Abstract

Background The driving motivation of interprofessional education is that learning together should stimulate trainees to better work together once they are in practice. More specifically, it is thought that learning together could provide an opportunity for trainees to learn about each other thus giving them a common knowledge-based required to interact with each other. However, there is little empirical evidence to support these hypotheses.

Purpose: The main purpose of this study was to investigate if, by learning together, trainees learn about their own and each other's clinical roles and responsibilities.

Materials and Methods: A musculoskeletal clinical case workshop, based on the principles of small-group learning and experiential learning, was offered to 28 trainees from four different programs (family and rheumatology residency, and occupational and physical therapy programs) of a Canadian Faculty of Medicine and Health Sciences in December 2011. A 24-item Short Answer Questionnaire measure was used to assess the impact of the workshop on participants’ knowledge of their own and others’ clinical roles and responsibilities.

Results: Participants’ knowledge about their (69.9 pre vs. 81.4% post) and others clinical responsibilities (60.4% pre vs. 69.5% post) significantly increased as observed in a pre-post comparison.

Conclusion: The observed results support the use of a small-group and experiential learning setting to help students learn with, from and about each other's' clinical responsibilities by having to work together towards a common goal, which was in this instance, a concerted treatment plan.

Keywords: Interprofessional Education; Musculoskeletal workshop; Experiential
INTRODUCTION

Interest for interprofessional collaboration (IPC) has seen a substantial increase over the last decades and accordingly, there has been an increasing flux of research on the topic.\(^1\)\(^-\)\(^3\) IPC is driven by pragmatic reasons such as the increasing complexity of patient care, and rises in health care costs,\(^4\)\(^-\)\(^9\) and by several observed and documented benefits such as the potential to positively contribute to the quality of patient care.\(^10\)

Moreover, IPC is one of the initiatives aimed at enhancing patient safety while preventing medical errors.\(^11\)

Consequently, there has been a boom of interest for interprofessional education (IPE).\(^12\)\(^-\)\(^14\) IPE is defined as “occasions when two or more professions learn with, from and about each other to improve collaboration and quality of care”.\(^15\) IPE innovations have occurred at every level of training (undergraduate, postgraduate and continuing development education) and aim to change attitudes and practices\(^16\) by providing an opportunity for trainees to learn about each other thus giving them a common knowledge-based required to interact with each other (knowing who does what, when and how) which is one of the important pillar for efficient IPC.\(^17\)

Patients presenting musculoskeletal diseases (MSD) are often seen by several health care providers, namely, family physicians (F-MD), rheumatologists (R-MD), physical therapists (PT) and occupational therapists (OT). Unfortunately, trainees from these health professions generally have limited exposure to one and other within the academic setting, and therefore limited knowledge about each profession’s clinical responsibilities. Such limited exposure could have a detrimental impact on the quality of patient care. In an effort to bridge this gap, we offered a workshop to trainees in family medicine, rheumatology, and physical and occupational therapy.

Educational Perspectives and Setting

The one-day workshop was based on the four steps of experiential learning\(^18\) and guiding principles of small group learning.\(^19\)\(^-\)\(^23\) Trainees in family medicine, rheumatology, and physical and occupational therapy were divided in four interprofessional groups which participated in four sequential stations. In each one, three moderators (a physician, a PT and an OT) discussed a treatment plan for a hypothetical musculoskeletal clinical case. Participants first observed the moderators’ discussion and then took part in a group discussion about similar hypothetical case with the aim of providing a concerted treatment plan.

Trainees experienced IPC in each station when discussing a case and proposing a concerted treatment plan (step 1: experience). It was thought that the time between clinical case discussions could provide participants with an opportunity to reflect on their collaboration in an Interprofessional learning setting (step 2: reflection). Assimilating abstract concepts that emerge from the experiences and reflection (step 3) was present in the background of the workshop. The sequential aspect of the workshop (four stations) provided participants with the several opportunities to test and revise (step 4). A
small group learning format was favored to “provide the basis for the development of teamwork and collaborative learning”. Working together on a clinical case in a small group setting was also thought to provide a practical opportunity for students to explore their own attitudes and beliefs about their and others’ clinical responsibilities, and to share and reflect upon their IPC experiences with the case. In summary, the workshop gave participants several opportunities to experience learning and sharing about their own and other health professionals’ clinical responsibilities.

Our main purpose was to investigate the impact of Interprofessional collaborative learning on trainees’ knowledge acquisition about their own and other health professionals’ specific clinical responsibilities when working on common MSD clinical cases. We also aimed to document interactions within the group as they could shed light on the observed main outcome. Results presented in this paper are part of a larger study which also aimed to document and define trainees’ perception of Interprofessional collaborative roles and to document participants’ collaborative learning processes.

Material and Methods
We used within-subject (pre and post workshop) and between-subject (trainees from four programs) comparisons to assess the impact of the workshop on participants’ knowledge. In addition, we explored and documented participant interactions during the clinical-case discussions and to further explain, through a triangulation process, the observed knowledge increases – or lack of increase. Ethics approval was obtained from the Ethics Review Board at the institution where the study was conducted.

Twenty-eight trainees from four different health profession education programs of a Canadian Faculty of Medicine and Health Sciences participated in the study: 11 family medicine residents (Post-graduate trainees (PGY) in year 1 and 2), seven residents (five PGY4 or PGY5 from rheumatology and two PGY3 from internal medicine doing a rotation in rheumatology), six 4th year physical therapy students, and four 4th year occupational therapy students. Students of the different professions were randomly assigned to a group in order to form four groups where each health profession was represented in each group. When a profession was represented by a sample size other than a factor of four, students were randomly assigned to groups with an intention to allow as much diversity as possible (i.e., to avoid an overrepresentation of a profession).

The research team members welcomed the participants to the workshop that occurred in December 2011. They received a step-by-step description of what their day would entail which is illustrated in Figure 1. First, they completed a 25-minute knowledge-based questionnaire about their own and other health professionals’ specific clinical responsibilities concerning two common MSD clinical cases for each of the four topics covered during the workshop (rheumatoid arthritis, osteoarthritis, shoulder capsulitis, and trochanteric bursitis). Second, they participated in four sequential 1-hour stations, in which they observed three health care professionals (i.e. moderators; one rheumatologist or family medicine physician, one physiotherapist, and one occupational therapist) discuss a hypothetical clinical case. Each presentation took 25-30 minutes. Then, participants took part in a group discussion of a different hypothetical clinical case on the same topic for 25-30 minutes. At the end of their group discussion, they were expected to voice a
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corded treatment plan for that case. Finally, at the end of the day, they completed for a second time the same initial knowledge-based questionnaire.

**Figure 1.** Illustration of the workshop set-up.
Musculoskeletal disorders cases. A member of the team (AM) first drafted the hypothetical clinical cases. A family physician (MCB) and a physiotherapist (NG) reviewed them. Further review occurred during a half-day face-to-face workshop with all station moderators involved in the project. Cases presented a patient with a given musculoskeletal clinical problem for which an interdisciplinary approach should or could be favoured. Cases were also reviewed by two other members of the team with expertise in assessment and research in medical education and IPC (CSTO and IG, respectively) for acceptability, alignment with the study objectives and comprehensiveness of the scenarios.

Pre and post knowledge questionnaire. We used a 24-item Short Answer Questionnaire (SAQ) based on the eight clinical vignettes during the workshop. For each of the eight clinical cases, Subject Matter Experts (SMEs; NG, MCB, AM) identified the key elements linked to professional responsibilities in-line with the given case and clinical context. They then developed one question per profession (medicine: including family medicine and rheumatology, and physical and occupational therapy) per case. There were three questions per clinical case. All clinicians reviewed the cases and SMEs ensured the content validity (NG, MCB, AM). Three other team members subsequently reviewed the questions for their appropriateness (respect of SAQ guidelines and alignment with the study objectives) (CSTO, IG, KO).

Data Analyses

Pre and post knowledge. Three SMEs developed and applied the SAQ scoring grids (NG, MCB, AM). Cronbach’s Alpha was used as a measure of internal consistency (and thus evidence of internal structure). The observed coefficients were of .51 and .49 for the pre and post administrations respectively. These lower than expected values can be explained, at least in part, by the heterogeneity of the participants and the content tested (multidisciplinary). We computed pre- and post- clinical responsibility scores (own vs. other professionals’ responsibilities) and total pre- and post-scores for each student by adding the appropriate question score from each case. We transformed these sums in percentage for ease of interpretation. We conducted a Repeated Measure MANOVA to assess the impact of trainee discipline (between subject comparison; four programs) and of the workshop (within subject comparison; pre and post) on students’ knowledge about their own clinical responsibilities and the other health professionals’ clinical responsibilities

Concerted treatment plans for the clinical cases. Two team members analyzed the audio-recorded participants’ discussions of the clinical cases (LB and CB). Talking time, participant intervention type (asking a question vs. making a statement) and occurrence of these types of interventions per discipline, per group and per station were tallied up using frequency tables.
**Results**

The overall mean scores for knowledge about one’s own clinical responsibility was 69.87% ($SD = 10.83$) pre-workshop, and 81.40% ($SD = 8.21$) post workshop. The overall mean scores for knowledge about other health professionals’ clinical responsibilities was 60.40% ($SD = 12.65$) pre workshop and 69.48% ($SD = 11.01$) post workshop. Table 1 presents detailed descriptive statistics per discipline and assessment (pre vs. post).

| Pre Workshop Scores | Post Workshop Scores |
|---------------------|----------------------|
|                     | Own Responsibilities | Others’ Responsibilities | Own Responsibilities | Others’ Responsibilities |
| Discipline       | Mean (%)   | SD     | Mean (%)   | SD     | Mean (%)   | Mean (%)   | SD     | SD     |
| Family Medicine  | 67.61      | 12.75  | 63.54      | 9.38   | 79.92      | 9.28       | 71.73  | 6.61  |
| Physiotherapy    | 71.88      | 6.56   | 66.67      | 6.42   | 85.07      | 4.83       | 73.61  | 7.47  |
| Occupational Therapy | 67.71  | 6.48   | 42.19      | 12.16  | 76.56      | 6.67       | 50.26  | 5.40  |
| Rheumatology     | 72.92      | 13.12  | 60.49      | 13.60  | 83.68      | 9.07       | 74.05  | 10.82 |

Repeated Measure MANOVA revealed a significant main effect of the workshop (pre vs. post; $F[1, 23] = 43.49, \ p < 0.001$) associated with an increase in performance at the post workshop assessment. There was a significant main effect for responsibility scores (one’s own responsibilities vs. others’ responsibilities; $F[1, 23] = 31.55, \ p < 0.001$) where at the end of the activity participants knew more about their own clinical responsibilities than the responsibilities of other health professionals. There was also a significant main effect of discipline ($F[3, 23] = 6.71, \ p = 0.002$). Pairwise Post Hoc analysis revealed that trainees from both medical programs and PT trainees performed significantly better than OT trainees on the overall score ($\Delta = 11.52, \ p = 0.009$; $\Delta = 13.75, \ p = 0.005$; $\Delta = 15.13, \ p = 0.002$; for family medicine trainees, rheumatology residents, and PT trainees respectively).
Further post hoc analyses per time (pre and post) and responsibility scores (others’ vs own’s) revealed that this difference was only true for the “others’ responsibility” scores (see figure 2) at the pre ($\Delta = 21.4, p = .010; \Delta = 18.3, p = .047; \Delta = 24.5, p = .007$; for comparison with F-MD, R-MD & PT respectively) and post scores ($\Delta = 21.5, p < .001; \Delta = 23.8, p < .001; \Delta = 23.4, p = .001$; for comparison with F-MD, R-MD and PT respectively). Finally, the analysis revealed a significant interaction between the Responsibility Scores and the Discipline ($F[3, 23] = 3.15, p = 0.044$). Figure 2 is provided to illustrate this interaction. It was observed that OT trainees’ prior knowledge of others’ responsibilities was lower compared to the other participants.

![Figure 2](image.png)

**Figure 2.** Illustration of own’s and other’s professional responsibilities scores prior to the workshop.

Figures 3 to 6 present detailed descriptions of the interaction between trainees. The following general trends can be gleaned from these results. In the four different groups, family physician residents intervened more often than the other residents. In addition, they tended to ask more questions (in 3 out of 4 groups, the rheumatology residents asked more questions in the fourth group). Medical trainees, that is, family medicine and rheumatology residents, talked more than the rehabilitation (OT & PT) students in three of the four groups, in the other group the OT trainee talked more than his peers. per intervention ratios in three of the four groups, the OT trainee had the longest talking time per intervention in only one group. In instances where a group differed, the variation was observed in group 1 and more specifically, it was the OT trainee that differed (talking time...
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and talking time per intervention). Thus, overall pre and post scores for the OT trainee in group 1 were compared to those of the other OT trainees (data not shown). Group 1 OT trainee’s overall performance did not differ from the other OT trainees’ performance. Finally, medical trainees received more questions than their peers.

|               | OT  | PT  | Family MD | Rheumatoid | Readapt | Medical |
|---------------|-----|-----|-----------|------------|---------|---------|
| 1st station   |     |     |           |            |         |         |
| # qst asked   | 0  | 0  | 14        | 1          |         |         |
| # qst received| 0  | 2  | 1         | 5          | 5       |         |
| # interventions| 7  | 7  | 13        | 12         |         |         |
| # sec talking time| 392| 131| 364       | 187        |         |         |
| 2nd station   |     |     |           |            |         |         |
| # qst asked   | 0  | 1  | 6         | 0          | 1       |         |
| # qst received| 0  | 2  | 0         | 2          | 3       | 0       |
| # interventions| 4  | 7  | 7         | 5          |         | 15      |
| # sec talking time| 338| 194| 252       | 35         |         | 355     |
| 3rd station   |     |     |           |            |         |         |
| # qst asked   | 0  | 0  | 8         |            | 2       |         |
| # qst received| 2  | 4  | 0         | 2          | 0       |         |
| # interventions| 5  | 4  | 11        |            |         |         |
| # sec talking time| 314| 103| 244       | 125        |         |         |
| 4th station   |     |     |           |            |         |         |
| # qst asked   | 0  | 1  | 0         |            |         | 12      |
| # qst received| 0  | 4  | 0         | 7          | 2       |         |
| # interventions| 6  | 9  | 2         |            |         | 22      |
| # sec talking time| 241| 109| 10        | 344        |         |         |
| Total         |     |     |           |            |         |         |
| # qst asked   | 0  | 2  | 28        | 1          |         | 15      |
| # qst received| 2  | 12 | 1         | 7          | 17      | 2       |
| # interventions| 22 | 27 | 33        | 17         |         | 37      |
| # sec talking time| 1285| 537| 870       | 222        |         | 824     |

Figure 3. Detailed interactions for group 1 per station

Note. Because the sound on some audiotapes were of less quality, it has been difficult to distinguish Family practitioner from Specialists in rheumatology in station 2, 3 and 4. When this was the case, statements or questions were put in the "medical" category.
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| Group 2 | OT | PT | Family MD | Rheumatologist | Readapt |
|---------|----|----|-----------|---------------|---------|
| 2nd station | # qst asked | 0 | 1 | 4 | 1 |
|         | # qst received | 1 | 2 | 0 | 0 | 0 |
|         | # interventions | 7 | 9 | 22 | 6 |
|         | # sec talking time | 130 | 119 | 421 | 107 |
| 4th station | # qst asked | na | na | na | na | na |
|         | # qst received | na | na | na | na | na |
|         | # interventions | na | na | na | na | na |
|         | # sec talking time | na | na | na | na | na |
| 1st station | # qst asked | 0 | 0 | 8 | 1 |
|         | # qst received | 1 | 1 | 0 | 4 | 0 |
|         | # interventions | 9 | 4 | 13 | 9 |
|         | # sec talking time | 247 | 80 | 308 | 335 |
| 3rd station | # qst asked | 1 | 1 | 4 | 1 |
|         | # qst received | 1 | 0 | 2 | 1 | 0 |
|         | # interventions | 15 | 16 | 25 | 10 |
|         | # sec talking time | 223 | 309 | 417 | 267 |
| Total (stations 1, 2 and 3) | # qst asked | 1 | 2 | 16 | 3 |
|         | # qst received | 3 | 3 | 2 | 5 | 0 |
|         | # interventions | 31 | 29 | 60 | 25 |
|         | # sec talking time | 600 | 508 | 1146 | 709 |

Figure 4. Detailed interactions for group 2 per station.
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| Group 3 | OT | PT | Family MD | Rheumato | Readapt |
|---------|----|----|-----------|----------|---------|
| **4th station** | # qst asked | 2 | 2 | 7 | 5 |
| | # qst received | 3 | 2 | 2 | 1 |
| | # interventions | 12 | 12 | 15 | 12 |
| | # sec talking time | 183 | 171 | 200 | 321 |
| **2nd station** | # qst asked | 1 | 0 | 5 | 1 |
| | # qst received | 1 | 3 | 1 | 0 |
| | # interventions | 4 | 17 | 15 | 3 |
| | # sec talking time | 102 | 328 | 238 | 101 |
| **3rd station** | # qst asked | 0 | 0 | 5 | 2 |
| | # qst received | 4 | 1 | 1 | 0 |
| | # interventions | 20 | 19 | 27 | 12 |
| | # sec talking time | 356 | 214 | 244 | 422 |
| **1st station** | # qst asked | 0 | 1 | 15 | 1 |
| | # qst received | 2 | 1 | 1 | 10 |
| | # interventions | 18 | 9 | 9 | 23 |
| | # sec talking time | 318 | 94 | 111 | 734 |
| **Total** | # qst asked | 3 | 3 | 32 | 9 |
| | # qst received | 10 | 7 | 5 | 11 |
| | # interventions | 54 | 57 | 66 | 50 |
| | # sec talking time | 959 | 807 | 793 | 1578 |

Figure 5. Detailed interactions for group 3 per station
### Table 1

| Station       | qst asked | qst received | interventions | sec talking time |
|---------------|-----------|--------------|---------------|------------------|
| 3rd station   | 0         | 0            | 2             | 136              |
| 1st station   | 0         | 0            | 2             | 141              |
| 4th station   | 0         | 0            | 2             | 200              |
| 2nd station   | 0         | 0            | 2             | 200              |
| Total         | 5         | 6            | 10            | 681              |

Figure 6. Detailed interactions for group 4 per station.

**Discussion**

We aimed to investigate if by working together on clinical cases, trainees from different health professions programs could learn with, from and about each other’s clinical responsibilities, which are the pillars for good IPC. Thus, we proposed a small-group and experiential learning-based workshop to family medicine and rheumatology residents, and to physical therapy and occupational trainees to achieve the aforementioned goal. We observed that, in addition to learning about other health professionals’ clinical responsibilities, they also improved their knowledge about their own clinical responsibilities. The positive observed results support the use of this particular setting: small-group and experiential learning settings to help students learn with, from and about each other’s clinical responsibilities by having to work together towards a common goal, which was in this instance, a concerted treatment plan. This pedagogical setting might thus help students learn with, from and about each other’s clinical roles/tasks. Interestingly, trainee participation seemed to reflect their future professional roles suggesting that the social professionalization process was already at play. Although
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professionalization process was already at play. Although individual differences were observed, communication styles seemed to reflect those expected in multidisciplinary teams. Family medicine residents tended to ask more questions and intervened more often. It can be hypothesized that this was driven by the future central and pivotal role they will be called to adopt, and as such they wanted to ensure an appropriate understanding of the clinical cases. Rheumatology residents and occupational therapy trainees had longer talking time per intervention which may reflect their future role as consultant, often called on for advice, precisions or explanations, to educate their patients and even other health professionals. Although only general trends could be gleaned from the interaction analyses, Group 1 differed from the other groups. More specifically, participants were overall less chatty than the other groups and the occupational therapy trainee differed from the other occupational therapy trainee in his/her interactions. This observation suggests that group dynamics might be an important factor to consider in IPE, as with other small-group based training.

Occupational therapy trainees’ lower performance was surprising. The results may reflect individual differences or lower interest of occupational therapy for topics developed in the workshop. In addition, review of occupational therapy curriculum revealed that they had less exposure to specific musculoskeletal learning experiences than other participants. Moreover, traditionally there is only a small proportion of occupational therapy professionals working specifically in the musculoskeletal rehabilitation field with emphasis given to global functional assessment and intervention and in primary health care services, which differ from the workshops.

This last observation highlights an important element of IPE, that is, prior exposure to- or knowledge of- the topic discussed as it can influence the intervention’s expected impact. Thus, IPE training should particularly consider the appropriateness of the proposed content for the intended population. To fully engage and reap the benefits of the intervention, it is not enough to put people together for them to learn with, from and about each other, they also need to have had sufficient exposure to- and expertise on- the topic discussed.

The results from this study show potential for trainees to learn about their own and other professionals’ clinical responsibilities, notwithstanding the fact that the relative individual effect (e.g., experiential learning, vs. small-group learning) of each feature within the intervention could not be teased out. Future studies could investigate the relative influence of the individual elements comprised in the proposed intervention in addition to investigating if and how these results translate into trainees practice once they integrate the workforce. Furthermore, generalization of the observed results should be done cautiously as the sample was small (although we achieved sufficient power) and limited to one center.

Conclusion

Knowing about each other’s clinical roles and responsibilities is a logical first step and documented factor of good IPC in practice. This study provides empirical evidence that trainees learning together in a small-group and experiential learning setting can not only learn about others’
clinical responsibilities, but can also improve their knowledge about their own clinical responsibilities. To have a greater impact on participants’ knowledge acquisition, participants should already have had sufficient exposure to the topic discussed.

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