The Impact of Structured Inter-professional Education on Health Care Professional Students' Perceptions of Collaboration in a Clinical Setting

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ABSTRACT

Purpose: To examine how a structured inter-professional education (IPE) clinical placement influences health care professional (HCP) students' perceptions of inter-professional collaboration (IPC) relative to that of students in a traditional clinical placement. ***Methods:*** This study used a mixed-methods design. The Interdisciplinary Education Perception Scale (IEPS) was administered to HCP students ($n = 36$) in two Toronto hospitals before and after a structured 5-week IPE clinical placement to examine changes in their perceptions of IPC. Students in a traditional clinical placement ($n = 28$) were used as a control group. Focus groups were then conducted with seven students who took part in the structured IPE clinical placement. A coding framework was devised a priori, and the qualitative results were used to explain the quantitative findings. ***Results:*** There were no statistically significant differences between groups after the structured IPE clinical placement, but the intervention group showed a greater positive trend in total IEPS scores from baseline to follow-up. Qualitative data suggest that students valued the knowledge and skills gained through the structured IPE clinical placement. ***Conclusions:*** Findings suggest that structured IPE clinical placements may provide students with valuable collaborative learning opportunities, enhanced respect for other professionals, and insight into the value of IPC in healthcare delivery. More research is needed to explore other factors that influence specific perceptions among physical therapy students.

Key Words: clinical skills; interprofessional relations; IPE facilitation; Interdisciplinary Education Perception Scale (IEPS); mixed methods; structured inter-professional placement.

RÉSUMÉ

Objectif : Analyser comment un stage clinique en formation interprofessionnelle structuré peut influencer les perceptions des étudiants professionnels de la santé face à la collaboration interprofessionnelle, en comparaison avec celles des étudiants qui réalisent un stage clinique traditionnel. ***Méthodes :*** Des méthodes mixtes ont été utilisées. L'échelle de perception en éducation interdisciplinaire (IEPS) a été administrée aux étudiants professionnels de la santé de deux hôpitaux de Toronto ($n = 36$) avant et après un stage clinique en formation interprofessionnelle de 5 semaines afin d'analyser les changements dans leur perception de la collaboration interprofessionnelle. Les étudiants en stage clinique traditionnel ($n = 28$) ont été utilisés comme groupe de contrôle. Des groupes de discussion ont ensuite été organisés avec sept étudiants qui ont participé au stage clinique interprofessionnel. Une structure de codage a d'abord été conçue, et les résultats qualitatifs ont été utilisés pour expliquer les conclusions quantitatives. ***Résultats :*** Il n'y a pas eu de différences statistiques entre les groupes après le stage clinique interdisciplinaire, mais le groupe d'intervention a démontré une tendance plus positive dans l'échelle IEPS (*Interdisciplinary Education Perception Scale*, ou échelle de perception en éducation interdisciplinaire) entre le début du stage et le suivi. Les données qualitatives suggèrent que les étudiants étaient sensibles à la valeur des connaissances et des habiletés acquises dans le cadre du stage interprofessionnel structuré. ***Conclusions :*** Les conclusions suggèrent que les stages cliniques en formation interprofessionnelle structurés peuvent faire en sorte que les étudiants bénéficient de possibilités d'apprentissage interprofessionnel valables, acquièrent plus de respect pour les autres professionnels et soient plus conscients de la valeur de la collaboration interprofessionnelle dans la prestation de soins. Plus de recherches seront nécessaires pour explorer d'autres facteurs susceptibles d'influencer les perceptions précises des étudiants en physiothérapie.

Our changing health landscape appears to require a more collaborative and coordinated team approach to feasibly meet the needs of patients, given the economic limitations of Canada's publicly funded health care system.[1] The issues currently contributing to the challenge of delivering coordinated and timely services include conditions requiring multiple therapies or treatment approaches and a health care system that is expected to produce better outcomes with fewer available resources.[1,2] Inter-professional collaboration (IPC) may offer a partial solution to this challenge. IPC occurs when "multiple health workers from different professional backgrounds provide comprehensive services by working with patients, their families, and communities to deliver the highest quality of care across settings."[2(p.7)]

In the 2006 World Health Report, the World Health Organization (WHO) announced the creation of the Inter-professional Education (IPE) Study Group to develop a global strategy for ensuring the implementation of IPE and collaborative practice worldwide.[3] In 2010, the WHO and its partners acknowledged IPE and IPC as an innovate strategy that will play an important part in mitigating the global health workforce crisis.[2] And in 2006, the Ontario Ministry of Health and Long-Term Care (MOHLTC) also recognized the benefit of IPC, investing health care resources into supporting and educating health care professionals (HCPs) and students through the HealthForceOntario initiative.[4] The MOHLTC reiterated a statement made by George Smitherman, then minister of health and long-term care, who stated that "we are supporting innovative approaches to health education and delivery that emphasize a team approach to patient care, which can lead to better care for Ontarians and greater job satisfaction for health professionals."[5(p.1)]

This approach to health care delivery has gained much more attention in recent years for its effectiveness in improving patient care, hospital processes, working relationships between HCPs, and recruitment and retention.[6,7]

There is a growing body of literature suggesting that IPC improves patient and worker satisfaction, improves coordinated access to appropriate clinicians and resources, and reduces costs associated with redundant medical testing and clinical errors.[2,8,9] There is also mounting evidence that IPE can facilitate the adoption of IPC in health care settings by modifying the attitudes of HCPs and allowing them to feel more confident in their roles and abilities, to be more aware and respectful of the roles and responsibilities of others, and to better collaborate in clinical decision making.[2,10] The collaborative process is now seen as a way to optimize patient care outcomes while simultaneously reducing costs.[6,7]

While the published literature supports collaborative team efforts in health care, there is considerably less information available on the effectiveness of student IPE activities in ensuring subsequent IPC in the clinical setting. There has been a tendency in Canada to expect effective IPC efforts in the clinical setting after educat-

ing HCP students independently of other professional student groups.[11] Students' lack of exposure to collaboration and IPE thus far has reportedly been due to organizational barriers, lack of resources, and a general lack of awareness about the specific benefits and objectives of IPE.[8] The 2002 Romanow Report[11] clearly recommended increasing IPE opportunities for HCP students to facilitate the transition to collaborative practice. A programme created based on these recommendations is the IPE curriculum for students in the Faculties of Health Sciences at the University of Toronto, in conjunction with Toronto Academic Health Science Network (TAHSN) hospitals. This curriculum includes an IPE clinical placement, facilitated through the teaching hospitals, during which students learn how to apply the theoretical concepts of collaboration in practice settings. Although IPE programmes directed at HCP students have begun to be implemented in various health care settings in Canada, there is relatively little evidence on their structure and effectiveness.

Rather than examining patient-specific outcomes, facilities and educators who implement IPE programmes are typically most interested in assessing changes in students' knowledge of, perceptions of, and attitudes toward self and others in the context of IPC.[2,12] A few studies have shown positive changes among students participating in IPE experiences, including improvements in students' perceptions of the benefits of IPC,[13] an improved sense of professional autonomy and competence,[14] a stronger sense of clinical self-confidence,[15] and a better understanding of other professions.[13–15] It is important to note that these positive changes have been found to improve team dynamics and prevent the carryover of negative stereotypes into the workforce.[16–18] IPE studies have also helped researchers and students to identify some of the factors that help or hinder successful collaboration and teamwork. Students generally perceive communication and relationships between team members as some of the most important factors in effective teamwork and believe opportunities for IPE before entering the workforce should be more widely available.[8,19] Awareness of these factors improves academic and clinical institutions' understanding of students' needs and of how to maximize the benefit gained from IPE programmes.[14,20] While these reviews of IPE have shown preliminary positive effects, they indicate a need for more rigorous evaluation of students' perceptions of and attitudes toward IPE after educational interventions.[1,2,6,7,21,22] The available IPE literature has several limitations, including the use of outcome measures that lack validity or reliability,[8,13] a lack of control groups,[13,14,23] and the use of a single-profession sample.[19] As a result, there was a need for a more rigorous assessment of the effectiveness of structured IPE interventions to more fully inform educational institutions and workplaces that plan and implement structured interventions.

We use the term "traditional" here to describe a clinical learning environment in which the HCP student is

under the direction of a preceptor from his/her own discipline and interaction with other HCPs occurs coincidentally during clinical work. This method of introducing students to team-based care was common before the introduction of structured IPE interventions. In the traditional clinical placement, the amount of teamwork that occurs "naturally" varies across professions: some HCPs typically work in a team environment, while others are more isolated. For example, those who work directly on the unit may regularly interact with HCPs from other disciplines, while those in a specific department (e.g., a laboratory) are more likely to interact only with others from their own discipline. We use the term "structured IPE" to describe a clinical context in which students' interactions with other HCP students are deliberately and purposefully planned and facilitated, with the aim of enhancing communication and collaboration. As described below, students who participated in our study reflected the vast array of professions involved in health care, including creative arts therapies, clinical dietetics, nuclear medicine, nursing, occupational therapy, physical therapy, pharmacy, radiation therapy, radiological technology, speech and language pathology, social work, and therapeutic recreation. The structured IPE clinical placement was designed to bring students together to facilitate partnership and cooperation.

The study design built on previous work by members of the research team. A pilot study was conducted at a Toronto hospital in 2008 (unpublished data) to assess changes in students' perceptions as a result of participating in a structured IPE clinical placement. Students in radiation therapy, physical therapy, occupational therapy, respiratory therapy, nursing, social work, pharmacy, and medicine participated in the pilot study. Students' perceptions of IPC were measured, using the Interdisciplinary Education Perception Scale (IEPS), at the beginning of a 5-week structured IPE clinical placement and again at its completion. The IEPS measures perceptions of one's own profession and of other disciplines (see "Methods" for more detailed description of the IEPS). The pilot study showed a trend suggesting a positive change in perceptions from baseline to follow-up in the structured IPE clinical placement group ($n = 15$). The study had several limitations, however, specifically the small sample size, with a notably smaller control group ($n = 6$), which limited the study's power. Furthermore, we cannot be certain that the control group was actually comparable, since no demographic information was collected from participants for comparison. Finally, the methodology of the pilot study involved only a single quantitative measure (the IEPS); in the absence of a qualitative component, it was difficult to understand the factors underlying the changes in perception following students' participation in a structured IPE clinical placement.

The purpose of the current study was to use the framework from the pilot study to further examine the extent to which a structured IPE clinical placement influ-ences HCP students' perceptions of IPC and to explore perceptions of IPE from the student perspective. We chose to examine HCP students, rather than physical therapy students alone, to assess overall changes, although it is clear that follow-up research for changes specific to physical therapy will be necessary. Our research will add to the current knowledge base by combining a quantitative assessment of students' IPE perceptions with qualitative data on students' perspectives, thus contributing to the growing evidence that may be used in designing future strategic directions for clinical IPE.

METHODS

Our study used a mixed-methods design[24] consisting of quantitative data from the self-administered IEPS, which has been validated elsewhere,[25,26] and qualitative data from focus groups. The IEPS was used to measure students' perceptions of IPC before and after 5 weeks of clinical placement; focus groups were conducted to explore their perspectives on IPE. Ethics approval for the study was obtained individually from the two Toronto-area hospitals where the study took place, as well as from the University of Toronto.

Hospital 1 has approximately 1,200 beds in service, spanning the continuum of care. Hospital 2 is a geriatric centre that includes residential housing and outpatient clinics; programmes at this site support approximately 2,500 people each day, 800 of whom are in-patients. At both sites, a wide array of HCPs contribute to the hospital's mission and to direct patient care.

The pilot study described above was identical in structure to the current study, with a structured IPE clinical placement group and a traditional clinical placement group. The pilot study was also conducted in one of the two hospitals where the current study took place, involved the same facilitators, was conducted under the same conditions (e.g., facilitator training, recruitment process, tutorial format, learning objectives), and was overseen by members of the current research team. Because the conditions were similar, the quantitative data from the pilot study were pooled with data collected in the present study to increase the sample size.

The pilot study involved 14 students participating in the structured IPE clinical placement and another 6 students participating in the traditional clinical placement, all of whom completed baseline and follow-up IEPS questionnaires. The current study used a two-phase design. Phase 1, the quantitative component, consisted of baseline and follow-up scorings using the IEPS; phase 2, the qualitative component, consisted of focus-group discussions. The traditional clinical placement (control) group completed phase 1 only; the structured IPE clinical placement (intervention) group completed phase 1 and had the option of completing phase 2. Because of the study's tight timeline, only one focus-group discussion could feasibly be conducted per site, which limited the number of students who could attend. Figure 1 pro-
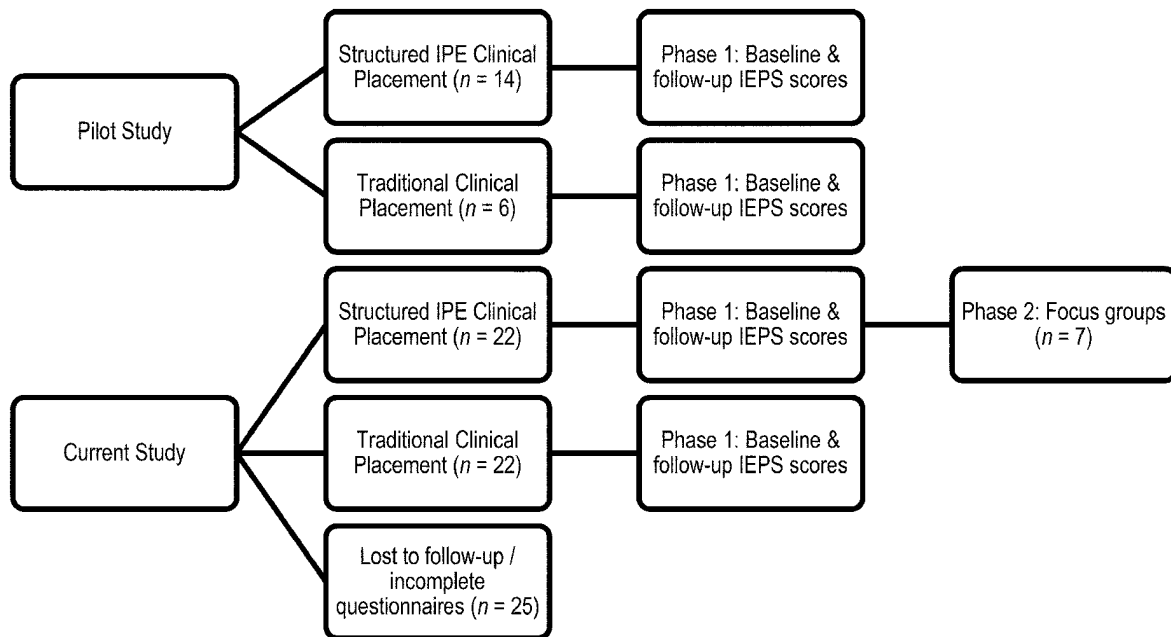
Figure 1 Arms and phases of the study.

vides a general overview of the pilot study and the current study. Note that the pooled samples yielded 36 participants in the structured IPE group and 28 in the traditional group. A total of 25 participants in the current study were lost to follow up, had incomplete questionnaires, or were omitted because of an administrative error that resulted in the research team's being unable to distinguish baseline from follow-up questionnaires. These questionnaires were removed from the analysis; while we acknowledge that this represents a weakness of the study, it would have been inappropriate to include them. (See discussion of limitations under "Discussion.")

Intervention group: Structured IPE placement

The structured IPE component of the clinical placement was a 5-week facilitated programme consisting of one introductory tutorial, four weekly patient-themed tutorials, and an inter-professional student presentation. The tutorial model was based on the University of Toronto Centre for Interprofessional Education's philosophies of teaching and facilitating small groups.[27] Interested clinicians or education leaders from various professions, including physical therapy, occupational therapy, pharmacy, creative arts therapy, and respiratory therapy, volunteered to facilitate the tutorials. At both sites, all facilitators underwent a standardized 2-hour IPE facilitator training session based on the programme developed by the University of Toronto Centre for IPE.[27] Each group had two facilitators from two different professions, one of whom was familiar with the patient-care area in which the group was grounded, so that facilitators could select cases representative of the patients in students' work

areas. Facilitator selection was not influenced by the professions of the students in each group. The facilitator's role was to guide student discussion, encourage problem solving, and provide information on the various topics covered in tutorials (e.g., team dynamics, communication, the health care system).

The tutorials were based on a student-driven curriculum in which students selected the content to be addressed during each session. During week 1, participants took part in a 3-hour tutorial during which they learned about one another; explored common professional interests, knowledge, experiences, and individual learning styles and needs; established group norms; and created learning objectives. In addition, participants developed an understanding of team roles and responsibilities and of the clinical reasoning skills required in the clinical placement. In weeks 2–5, participants met once per week for a 1.5-hour patient-themed tutorial. The patient cases were chosen or developed by the facilitators to satisfy the content and learning objectives created by the students. While working through the case studies, students explored issues relating to their clinical experience, the health care system, and the delivery of health services within the team. Participants also discussed issues related to inter-professional roles, collaborative practice, and conflict resolution. Frequently, staff members from disciplines not represented in the student group attended the tutorials to briefly address the participants and explain their roles, responsibilities, and contributions to the health care team. In the final week, participants delivered an inter-professional student presentation based on a topic that resonated within the clinical setting. Student participation in the tutorials and pre-

Box 1   Interdisciplinary Education Perception Scale (IEPS)

Rate your perception of your profession and other disciplines:
(1 = strongly disagree, 2 = moderately disagree, 3 = somewhat disagree, 4 = somewhat agree, 5 = moderately agree, 6 = strongly agree)

1. Individuals in my profession are well-trained.
2. Individuals in my profession are able to work closely with individuals in other professions.
3. Individuals in my profession demonstrate a great deal of autonomy.
4. Individuals in other professions respect the work done by my profession.
5. Individuals in my profession are very positive about their goals and objectives.
6. Individuals in my profession need to cooperate with other professions.
7. Individuals in my profession are very positive about their contributions and accomplishments.
8. Individuals in my profession must depend upon the work of people in other professions.
9. Individuals in other professions think highly of my profession.
10. Individuals in my profession trust each other's professional judgment.
11. Individuals in my profession have a higher status than individuals in other professions.
12. Individuals in my profession make every effort to understand the capabilities and contributions other professions.
13. Individuals in my profession are extremely competent.
14. Individuals in my profession are willing to share information and resources with other professionals.
15. Individuals in my profession have good relations with people in other professions.
16. Individuals in my profession think highly of other related professions.
17. Individuals in my profession work well with each other.
18. Individuals in my profession often seek the advice of people in my profession.

Adapted from Luecht and colleagues (1990[25]) and reproduced with permission.

sentations was not evaluated, and involvement in the structured IPE placement did not influence participants' clinical placement evaluations. The only expectation of preceptors was that they schedule patient care and teaching time in a way that did not interfere with the students' participation in the tutorials.

Control group: Traditional placement

Participants in the traditional clinical placement group completed their placement under the supervision of a preceptor in the same discipline. Interaction with other HCPs may have occurred because of the nature of the working environment, but no additional effort was made to promote collaboration. Patient care and teaching time were not scheduled in any particular manner for students in the traditional group.

Phase 1: Questionnaire

Participants and recruitment

Participants in phase 1 were HCP students in an English-language programme engaged in clinical placement at either of the two participating hospitals between June 2008 and May 2010. Students were recruited to participate in a structured IPE placement by the clinical coordinator for their profession if the timing and location coincided with their assigned placement. If the structured IPE clinical placement was not occurring, or when a student chose not to participate, the clinical coordinator recruited students for the traditional clinical placement arm of the study. Informed consent was obtained from all participants. In the pilot study, participants completed the IEPS as part of their experience. In the current study, a member of the research team who was not the IPE facilitator for that group recruited students from the

IPE clinical placement to participate in the study, and informed consent was obtained. The samples were not randomized, so that no one who wished to participate in the structured IPE clinical placement would be denied this learning opportunity.

Data collection

The IEPS is an 18-item questionnaire used to measure students' perceptions of their own and other professions (see Box 1).[14] Responses use a 6-point Likert scale (1 = strongly disagree, 6 = strongly agree); since there is no neutral value, respondents must dichotomize to agreement or disagreement. The validity and reliability of this tool have been demonstrated elsewhere.[25,26] The questionnaire items were originally divided into four sub-scales but were later revised by McFadyen and colleagues to three sub-scales and subsequently validated.[26] These sub-scales are based on 12 of the 18 questions and are used to evaluate (a) perceptions in professional competency and autonomy (items 1, 5, 7, 10, and 13); (b) perceived need for professional cooperation (items 6 and 8); and (c) perception of actual cooperation (items 2 and 14–17).

Participants in the structured IPE group completed the baseline IEPS questionnaire at the time of the week 1 tutorial and the follow-up IEPS questionnaire at the time of the week 5 tutorial. Participants in the traditional group completed the baseline IEPS questionnaire as soon as possible after recruitment and were tested again 4 weeks later. As the length of clinical placements varied by profession, it was not possible to control whether students in either group were surveyed at the beginning, middle, or end of their placements.

Table 1 Demographic Data for Participants in the Current Study

Demographics	Group; no. of participants*	
	Structured IPE placement (*n* = 22)	Traditional placement (*n* = 22)
Mean age (range), y	24 (21–31)	26 (22–33)
Sex		
Male	1	3
Female	21	19
Profession		
Creative arts therapies	2	0
Clinical dietetics	1	0
Nuclear medicine	1	0
Nursing	0	1
Occupational therapy	2	0
Physical therapy	1	9
Physical therapy assistance	1	1
Pharmacy	3	5
Radiation therapy	2	1
Radiological technology	1	0
Speech and language pathology	2	0
Social work	3	5
Therapeutic recreation	1	0
Other	2	0
Previous IPE experience		
Yes	18	16
No	3	3
Missing data	1	3

*Unless otherwise specified.

IPE = inter-professional education.

Data analysis

Analysis of the IEPS scores was performed according to McFadyen and colleagues' revised sub-scales.[26] Quantitative analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 18 for Windows (SPSS Inc., Chicago, IL). The Wilcoxon rank-sum test was used to compare change in IEPS scores between groups, and the Wilcoxon signed-rank test was used to compare changes in IEPS scores within each group. For each test, the total IEPS score and the scores for each sub-scale were analyzed. Non-parametric tests were used because analysis of the ordinal data showed that the scores were not normally distributed.

Phase 2: Focus groups

Participants and recruitment

Focus-group participants were from the current study only and were recruited by the IPE facilitator. Inclusion criteria for phase 2 were participation in the structured IPE clinical placement and completion of baseline and follow-up IEPS questionnaires. The targeted number of participants per focus group was six to eight (the average number of students in each structured IPE placement). Students completing the structured IPE clinical placement in February 2010 were recruited for the focus groups by a member of the research team who was not

involved in the IPE tutorials. Each participant provided informed consent to participate in the focus group and be audio-recorded.

Data collection

A 1.5-hour focus group was held at each site for participants in the structured IPE clinical placement during week 5 of the placement. The sessions followed a semi-structured format and were facilitated by one of the researchers (TK) who is a skilled moderator and held no evaluative authority over the students. Five of the six questions used in the semi-structured focus groups were related to statements in the IEPS; the sixth was included to gain insights into the strengths and weaknesses of the IPE tutorials. These sessions were audio-taped and transcribed verbatim by the researchers. (See Appendix for focus-group guide).

Data analysis

We analyzed the interview transcripts using NVivo 8 software (Doncaster, VIC, Australia). The study used directed content analysis[28] to conceptually extend the IEPS responses; a coding framework was therefore devised, using the sub-scales of the IEPS, and basic themes were identified from the coded text segments. Codes were created before the study, based on the IEPS sub-scales, to complement the questionnaire responses: *perceptions of autonomy and competency*, *perceived need for cooperation*, and *perceptions of actual cooperation*. Having analyzed the transcripts, we found that not all themes directly related to the sub-scales, and so a fourth code, *additional insights regarding IPE tutorials*, was created.

RESULTS

Quantitative results

A total of 64 participants completed baseline and follow-up IEPS questionnaires (36 in the structured IPE group and 28 in the traditional group). Demographic data were collected only for the 44 current study participants. Participants' age, gender, profession, and previous IPE experience are listed in Table 1. There were no significant differences between groups in terms of age and gender. Participants were asked to list any prior IPE activities in which they had participated and, in both groups, the majority of participants reported having some previous IPE experience (e.g., previous structured IPE clinical placement, participation in workshops, didactic learning). The type and extent of these experiences were not statistically analyzed. An additional 25 participants from the current study were lost to follow-up or had incomplete questionnaires; these participants were omitted from the study.

To analyze baseline and follow-up IEPS scores, we calculated the sum of the scores for all 18 items as well as the sums for the items in each sub-scale. The median
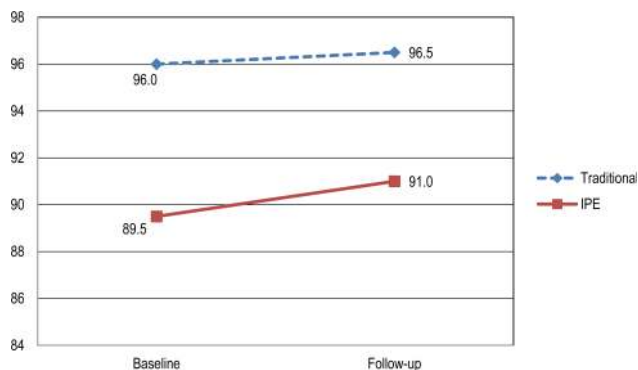
Figure 2 Total scores: Median total scores at baseline and follow-up for each group (max score = 108).

Figure 4 Sub-scale B—Perceived needs for professional cooperation (items 6, 8): Median sub-scale B scores at baseline and follow-up for each group (max score = 12).
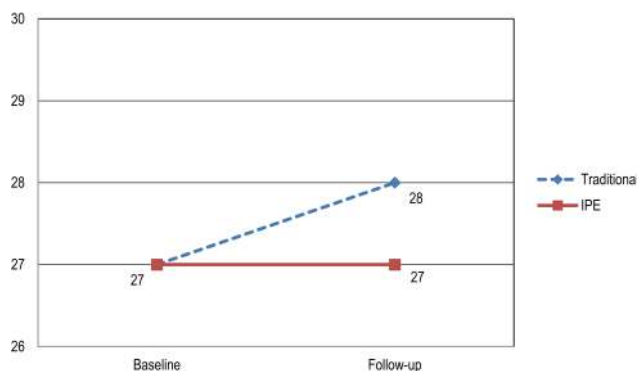

Figure 3 Sub-scale A—Perceptions in professional competency and autonomy (items 1, 5, 7, 10, 13): Median sub-scale A scores at baseline and follow-up for each group (max score = 30).

Figure 5 Sub-scale C—Perceptions of actual cooperation (items 2, 14–17): Median sub-scale C scores at baseline and follow-up for each group (max score = 30).

scores for each group at baseline and follow-up are shown in Figures 2–5.

The Wilcoxon rank-sum test was used to evaluate differences between groups. A statistically significant difference was found between total IEPS scores at baseline ($p = 0.039$) and follow-up ($p = 0.047$); there was also a significant difference between scores in sub-scale B (perceived needs for cooperation) at baseline ($p = 0.035$), but this difference was not maintained at follow-up. In these cases, the traditional group scored higher on the IEPS than the structured IPE group.

The Wilcoxon signed-rank test was used to investigate changes in IEPS scores within each group for each sub-scale and for the total score. There were no significant findings in either group.

Qualitative results

A focus group was conducted at each hospital. A total of seven students (3 at one site, 4 at the other) participated in the focus groups, representing the following professions: pharmacy (2), creative arts therapy (1), radia-
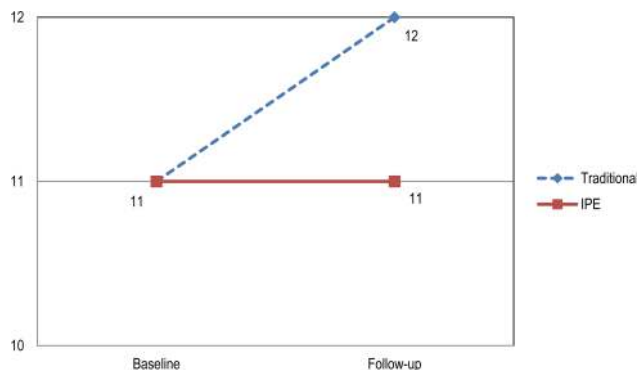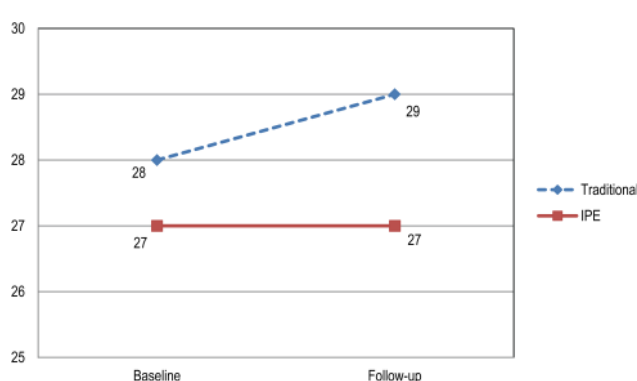
tion therapy (1), physical therapy assistant (1), and speech and language pathology (2).The purpose of the qualitative component of the study was to prompt students to explore their experiences and to gain additional insights into what helped or hindered collaborative practice. The themes that emerged from the data are discussed below.

(1) Autonomy and competency

Students perceived that while each professional was independent and skilled, he or she existed within the hierarchy of the health care team. Among qualified HCPs, students reported feeling that the physician adopted more of a leadership role while students, regardless of the profession to which they belonged, felt closer to the bottom of the hierarchy:

> … when I see other health care professionals, I don't know if I can approach them, doctors are busy, nurses are running around all day long, I don't feel that I can talk to them unless it's something really important. (Pharmacy student #1)

Despite this reported difference in status between HCPs, participants still felt that their profession had a defined role within the team. One participant suggested that

> it was more based on individual as opposed to profession, 'cause some [professionals] … feel that every profession has something to contribute to the care of the patient and they do want to listen to everybody … (Pharmacy student #2)

Participants also felt that the status of each professional and the amount of respect he or she received were more strongly correlated with years of clinical experience than with the profession to which each belonged:

> I guess it's different being from the perspective of the student, though, so personally I probably didn't feel as respected as the actual pharmacist on the floor … (Pharmacy student #1)

Although responses varied, most participants felt that each profession earned respect by contributing insight to team discussions, and that this was exemplified when the team asked for and implemented their recommendations. However, participants felt that this dynamic depended on how well the other members of the team understood their profession's role. One participant explained,

> It really varies from unit to unit how my profession … is respected or acknowledged for their expertise … if [the profession is] more known they'll come directly to us and … ask directly our opinion. (Speech & language pathology [SLP] student #2)

(2) Perceived need for cooperation

Students identified prior academic exposure to IPE and knowledge and awareness of other professions as factors influencing their perception of the need for cooperation. Students also felt that cooperation was necessary because it led to better patient outcomes and more efficient delivery of care.

Participants felt that the structured IPE clinical placement provided a great opportunity to experience team collaboration early in their education so that it could become part of their approach to practice upon entry to the workforce. They noted that the tutorials offered a more practical opportunity to explore collaborative practice. As one participant elaborated,

> Students don't have a very good understanding of how the team collaborates and we don't really learn about that in school very much, and so if [other students] were to participate in sessions like this I think it would be very helpful for the patient and for the student. (Physical therapy assistance [PTA] student)

Participants also felt that through the IPE tutorials they gained a better appreciation for each profession's specific scope, roles, and values within the health care team. They felt that each professional brought a necessary discipline-specific perspective to the team, and thus collaboration from each team member was essential to maintaining a thorough approach to patient care. One participant stated,

> I think it's important to have these kinds of things because a lot of times we don't really know what a lot of the other professions do and what they are capable of doing, and with limited knowledge it's hard to know where you can contact someone else for the benefit of the patient. (Radiation therapy student)

Participants felt that with the knowledge they had gained from participating in the structured tutorials, they now had a better understanding of the need to collaborate to reach a common goal and achieve the best possible patient outcomes. Collaboration may be optimized within the hospital setting, where professionals have direct access to one another and can share information about the patient's condition, needs, and preferences. The students clearly recognized the benefits of IPC; as one participant suggested,

> I think that it's always important for the best care to be given, so if it means involving someone else, I think it's our responsibility to involve that person. (Radiation therapy student)

Participants also identified a need for a greater degree of IPC to maximize efficiency of care in the hospital setting. As one participant said, reflecting on a particular situation,

> I think if there was … a little bit more structure, a little bit more understanding of each other's roles, perhaps multiple professionals could have coordinated better. (SLP student #2)

With respect to delivery of care, they found that by being more aware of the professionals on the team and their scopes of practice, they could facilitate appropriate referrals quickly to achieve better patient outcomes. Overall, participants conveyed a clear perception that cooperation within the health care team is imperative.

(3) Perceptions of actual cooperation

Participants valued the structured IPE clinical placement because they believed it had a direct effect on improving communication and collaboration between professionals during their clinical placements and allowed for optimal patient care. As one participant said,

> When you start working with other health professionals and you don't have the IPE background, you might not be as … willing to share information or willing to communicate with others, and if you do have that IPE background, I think it's a lot easier to relate to other health professionals and work as a team, so I think … it's a great thing. (Pharmacy student #2)

Participants also described several situations in which IPC was directly used in clinical practice to alter a patient's plan of care. One student described this experience as follows:

> We had one patient [whom] we thought … had a metastasis, and we were going to treat it, but we couldn't tell for sure from the images if we should treat it, so we went down to the radiology department … we repeated the scans and it turned out the area we were interested in treating was not a metastasis, so it ended up that we treated another area altogether … so it was actually really beneficial for us to be able to have that relationship where we could walk into their office and have them look at it right away, so we ended up treating the patient for a completely different reason. (Radiation therapy student)

Participants also felt that learning how to collaborate as students would better prepare them for entering the workforce:

> This was like … a snapshot before we even get to start working … how we would even collaborate with other professionals, so I definitely think it helped and it makes us more open to working on a team. (SLP student #1)

Participants noted that it was difficult to apply what they learned in the tutorials to the units on which they worked, since the professions included in the tutorials were not always representative of the team in which they would typically work. Furthermore, they felt that IPE is important not only for students but also for HCPs already providing care, because, although collaboration in the field seems to be improving, there is still room for further development:

> I think there … definitely should be an educational piece … similar to what we went through, for all professionals on every floor … (SLP student #1)

Overall, although participants identified challenges to the application of IPE in clinical practice, they felt that IPE for HCPs would be extremely beneficial.

(4) Additional insights regarding IPE tutorials

Participants presented several ideas related to the IPE tutorials that did not fit within the initial coding framework. Students reported several positive experiences associated with the tutorials, including case-based learning, an increased awareness of IPC, and a comfortable environment.

Participants felt that the case studies presented in the structured tutorials prompted rich discussions that allowed them to gain insight from one another and to learn about the similarities and differences between professions. One participant offered this reflection on a specific aspect of the tutorials:

> I did find that the case studies did provide a real-life example and it allowed the perspective of each profession to contribute and see how their decision would affect function and what they can bring to the patient's care. (Creative arts therapy student)

Participants reported feeling more willing to talk to other members of the team after participating in the structured tutorials. One stated that

> after the current [structured IPE clinical placement] that we just finished, I think I'm more open to the idea of inter-collaborative care. (Pharmacy student #1)

Participants felt that the sessions created a comfortable learning environment that was open and non-judgemental, allowing for interactions that would not have otherwise occurred:

> We were in an environment where it was three other students and it was an open learning environment so I was more comfortable … asking [the pharmacy student] a question … as opposed to in rounds … I would not have felt [comfortable] … (SLP student #2)

The students also identified several sub-optimal elements of the IPE tutorials, including time constraints, an incomplete team, lack of conflict-resolution training, and differing levels of commitment to the IPE tutorials on the part of student peers. Some participants identified time demands as a significant challenge to participating in the tutorials, as they felt pressure from their clinical preceptors to limit how much time they spent in IPE sessions and away from patient care. Nevertheless, students said they would have liked the IPE sessions to be longer, to allow more time for group discussion. In fact, one participant said,

> A lot of times we would really get involved with the case and be deep in discussion, but we'd run out of time and we'd have to carry over the topic to the next session. (PTA student)

One of the major challenges discussed was that several professions were not represented within the structured tutorials:

> We were missing a few key professions … and problems with those professions constantly came up in our sessions, and it would've been helpful if that profession was part of the group, but I mean it's not realistic to have everyone. (PTA student)

They felt they would have gained more from the tutorials if a greater number of professions had participated.

Participants also felt that focusing more on conflict-resolution strategies and identifying potential challenges that may arise within the team would have been beneficial:

> We went over what causes ineffective communication and what kind of … challenges there are in inter-professional care, but we didn't really go over how we can overcome these obstacles in real life. (Pharmacy student #1)

Some participants felt that "the level of commitment of the students within the group itself was different" and that not all students contributed equally to the tutorials and presentation. They suggested ensuring that all students are aware of the expectations of participating in

an IPE clinical placement, and that preceptors are on board with the programme, in order to maximize group interaction opportunities.

DISCUSSION

Our findings suggest that structured IPE clinical placements offer students valuable collaborative learning opportunities and a greater understanding of IPC. After 5 weeks of clinical placement, the median total IEPS score increased for both groups. The change in total score was greater, although not significantly so, for the structured IPE clinical placement group, which implies a trend of positive perceptions after completing the tutorial programme. To further understand the meaning of responses to the IEPS, we compared data from the questionnaires to data from the focus groups. Students in the structured IPE clinical placement group revealed several important views on IPC which indicate that they appreciated the knowledge and skills gained through structured IPE tutorials.

Focus-group participants reported that after completing the structured IPE clinical placement, they felt more at ease communicating with others and more confident about working within a team. They valued the relationships they formed as well as the opportunity to learn about the scopes and roles of other professions. As suggested in the literature, the formation of good rapport between team members and the ability to feel more assured in one's role(s) and more aware of the functions of others are factors in the adoption of IPC.[2,8,10,19] The adoption of IPC not only improves team dynamics but can also lead to improved patient outcomes and employment satisfaction.[6,7]

At baseline, the traditional group scored significantly higher than the structured IPE group on the total IEPS and sub-scale B. Because of the nature of the various participating professions' academic and clinical curricula with respect to IPE, it is possible that the unequal distribution of these professions between the groups contributed to the differences in baseline scores. There have been relatively few studies that include both a large sample size and multi-professional groups to which we can compare our results. While matched allocation would have created an equal professional distribution, we chose instead to allow as many students as possible to participate in the structured IPE clinical placement.

Since both groups had high baseline IEPS scores, and the majority in each group reported some prior IPE exposure, the educational system has evidently evolved in focus and is incorporating IPE activities more frequently. However, participants also said that while they understand the theory of IPE, they found it difficult to implement during clinical internships because their preceptors did not always practice IPC, possibly as a result of scheduling constraints, physical location within the hospital, and/or lack of IPE training. While students may arrive at placements with high expectations of IPC based on what they have learned at school, these views may be difficult to amplify or apply, since IPC may not be occurring in the practice setting and they may be learning from professionals who have not had formal IPE training themselves. Involving qualified HCPs might result in more effective application of knowledge into clinical practice. Possible approaches to achieving this goal include engaging practising clinicians and educators in the development of the IPE structured clinical placement programme at a specific hospital site; supporting the training of IPE facilitators across professions; enlisting local IPE champions; and orienting unit staff, unit leaders, and clinical educators in specific professions to the structured IPE clinical placement in terms of what is expected of students and how they can support students, given their particular role.

Although IEPS scores showed no statistically significant difference in perceptions either between groups or within groups from baseline to follow-up, themes emerging from the focus groups reveal that participants valued the structured IPE clinical placement. Participants reported positive perceptions with respect to improved collaboration, patient care, and knowledge acquisition; they were more comfortable communicating with each other and better understood each other's scopes of practice. Furthermore, students saw improvements in the process of care as a result of collaboration, such as the example cited by one student who collaborated with a member of the radiology department to make a diagnosis and develop a treatment plan. The focus-group participants reported that having this opportunity as students was beneficial in their preparation to be qualified HCPs. These findings are supported by the literature, which shows the importance of familiarizing HCP students with IPC while they are learning about their own and other professionals' roles, since positive perceptions may have more persistent attitude effects if established early in one's career.[16–18]

The qualitative component of our study provides feedback on the organization and delivery of the structured tutorials. Students provided several valuable suggestions that may potentially improve the effectiveness of the IPE tutorials: they identified the use of case studies and comparison of approaches to patient care as highly valuable to their learning experience; they also suggested that emphasizing conflict-resolution strategies and increasing the time allotted for group discussion, as well as including a team representative from the work environment, would increase the potential benefit for students of interactions within the tutorial. Students' suggestion that their perceptions of IPC were affected by the beliefs of qualified HCPS on the team highlights the need to educate HCPs on collaboration.

LIMITATIONS

Our study had several limitations. First, existing quantitative data from the pilot study were pooled with data collected in the present study in order to increase the sample size; without the corresponding demographic data for that group, however, we cannot know whether or not inferences about professional distribution and prior IPE experience made during the present study apply to those students.

Second, extrapolating our findings to the larger community is difficult, since 25 participants were either lost to follow-up or submitted incomplete questionnaires and were therefore omitted from the study. Likewise, results from the focus groups are based on a small sample of 7 participants, which makes generalization of our findings challenging.

Third, although it is beyond the scope of this paper to analyze perceptions of IPC based on profession, it is important to note the different distribution of professions in the two participant groups. This dissimilarity may have affected our findings, since some professions have typically always worked in a team environment while others may work in more isolated settings. We recommend that future studies include a diverse professional sample while still maintaining similar specialties in the control and intervention groups.

Fourth, we did not analyze the type and extent of participants' previous IPE exposure, since we could not objectively measure how one type of experience would shape perception relative to another. It is likely that the type and extent of each student's prior IPE exposure also affected the results.

Fifth, the use of the IEPS as the quantitative outcome measure was based on its current use in both research and clinical practice to assess students' perceptions of IPC.[14,26] This may not have been the most appropriate approach to assessing students' attitudes and perceptions, however, because the numeric scale has significant limitations. The IEPS uses a 6-point Likert scale that does not give respondents the option of choosing a neutral score. Our study participants all scored very high, even at baseline, and we hypothesize that they may have been influenced to score higher by the lack of a neutral option. Moreover, the positive wording of the statements on the IEPS may have influenced responders to agree, and thus to score higher. These possible influences toward a higher score, combined with the fact that the majority of students in both groups had prior IPE exposure, may explain the high baseline IEPS scores, which demonstrated a ceiling effect and left little room for improvement. However, results from the focus groups indicate a positive change in attitudes and an appreciation of the knowledge gained through the IPE tutorials. Echoing findings in the literature, students in our study agreed that opportunities for IPE before entering the

workforce should be more widely available.[8,19] As IPE is gradually being incorporated into the academic and practical curricula for HCP students, methods are needed to measure the effects of IPE on IPC. We recommend that other quantitative measures be considered to measure changes in perception, or that a qualitative approach be used to understand the factors leading to those changes.

Finally, in light of the logistical challenges associated with organizing structured IPE interventions, one of the major limitations of our study is that certain professions were missing from the structured IPE clinical placement group. One potential reason for this is that it is rare for students from all professions to participate in clinical placements at the same time. In addition, students and/or their preceptors may be reluctant to volunteer to participate in structured IPE interventions, since doing so necessarily involves time away from clinical practice. In the hospital setting, doctors and nurses are generally considered core members of the health care team, but, for reasons unspecified, neither profession participated in the IPE tutorials. Participants also commented on the fact that the distribution of professions in the tutorials did not represent the typical professions with whom they worked on the unit. A recommendation for the future would be to make tutorial groups more accurately represent the participants' respective units, as this could potentially lead to greater application to clinical practice.

CONCLUSION

As a result of participating in the structured IPE tutorials, certain HCP students reported an enhanced understanding of and respect for each professional's role within the team and identified IPC as essential to improving patient care and overall health care delivery. Although the difference in perceptions as measured by the IEPS was not significant, valuable information was obtained from the focus groups regarding the perceived benefits of participating in a structured IPE clinical placement. To evaluate the effectiveness of structured IPE interventions without being limited by the ceiling effect associated with the use of the IEPS in this study, future studies should use another measure. By doing so, researchers can more thoroughly assess differences in perception between those who take part in structured IPE interventions and those who participate in a traditional clinical placement. Clinical sites should continue the implementation of structured IPE interventions, as the current study shows that IPE training has a positive impact on students' attitudes toward and perceptions of the importance of collaboration within the health care team.

KEY MESSAGES

What is already known on this topic

Existing studies have shown that IPE promotes collaboration among HCPs, resulting in improved patient outcomes and reduced costs; however, there is less informa-

tion available on the effectiveness of IPE activities for HCP students. It has been shown that IPE may give students opportunities to learn about other professionals and develop a sense of autonomy, yet the reasons behind and extent to which students' perceptions of interprofessional collaboration change after structured IPE are not well understood. More rigorous evaluation of the impact of IPE on students' perceptions is needed to more fully inform institutions of the value of IPE.

What this study adds

This is the first study to combine quantitative and qualitative assessments of the change in students' perceptions of collaboration after a structured IPE clinical placement. Although changes were not statistically significant, students who participated in the structured IPE clinical placement reported the learning opportunity as valuable and perceived IPC as necessary to providing the best possible health care. The findings suggest that IPE in the clinical setting is effective and should continue to be expanded and implemented for HCP students.

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APPENDIX: FOCUS-GROUP GUIDE

1. What were some of your overall ideas, attitudes, and perceptions that you had toward IPE before participating in this internship?

Prompt:
How did you feel about the idea of working within a health care team?

And has your opinion changed at all since undergoing this placement?

2. Were there any specific components of your IPE tutorials that you found to be most useful and enjoyable, and why?

Prompt:
Do you think that students in your profession should participate in more or less IPE?

Also, was there anything you would have liked to change about the tutorials?

3. How do you feel about the way your profession's opinion is considered in the context of clinical decision making?

Prompt:
How much do you think that your profession is respected by other health care professionals and why?

4. Can you think of any situations where you needed to work with another health care professional to complete your work? Can you provide an example?

Prompt:
Do you think that people in your profession need to be more collaborative in their work? Why or why not?

5. What are your general perceptions and attitudes toward various individuals in other health care professions?

Prompt:
Do you feel that there is a difference in status that exists among health care professionals? Why or why not?

6. Can you think of any situations that you have had over your placement where IPE has had a direct impact on patient care?

Prompt:
Were there any situations where you felt that it was really important for all the team members to be involved to provide the best care to the patient?