Abe K, Yasui H, Takahashi N, Okazaki K, et al. A Scottish and Japanese experience of patient-centred diabetic care: descriptive study of interprofessional education on live webinar. *Nagoya J Med Sci*. 2018;80(4):465.
12. Zwarenstein M, Atkins J, Barr H, Hammick M, Koppel I, Reeves S. A systematic review of interprofessional education. *J Interprof Care*. 1999;13(4):417–24.
13. Barr H, Ross F. Mainstreaming interprofessional education in the United Kingdom: A position paper. *J Interprof Care*. 2006;20(2):96–104.
14. Cusack T, O'Donoghue G. The introduction of an interprofessional education module: students' perceptions. *Qual Prim Care*. 2012;20(3):231–8.
15. Reeves S, Goldman J, Oandasan I. Key factors in planning and implementing interprofessional education in health care settings. *J Allied Health*. 2007;36(4):231–5.
16. Zanotti R, Sartor G, Canova C. Effectiveness of interprofessional education by on-field training for medical students, with a pre-post design. *BMC medical education*. 2015;15(1):1.
17. Horsburgh M, Lamdin R, Williamson E. Multiprofessional learning: the attitudes of medical, nursing and pharmacy students to shared learning. *Medical education*. 2001;35(9):876–83.
18. Freeth D, Reeves S. Learning to work together: using the presage, process, product (3P) model to highlight decisions and possibilities. *J Interprof Care*. 2004;18(1):43–56.

19. Rudland JR, Mires GJ. Characteristics of doctors and nurses as perceived by students entering medical school: implications for shared teaching. *Medical education*. 2005;39(5):448–55.
20. Ward W, Zagoloff A, Rieck C, Robiner W. Interprofessional education: Opportunities and challenges for psychology. *J Clin Psychol Med Settings*. 2018;25(3):250–66.
21. Thistlethwaite JE. Interprofessional education: implications and development for medical education. *Educación Médica*. 2015;16(1):68–73.
22. Freeth D, Reeves S, Koppel I, Hammick M, Barr H. *Evaluating interprofessional education: A self-help guide*. 2005.
23. Sick B, Radosevich DM, Pittenger AL, Brandt B. Development and validation of a tool to assess the readiness of a clinical teaching site for interprofessional education (InSITE). *Journal of interprofessional care*. 2019:1–11.
24. Guraya SY, Barr H. The effectiveness of interprofessional education in healthcare: A systematic review and meta-analysis. *Kaohsiung J Med Sci*. 2018;34(3):160–5.
25. Thistlethwaite J. Interprofessional education: a review of context, learning and the research agenda. *Medical education*. 2012;46(1):58–70.
26. Vafadar Z, Vanaki Z, Ebadi A. The readiness of postgraduate health sciences students for interprofessional education in iran. *Global journal of health science*. 2015;7(4):190.
27. Kapur K, McAleer S, Persson F, Bjerre-Christensen U. Improving the effectiveness of short-term courses for multidisciplinary health care professionals. *Practical Diabetes*. 2015;32(5):180–5.
28. Al-Eisa E, Alderaa A, AlSayyad A, AlHosawi F, AlAmoudi S, AlTaib S, et al. The perceptions and readiness toward interprofessional education among female undergraduate health-care students at King Saud University. *Journal of physical therapy science*. 2016;28(4):1142–6.
29. Sunguya BF, Hinthong W, Jimba M, Yasuoka J. Interprofessional education for whom?—challenges and lessons learned from its implementation in developed countries and their application to developing countries: a systematic review. *PloS one*. 2014;9(5):e96724.
30. Bartow C, Collins N, Kopp E, Guillamondegui O. Benefits of a Multidisciplinary Tracheostomy Team: Acute Care Experience. *Perspectives of the ASHA Special Interest Groups*. 2018;3(13):89–100.
31. Guraya SY, Almaramhy HH. Small group teaching improves students' acquisition of knowledge and skills. *Saudi Med J*. 2012;33(12):1304–9.
32. Laal M, Ghodsi SM. Benefits of collaborative learning. *Procedia-social behavioral sciences*. 2012;31:486–90.
33. Hall LW, Zierler BK. Interprofessional education and practice guide no. 1: developing faculty to effectively facilitate interprofessional education. *J Interprof Care*. 2015;29(1):3–7.
34. Guraya SY, Forgione A, Sampogna G, Pugliese R. The mapping of preferred resources for surgical education: Perceptions of surgical trainees at the Advanced International Minimally Invasive Surgery Academy (AIMS), Milan, Italy. *Journal of Taibah University Medical Sciences*. 2015;10(4):396–404.

35. Forgione A, Kislov V, Guraya SY, Kasakevich E, Pugliese R. Safe introduction of laparoscopic colorectal surgery even in remote areas of the world: the value of a comprehensive telementoring training program. *J Laparoendosc Adv Surg Tech.* 2015;25(1):37–42.
36. Al Achkar M, Hanauer M, Colavecchia C, Seehusen DA. Interprofessional education in graduate medical education: survey study of residency program directors. *BMC medical education.* 2018;18(1):11.
37. Hoffman SJ, Rosenfield D, Gilbert JH, Oandasan IF. Student leadership in interprofessional education: benefits, challenges and implications for educators, researchers and policymakers. *Medical education.* 2008;42(7):654–61.
38. Carlisle C, Cooper H, Watkins C. “Do none of you talk to each other?”: the challenges facing the implementation of interprofessional education. *Med Teach.* 2004;26(6):545–52.
39. Wilson L, McNeill B, Gillon GT. A comparison of inter-professional education programs in preparing prospective teachers and speech and language pathologists for collaborative language–literacy instruction. *Read Writ.* 2016;29(6):1179–201.

Figures

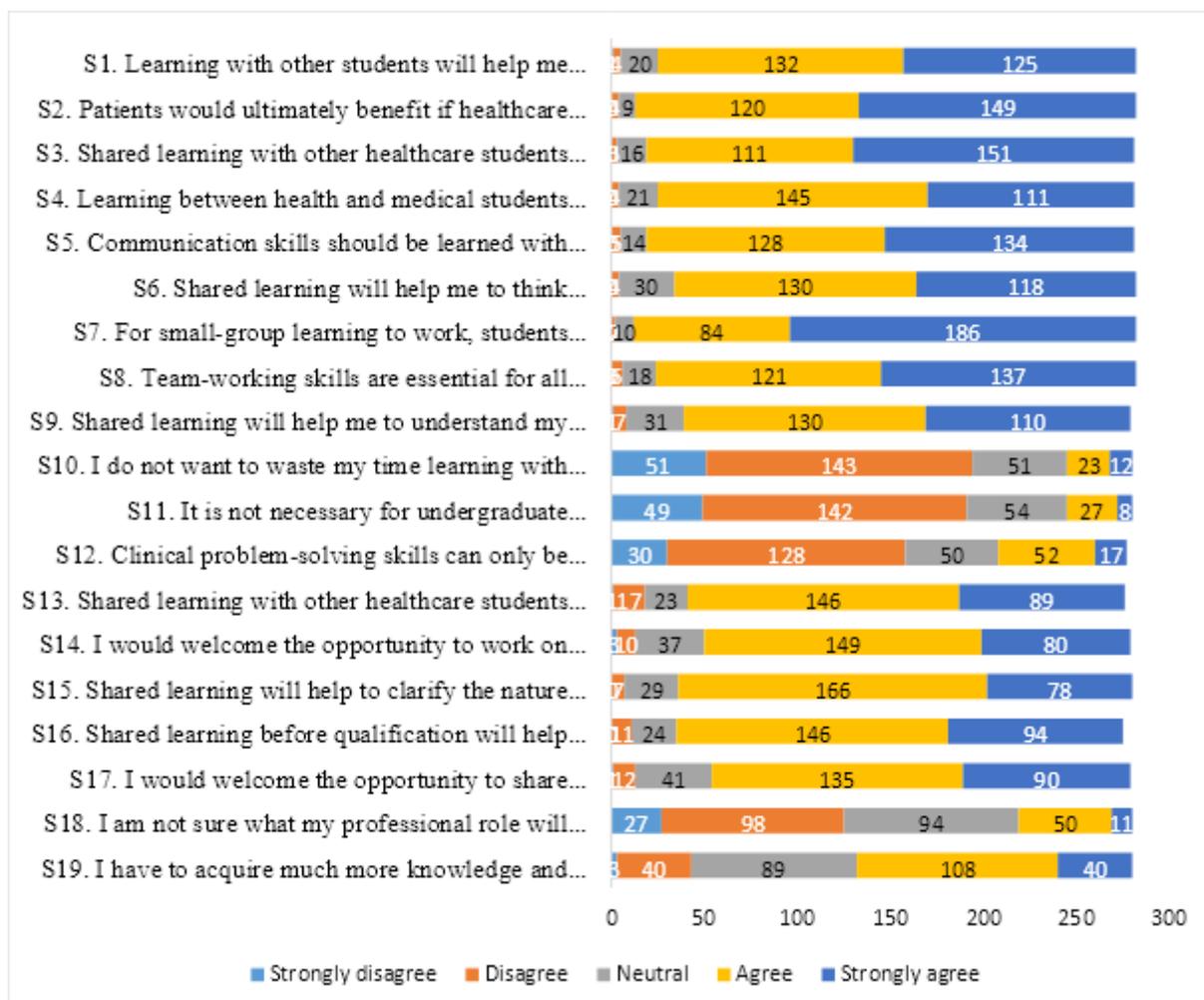


Figure 1

Empirical results

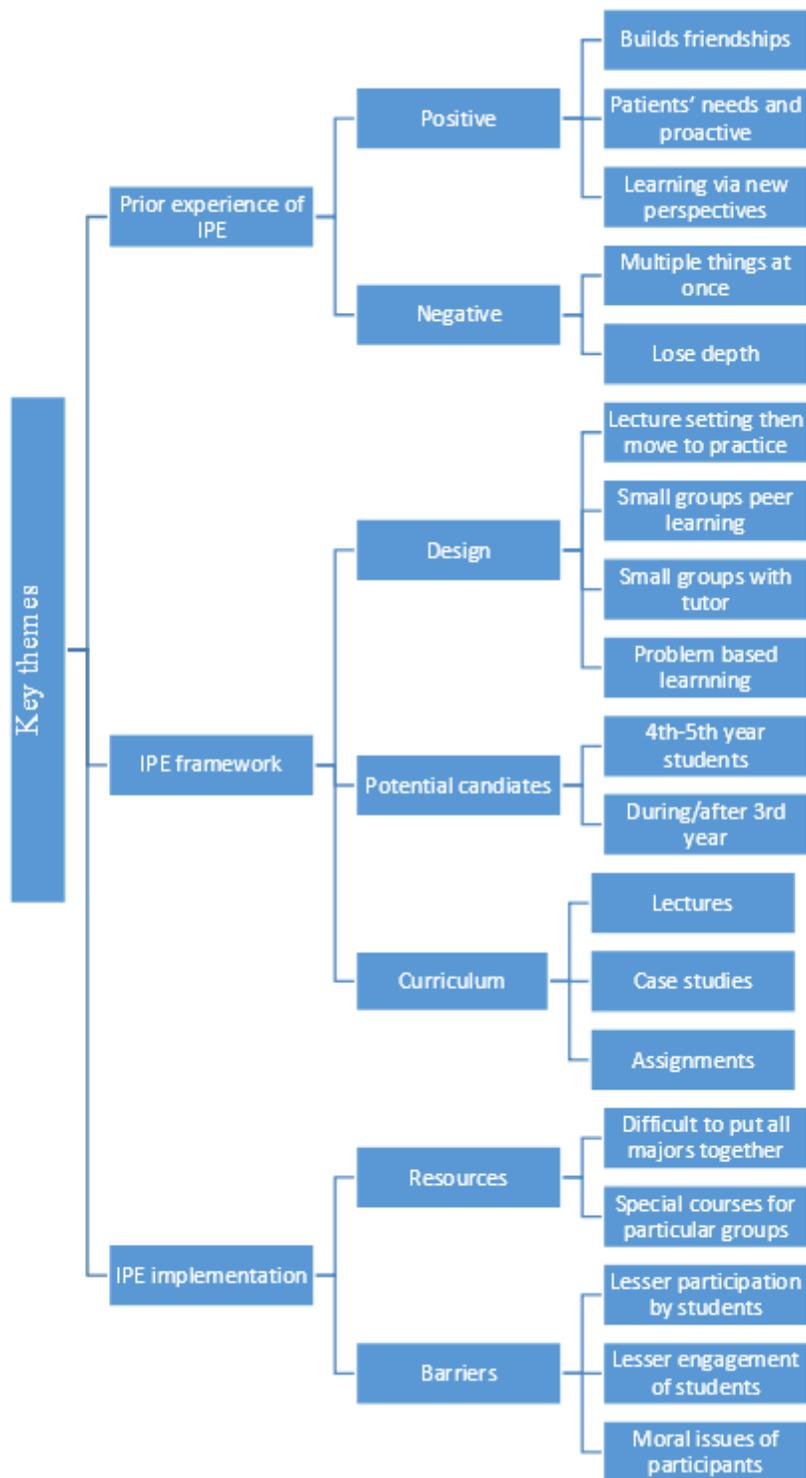


Figure 2

Qualitative results

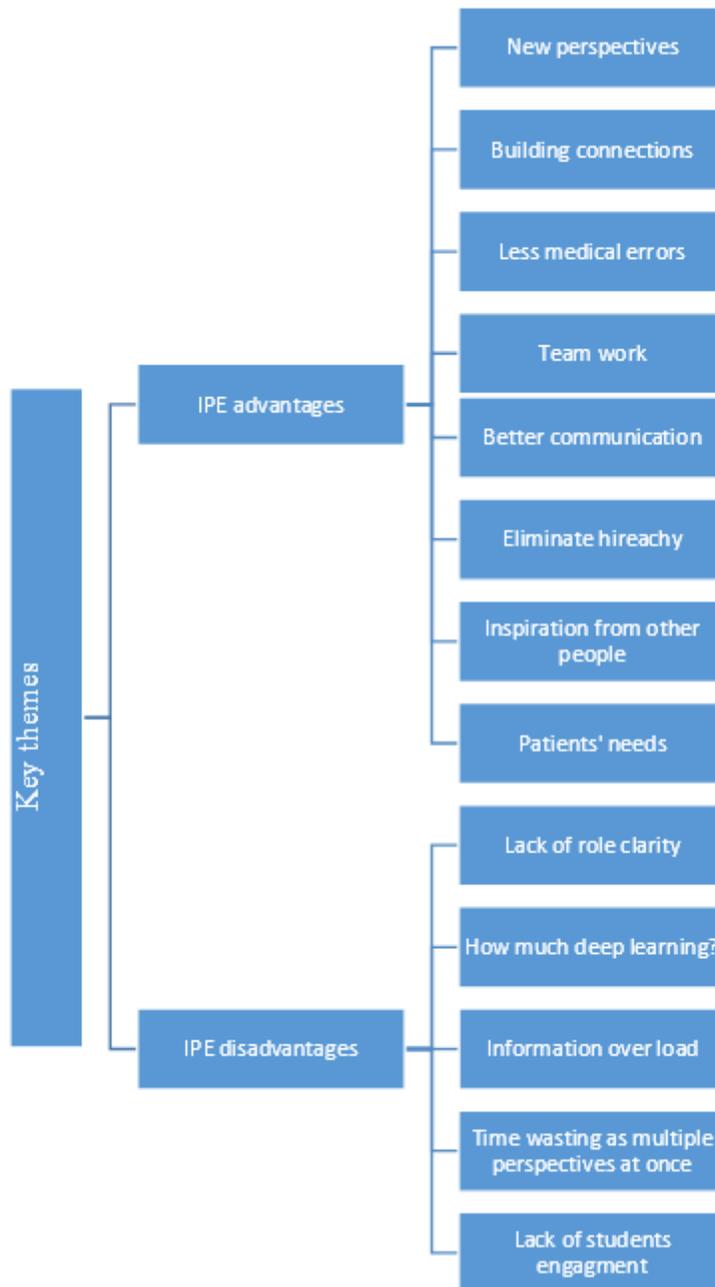


Figure 3
Experiences