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Research Article

Can Student-Centered Interprofessional Sequential Simulations Enhance Students' Teamwork and Knowledge of Other Professions and Teaching?

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Abstract

Objective: A student-centered voluntary interprofessional sequential simulation course was designed to find out whether students would benefit from interprofessional sequential simulations and be able to create and operate this type of a simulation. **Methods:** Medical, nursing, paramedic, biomedical laboratory science and radiography students were enrolled. The students were divided into three groups. The assignment for the groups was to create and operate an interprofessional sequential simulation for another group. The simulations should provide a role for every discipline corresponding their education. The students filled two short questionnaires during the planning phase and the post-simulation phase. **Results:** 23 students (74%) answered the first questionnaire and 20 students (65%) the second questionnaire. The students' attitudes towards interprofessional simulations were overwhelmingly positive. In both surveys they felt that the group was functioning well, their opinions had been heard properly, it was easy to work in an interprofessional team and they were able to contribute to the process the way they wanted to. They also perceived that the work process was well organized and interprofessional work in an electronic environment was successful. **Conclusions:** The students can create and operate a complex interprofessional sequential simulation if guided by professionals. Interprofessional simulations induced positive experiences and attitudes in healthcare students and promote interprofessional teamwork. This type of simulation promotes active learning. The study asserts also that successful interprofessional simulations are possible to run amidst the global pandemic and it is possible to integrate parts of the processes into electronic environment.

Keywords: Education; Healthcare; Interprofessional simulation; Sequential simulation

Introduction

Simulation has been found to be an effective method for healthcare education [1-5]. An important theoretical fundament of simulation is Kolb's concept of experiential learning; the learner gets the experience, contemplates the experience, draws abstractions and concepts from the experience, experiments with the new concepts and ultimately gains a new experience [6,7].

Simulation is considered to promote active learning [8]. Active learning emphasizes students' agency and participation in the learning process [9]. According to Berhaut et al. active learning ought to be one of the core guiding principles of high quality

medical and nursing education [10].

Interprofessional simulation is a form of simulation where the participants represent two or more professional disciplines and students learn from and about each other [11]. It enhances cooperation between professions and therefore improves patient care [12]. In chain/sequential simulation patient's pathway through the healthcare system is demonstrated [13]. Interprofessional sequential simulation is less commonly used in healthcare education.

A student-centered voluntary interprofessional sequential simulation course was designed to promote interprofessionalism and to find out whether the students can take more responsibility of simulations.

Materials and Methods

Medical, nursing, paramedic, biomedical laboratory science and radiography students were enrolled. All of the participants were approaching the end of their studies. The paramedic students had had a lot of simulation experience prior to the course. The nursing and medical students had some experience whereas the biomedical laboratory science and radiography students had virtually no experience of simulations. The students were divided into three groups consisting of two students from each professional discipline except one group having three paramedic students. The students were guided by the teachers of nursing and medicine and teaching coordinators/simulation operators of the Tampere Centre for Skills Training and Simulation.

The purpose of the first meeting was to get to know each other (including teachers) and introduce the project. The assignment for the groups was to create and operate an interprofessional sequential simulation for another group. The learning objects were teamwork and interprofessionalism and simulation should provide a role for every discipline corresponding their education. The students started to plan a simulation case in guidance of teachers. The groups were not allowed to discuss their simulation case with other groups.

In March 2020 we saw the rise of world-wide COVID-19 pandemic. Social distancing and remote learning platforms had to be implemented. The work was mostly done via electronic platforms such as Teams and WhatsApp where the teams gathered to brainstorm and to discuss their ideas with the teachers. The students prepared their cases and presented a written and oral case to the teachers. The teachers gave feedback and the students made modifications. There was another meeting, where the students represented their simulation case, and some final modifications were made so that the cases could be easily operated.

The actual simulations were postponed from May until the fall. COVID-19 recommendations and restrictions were carefully obeyed. In September 2020 the groups met in Tampere Centre for Skills Training and Simulation. The simulation surroundings and equipment were introduced to them. The students had a possibility to ask questions and modify their simulation cases. The cases were performed during three separate evenings (three hours per evening) One group prepared and operated the simulation, one group was acting, and one was observing. Each operating group had to decide whether the debriefing was in the end or after each sequence.

The students filled two questionnaires during the planning phase and the post-simulation phase. Participation in the simulation as well as answering the surveys was voluntary. The questionnaires featured multiple Likert-scale strongly agree-strongly disagree questions and open-ended questions. Questions were about the functioning of the interprofessional group, the knowledge about the other professional disciplines, whether their opinion had been heard or not, if they got the opportunity to contribute in a way they wanted to and if it was easy to work in the group. In the first questionnaire it was asked if working in the team had been well organized and if working in the digital environment had been a success. In the second questionnaire it was asked whether the participants had learned a lot from the interprofessional simulations or not. In both questionnaires there was a question whether COVID-19 pandemic had affected the course. The students also had a possibility to explain, why they answered the way they did.

There were mandatory open-ended questions in the first questionnaire 1) the participant's reason for participating in the course, 2) opinion on the course and 3) what she/he had learned from the interprofessional teamwork. In the second questionnaire there was mandatory open-ended questions on what the participants had learned about their own professional discipline and professions.

Statistical analysis was performed for the closed questions using R program. Medians were determined for all five step strongly agree-strongly disagree questions. The statistical difference of the population median from neutral median was determined by using Wilcoxon signed rank test. Both one-tailed test to both directions and two-tailed test were performed to determine whether the answers reflected a positive or negative bias to either direction. Wilcoxon signed rank test was used to determine if there was a statistically significant change between the answers of the two questionnaires. A p value of less than 0.05 was considered statistically significant. Open-ended questions were used to interpret the findings of the quantitative analysis.

Results

23 students (74%) answered the first and 20 students (65%) the second questionnaire. There was no evident bias in response rate by profession. The students' attitudes towards interprofessional

simulations were overwhelmingly positive (Figure 1). In both surveys they felt that the group was functioning well, their opinions had been heard properly, it was easy to work in an interprofessional team and they were able to contribute to the process the way they wanted to. They also perceived that the work process was well organized and interprofessional work in an electronic environment was successful.

The students felt that the group work got better during the course (with a p-value of 0.01 with confidence level of 95%), even though the students reported that their opinions were better heard in the planning phase than in post-simulation phase (p-value = 0.05, not statistically significant). When the course proceeded the students felt that their possibility to contribute got better (p-value = 0.08, not statistically significant). Interestingly the students' understanding of other professions diminished during the course (p-value = 0.16, not statistically significant).

In the post-simulation phase the students felt that they had learned a lot from interprofessional simulations (p-value < 0,01). Several respondents mentioned that they learned to understand other professions more. Some students reported that they had learned about different ways of thinking that other professional disciplines possessed. It was mentioned many times that the project helped to understand the vastness of capabilities of other professions. The students expressed that the curriculum was demanding yet diverse and educational. It was also stated that there should be more of this type of learning, and it should be included in the mandatory curriculum if possible.

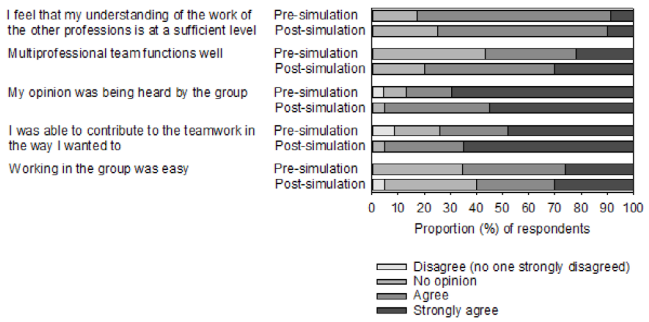

Figure 1: How students answered pre- and post-simulation.

The medical students felt that the workload was not spread out evenly, some of them felt that they had to take too much responsibility. Other students concurred with this notion. There were some concerns about the biomedical laboratory science students' and radiography students' role in planning and executing simulations because they did not have previous experience and their role in simulations was minor. In the debriefing session they verbally expressed that simulations were a good possibility to learn about other professions and interprofessional.

As expected in the planning phase 87,5% of the students felt that COVID-19 pandemic was affecting the work. In the post-simulation phase only 65% felt the work was affected. The planning phase was conducted remotely but simulations were performed in a normal way (COVID-19 recommendations and restrictions were carefully obeyed). Even though the students felt that remote planning of the simulation was successful, in open ended questions some students regretted the limitations of remote group work. Another upcoming issue was that the simulations themselves were postponed several months. Over all the students felt that COVID-19 did affect the course but that remote learning and simulations themselves were successful.

Discussion

The aim of the study was to promote interprofessionalism and to find out whether the students can take more actively part in learning process (active learning). Previous studies on interprofessionalism have reported positive educational outcomes [12,14,15]. In this study the participants engaged in the learning process as a multidisciplinary team. The students reported positive experiences of other professions, multidisciplinary teamwork as well as essence of other professions. These findings showed that the course promoted interprofessionalism.

The active learning emphasizes students' agency and participation in the learning process [9]. We wanted to find out if the students can take a more active role in learning and teaching. The students were responsible of planning, running, operating, observing as well as participating in the simulations. In guidance of experienced teachers, the students could produce high-quality high-fidelity simulations. The students reported that the course was a positive learning experience, and they learned a lot. Therefore, we can say that the course promoted active learning.

The students' attitudes concerning the interprofessional simulations were positive throughout the process. This was in line with the literature [16-19]. It has been previously reported that this type of simulation course promotes interprofessional communication, understanding of other professions [20] as well as dissolving stereotypes about other professions [17].

The students felt that the group work (with a p-value of 0.01 with confidence level of 95%) and their possibility to contribute the work got better during the course (p-value = 0.08, not statistically significant). The reason for this might be that they got to know each other better and the work (simulation learning) was more familiar, even though the students reported that their opinions in group were better heard in the planning phase than in post-simulation

phase (p-value = 0.05, not statistically significant). Interestingly students' understanding of other professions diminished during the course (p-value = 0.16, not statistically significant). This might indicate that students understood how multidimensional other professions are.

Changes in attitudes did not mount to statistical significance except when asked if the group was functioning well. The students felt that they learned a lot and in the close-ended questions expressed that they had gained insights into other professions and other professional identities. The students mentioned that interprofessional simulation course was challenging but educational. It was a surprisingly challenging yet rewarding learning experience to construct a simulation. This type of learning makes the insights go much deeper than mere reading. The students reported having had learned about the importance of delegating and about various styles of working as well as learning to work under pressure. They felt they had learned about their own professional identities as well as other professions through working in a team.

Previous studies have often found statistically significant change in attitudes during [15,17,18]. It has been theorized that nowadays most of the healthcare students have been exposed to interprofessional education and simulation. Therefor their predispositions are primarily realistic and positive, hence not resulting in a large shift in the attitudes [18]. The biomedical laboratory science and radiography students had virtually no experience from simulation, yet they expressed positive attitudes about the course.

The medical students felt that the workload was not spread out evenly, some of them felt that they had to take too much responsibility. Other students concurred with this notion. One reason for this might be that doctors are team leaders in healthcare. In future it is important to emphasize that the workload must be distributed evenly.

There were some concerns about the biomedical laboratory science students' and radiography students' role because they did not have previous experience and their own teachers did not participate in the planning and executing of the course. However, in the debriefing sessions these students expressed that simulations were a good possibility to learn about other professions and interprofessionalism, even though their role in simulations was minor. It is important in interprofessional simulation that the participants can be in their own realistic roles and there is a teacher from their specialty who looks after that simulation is realistic and rewarding for everyone. That is why interprofessional simulations demand more resources [21,22].

The COVID-19 pandemic affected the course. The meetings had to be held in electronic environments and the simulations were postponed several months. The students felt that planning was successful remotely. This is in line with the literature on COVID-19 and remote learning. It is concurred that while in person clinical and hands-on learning is crucial for medical professions education, remote education solutions have been adequate and, in some respects, even favored over traditional in-person teaching [23-29].

Conclusions

Our study showed that students can create and operate complex interprofessional sequential simulations in guidance of experienced teachers. Interprofessional simulations induced positive experiences and attitudes in healthcare students and promote interprofessional teamwork. This type of simulation promotes active learning. The study asserts that successful interprofessional simulations are possible to run amidst the global pandemic and it is possible to integrate parts of the processes into electronic environment. Further studies, especially randomized controlled trials are warranted for determining causal relationships in conclusions.

Conflict of Interest

We have none.

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