Active interprofessional education in a patient based setting increases perceived collaborative and professional competence

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Abstract

Background: Interprofessional competence can be defined as knowledge and understanding of their own and the other team members’ professional roles, comprehension of communication and teamwork and collaboration in taking care of patients.

Aim: To evaluate whether students perceived that they had achieved interprofessional competence after participating in clinical teamwork training.

Method: Six hundred and sixteen students from four undergraduate educational programs – medicine, nursing, physiotherapy and occupational therapy – participated in an interprofessional course at a clinical education ward. The students filled out pre and post questionnaires (96% response rate).

Results: All student groups increased their perceived interprofessional competence. Occupational therapy and medical students had the greatest achievements. All student groups perceived improved knowledge of the other three professions’ work \( (p=0.00000) \) and assessed that the course had contributed to the understanding of the importance of communication and teamwork to patient care (effect size 1.0; \( p=0.00002 \)). The medical students had the greatest gain \( (p=0.00095) \). All student groups perceived that the clarity of their own professional role had increased significantly \( (p=0.00003) \). Occupational therapy students had the greatest gain \( (p=0.000014) \).

Conclusions: Active patient based learning by working together in a real ward context seemed to be an effective means to increase collaborative and professional competence.

Introduction

Interprofessional education (IPE) occurs when two or more professions learn with, from and about each other in order to improve collaboration and the quality of practice (CAIPE 2002). IPE facilitates the students’ look at a task from the perspective of other professions as well as from their own. It enables students to acquire knowledge, skills and attitudes that they could not acquire in uniprofessional education (Funnell 1995). In IPE one has moved to a comparative content where differences as well as similarities between the professions are discussed. This implies a greater level of interactivity between the professions during learning (Barr 1996). In the present paper the term profession is restricted to denote the different professions; physiotherapy; nursing; occupational therapy; and medicine.

In traditional clinical education the student’s position can often be characterized as an observer rather than as an active working participant (Netterstrom et al. 2003). To be an active participant in clinical work instead of a passive listener or reader is a powerful method of effective learning as shown in, e.g. continuous medical education (O’Brien et al. 2001).

Clinical interprofessional education wards (CEWs) were established in 1998 in Sweden and in 1999 in the United Kingdom. Evaluation of this concept has been continuous since the start (Wahlström 1998; Mogensen et al. 2002; Reeves and Freeth 2002; Reeves et al. 2002; Ponzer et al. 2004). The CEW course enables the students to actively participate in interprofessional clinical teamwork and adds a new dimension to the learning experience.

The main aim of the present study was to evaluate whether the students perceived that they had achieved interprofessional competence after participating in patient...
based teamwork training during the interprofessional CEW course. The achieved competence was assessed as change over time in perceived knowledge and understanding of one’s own and other team members’ professional roles and comprehension of communication and teamwork collaboration skills in taking care of patients.

Method

Learning objectives and educational methods

The learning objectives of the course were both interprofessional (shared by all student groups) and profession specific.

Interprofessional learning objectives:

- to increase knowledge and understanding of other professions’ competences;
- to increase knowledge and understanding of his/her own professional competence and role;
- to practice and develop comprehension of communication and teamwork;
- to become skilled at independent handling – under supervision – of the patient’s medical treatment, care and rehabilitation.

The overall educational methods were based on the CAIPE definition of interprofessional education. In this course, the interprofessional learning took place in a real clinical work place. During the course, the interprofessional student teams collaborated in taking care of and treating the patients. In the beginning, the tutors acted as role models in the team. When the student teams gradually became more independent the tutors stepped back to act as supervisors ‘with their hands on the back’. This teaching method aimed to facilitate the students taking an active part in the teamwork of the ward.

The students performed all medical, nursing, physiotherapy and occupational therapy work and care of the patients. The tutors were always available for guidance and feedback but the students were supposed to work as an independent team as much as possible, with preserved security of the patients. The students were continuously encouraged to interact over professional borders. Recurrent learning activities during courses were common rounds, reports and joint planning of diagnostics, therapy and care. To professionally and independently handle regular patients’ care and to communicate with patients, spouses and colleagues were also integral parts of the students’ learning activities at the ward. During these activities all students acted in their own professional role. They were also encouraged to reflect on their own professional identity and role in the team. The atmosphere was permissive and the students were encouraged to discuss with each other and the tutors.

The working schedule was alternating daytime and evening shifts. One evening shift was followed the next day by a day shift in order to improve patient continuity. The overlapping schedules allowed plenty of time to inform each other about the patients – team to team or within each profession.

The students’ independent problem-solving skills were developed in parallel with the ability to use the knowledge and skills of the other professions to resolve the clinical problems that were at hand (Ponzer et al. 2004). Most day shifts ended with a scheduled team reflective session of half an hour. This together with a closing reflective seminar was aimed to support deep learning.

Educational Setting

Students. The mandatory CEW course was designed for medical students in their surgical semester (eighth out of eleven) and for nursing, physiotherapy and occupational therapy students all in their last semester (sixth). This means that participating students had passed at least three semesters of uniprofessional clinical clerkships. Two hundred students participated each year in the course at Karolinska Institutet, Danderyd University Hospital, Stockholm, Sweden.

The course lasted for two weeks. It started with an introductory day followed by eight days of team training at the CEW and ended with a closing seminar. The students were divided into two teams consisting of 1–2 medical students, 3–4 nursing students, 1 physiotherapy student and 0–1 occupational therapy students. The occupational therapist tutor acted as a role model when an occupational therapy student was lacking.

CEW staff and schedule. The staff at CEW consisted of 5–6 nurses, 1 orthopedic surgeon, 1 physiotherapist, 1 occupational therapist and 1 nursing assistant. The latter helped the student team with basic patient care. The other staff members’ main function, besides the responsibility of patient care, was to give qualified supervision to the students and to function as tutors. In this paper we chose to name the teachers, or facilitators, tutors. The tutor nurses worked full-time at CEW – both daytime shifts and evening shifts. The tutor physician, physiotherapist and occupational therapist worked daytime shifts at CEW. They also hold part-time positions elsewhere within the clinic. During daytime shifts all students had access to tutors from their own profession. During evening shifts the tutor nurses supervised the entire student team. When the team needed further medical help during evenings, the orthopedic surgeon on call was available. During shifts without students (i.e. night and weekend shifts) the regular ward staff manned the CEW.

An interprofessional faculty team representing the four professions was responsible for the course and its development, curriculum planning, support of the staff and student evaluations. They also participated in the introductory and closing seminars.

Patients and the ward. The CEW was an integrated part of the orthopedics clinic. CEW consisted of eight patient beds and one conference room.

The patients represented a wide variety of orthopedic diagnoses. They were admitted from the emergency room (i.e. fractures, pain disorders) or referred for elective surgery (i.e. joint replacements and back surgery). A majority of the patients were elderly and presented – besides the orthopedic diagnosis – a wide range of other diagnoses such as cardiovascular diseases, diabetes and malnutrition. All patients were informed about the CEW construct by a staff nurse.
at arrival to the ward. They had the option to be treated outside the CEW. Very few patients used this option. Patients with a diagnosis of dementia or in need of a single room were not admitted to the CEW.

Evaluation method

This study was based on the student evaluation questionnaires from autumn term 2002 to spring term 2005. Since 1998, at least 200 students each year answered a questionnaire on the last day at CEW (post CEW). The selection of items and validation of the questionnaire has been described elsewhere (Ponzer et al. 2004). In addition a similar pre CEW questionnaire was included from autumn 2002. The core of the questionnaire, concerning the students’ inter-professional learning objectives, was left untouched throughout the whole study-period. The questionnaires were answered anonymously. Individual pre and post CEW questionnaires were matched by a code chosen by the student.

On the first day of training – at CEW introduction – before the teachers began instructing the students, the students were asked to fill out the pre-evaluation forms. Conversely, at the end of training – during the closing seminar – the students were provided with the post-evaluation forms. Both of these questionnaires were handed out by the responsible teachers; the students had scheduled class time to fill out evaluations before they were dismissed. Occasional students, not attending the introduction or the closing seminar, were handed the questionnaire on the next day. No tracking of missing answers was performed.

The questions were answered on an unnumbered visual analogus scale (VAS) (Bowling 1997). The respondent was asked to indicate his or her present perception by placing an X on the scale, a 10-centimeter line with verbal ‘anchors’ expressing the extremes. The score for each item was obtained by measuring the centimetres from the left anchor to the X mark. The answers were measured with an accuracy of 0.1 centimetre. Table 1 shows the distribution of students by profession and gender during the evaluation period. Table 2 shows the questions with verbal ‘anchors’. The students were also asked to give their own free comments (not presented here).

Statistical analysis. The aim of the analysis was to assess the effect of the CEW course and putative inter-professional differences. Results in the pre-CEW evaluation form were compared to the post-CEW evaluation. Analyses of variance (ANOVA) with up to two within-subject factors and contrasts were used. The power analysis showed that with 590 students in each group, we had more than 90% power to detect a ten percentage change between the pre and post CEW course evaluations at a two sided alpha of 0.05. The descriptive data for the VAS measurements are given as means and 95% confidence intervals. The student characteristics are given as n(%). The results were considered significant at \( p < 0.05 \). All analyses were performed with the STATISTICA Stat Soft, Inc 7.0 package.

Results

Six hundred and sixteen students from four undergraduate programs participated in the CEW courses during the evaluation period (Table 1). The response rates of the pre and post-evaluation forms were 96% and 97% respectively. A gender question was not included in the questionnaire. However, for all groups except medical students there were almost no male students (Table 1).

Knowledge of other professions’ competence (Figure 1)

All four student groups perceived that they had increased their knowledge of the other three professions after the CEW training \((p = 0.000000)\). The change in the medical students’ perceived knowledge of physiotherapy and occupational therapy was significantly higher than that of nursing. The absolute gain was highest concerning occupational therapy. The change in the nursing students’ perceived knowledge of physiotherapy and occupational therapy was significantly higher than that of the medical profession. In parallel with the medical students, the nursing students’ greatest gain was in their knowledge of occupational therapy. For physiotherapy students the significant increase in perceived knowledge showed no difference between the other three professions. Finally, the occupational therapy students’ gain in perceived knowledge of the medical and nursing professions were significantly higher than that of the physiotherapy profession.

Practice and comprehension of communication and teamwork (Figure 2)

As of 2004 the students rated how their clinical education had contributed to their understanding of the importance of communication and teamwork in patient care (Table 2). All student groups assessed that the CEW course had contributed considerably to this insight \((1.00; \ p = 0.000002)\). Before CEW, the medical students had significantly lower ratings of how their clinical education, so far, had contributed to their understanding, compared to the other groups. This difference diminished after CEW and the medical students had the greatest gain compared to the other student groups \((p = 0.00093)\).
The student’s perception of clarity of their own professional role increased significantly after the CEW course for all student groups \((p = 0.00003)\). Occupational therapy students had the greatest gain in clarity compared to the other student groups \((p = 0.000014)\) and had a significantly lower clarity compared to the others in the pre-CEW questionnaire. This difference disappeared after the CEW course.

Other aspects of interprofessional/professional competence

All students had high ratings on the importance of communication and teamwork for good patient care both before \([9.32 (9.22–9.43)]\) and after the CEW course \([9.41 (9.32–9.50) \text{ ns}]\). A comparison between the different student groups after CEW showed that the largest difference was between medical students \([9.09 (8.86–9.33)]\) and occupational therapy students \([9.60 (9.44–9.77)]\).

As expected all student groups had high ratings on the importance of professional competence to good patient care already before the CEW course \([9.04 (8.83–9.25)]\). A small increase was found after the CEW training \([9.32 (9.16–9.50); p = 0.0044]\).

All student groups perceived that the patients’ need of medical care, nursing and rehabilitation were met at the ward. All student groups had high ratings, of around 8, on the VAS scale after the CEW course. However, the physiotherapy students had a slightly lower rating with a mean of 7.9 \((p = 0.0017)\) compared to the other student groups who varied between 8.3–8.6.

Furthermore, all student groups perceived that the teamwork at the CEW had met patient needs \([8.65 (8.47–8.83)]\).
This study shows that all student groups perceived – with a large statistical effect size – that they had reached the interprofessional learning objectives of the CEW course. Occupational therapy and medical students seemed to have the greatest achievements.

All four student categories perceived an increased clarity of their own professional role as well as that of the other professions. This is worth considering since all students –

Discussion

This study shows that all student groups perceived – with a large statistical effect size – that they had reached the interprofessional learning objectives of the CEW course.
except medical students — were in their last term of pre-qualifying education. Medical students’ change in their knowledge of physiotherapy and occupational therapy was significantly higher than that of nursing. This was probably related to the fact that medical students had a lot more of interaction with graduated nurses than with physiotherapists and occupational therapists during their uniprofessional clerkship prior to the CEW course. Surprisingly, occupational therapy students had the lowest clarity of their own professional role before CEW. Fortunately, they also had the greatest gain during the course and did not differ from the other professions after CEW. In Sweden, occupational therapy students have few contacts with work at a clinical ward during their studies. The CEW course is often their first opportunity to practice interprofessional teamwork and also the first chance to expose their professional role to others. As a consequence, medical and nursing students perceived the greatest gain in their knowledge of the occupational therapy profession. These findings strengthen the assertion that acquired knowledge, skills and attitudes differ between IPE and uniprofessional education (Funnell 1995).

Furthermore, we present evidence that this interprofessional course seems to make a significant contribution to the student’s practice of good communication and teamwork. The new health system for the 21st century needs collaborative competence to secure patient safety as stated in a policy document issued by the Institute of Medicine (2001). All four groups acknowledged the importance of communication and teamwork for good patient care. Our findings are in line with those of other groups (Wahlstrom 1998; Hilton & Morris 2001; Mogensen et al. 2002; Reeves & Freeth 2002; Reeves et al. 2002; Ponzer et al. 2004) and are in harmony with the WHO statement of 1988: ‘Inter-professional education is an effective method of enhancing collaboration between health and social care professionals’ (WHO 1988). When we compared the CEW course to the students’ previous clinical education’s contribution, a significant difference in favor of CEW appeared. This was most obvious among medical students. Medical student’s regular clinical practice in Sweden is almost strictly uniprofessional and disciplinary. They seldom come in contact or interact with students of other professions and their contact with other health professionals is also limited.

The remaining objectives — to provide the patients with good care and the importance of professional competence — were also perceived fulfilled with high ratings by all four groups.

All student groups perceived a significant increase in their deep knowledge of the other professions’ work after CEW. Deep learning has important qualitative differences to that of superficial learning (Marton & Säljö 1976a,b). In this particular study we could only speculate on critical factors of a successful interprofessional CEW course. However, a well functioning faculty group, highly competent tutors, reflective sessions and adaptation to local clinical context, logistics and culture might be crucial.

One weakness of this study was that we cannot present gender specific results. On the other hand — except for medical students — almost all students were women (Table 1). It could of course be argued that a control group should have been included. However, this was not possible at our university. Evaluation of the effects of training could be done at four levels (reaction, learning, behaviour and result levels) (Kirkpatrick 1967). Kirkpatrick stated that both the relevance of the outcome and the complexity of the evaluation increase by level grade. We evaluated perceived outcome at learning and behaviour levels. It is almost impossible to create a non-biased control group in educational studies at these outcome levels.

The strength of our work was that we focussed our evaluation on student perceived learning outcomes and on each individual’s progress over a period of time. This means that we included prospective ratings. According to recurrent interviews with students we could conclude that the questionnaire has a high face validity and that it was easy to understand and to fill out. We had a response rate exceeding 95%. The reason might be that all students had scheduled time to fill in the questionnaires. This response rate, the large number of students and the long study period should make the results robust.

Important issues that should be further explored in future studies are the different aspects and effects of IPE that were stated by Hammick et al. (2007) and Reeves et al. (2008). Furthermore, research should be performed on the influence of gender, and ethical and cultural aspects. In addition the student’s attitudes towards his/her own and others professional roles should be explored and how these attitudes are influenced by participation in interprofessional training. Patient outcome and satisfaction are other important fields of research. If possible, long-term effects should be assessed. Evaluation at high Kirkpatrick level should be used if possible. Good quality evaluations of IPE are needed at the pre-registration level (Freeth et al. 2002; Barr et al. 2006). This is also important since more resources and time are allocated to IPE (Mattick & Bligh 2003) in order to enhance patient care quality and safety (Institution of Medicine 2001; Barr et al. 2006).

Conclusion
Teamwork training during an interprofessional CEW course improved perceived knowledge of other profession’s competences, one’s own professional competence and role and profoundly contributed to the understanding of the importance of communication and teamwork to patient care.
Active patient based learning by working together in a real ward context seemed to be an effective means to increase collaborative and professional competence.

Ethical aspects
The study was approved by the local Ethics’ Committee.

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