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Attitudes towards interprofessionalism among midwife students after hybrid-simulation: A prospective cohort study

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ABSTRACT

Background: Team performance, communication and leadership enhance the quality and effectiveness of interprofessional collaborations between midwifery students and anaesthetists in obstetric emergencies. The realistic setting of hybrid simulation provides practice for interprofessional competencies in a stressful environment without putting women at risk during childbirth.
Objectives: We investigated how full-scale interprofessional hybrid simulation affects the attitudes towards interprofessionalism of final year midwife students.
Design: Two-centre prospective cohort study.
Settings: Bern Simulation and CPR Centre of the Department of Anaesthesiology and Pain Medicine at the Bern University Hospital (Bern, Switzerland) and Zürich University of Applied Sciences.
Participants: Final year midwife students from Bern University of Applied Sciences and Zürich University of Applied Sciences, both from the German-speaking Switzerland.
Methods: One cohort was exposed to hybrid simulation and the other served as control. The simulation group filled in the German Interprofessional Attitude Scale (G-IPAS) before and after simulation, and then again three months later. The control group filled in two sets of G-IPAS questionnaires three months apart.
Results: The total G-IPAS score increased significantly towards a more positive interprofessional attitude directly after the hybrid simulation. This increase was not sustained over the observation period of three months, although the score remained significantly higher than the score of the cohort without simulation.
Conclusions: A novel interprofessional hybrid simulation for obstetric emergencies for midwifery students promoted improved attitudes towards interprofessionalism immediately after simulation. These attitudes were improved compared to a control cohort without simulation, and the difference between the two cohorts remained three months after simulation. Future studies might focus on whether improved interprofessional attitudes lead to better healthcare and safety for women and children during childbirth.

1. Introduction

Obstetric emergencies are life threatening and unpredictable. Childbirth can become complicated without warning for situations such as cord prolapse, shoulder dystocia and eclampsia, which require synchronised and efficient responses from the interdisciplinary team (Cornthwaite et al., 2013). Given the rarity of such complications, hospital staff are infrequently exposed to these high-risk emergencies, and therefore they lack the learning experiences for their management.

Interprofessional collaborative practice has become a landmark to address such complex healthcare issues as it promotes teamwork, which has been shown to prevent morbidity and mortality for mothers and babies (Cornthwaite et al., 2013). There is a growing pool of empirical studies that show that interprofessional education can have beneficial impacts on learner attitudes, knowledge, skills, and behaviour (e.g., collaborative competencies) (Abu-Rish et al., 2012; Makino et al., 2013),

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and can positively affect professional practice and patient outcomes (Kent and Keating, 2013; Reeves et al., 2013).

According to the World Health Organisation, interprofessional education occurs when "students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes" (World Health Organisation, 2010). Safe, high-quality, accessible, patient-centred care requires continuous development of interprofessional competencies (Interprofessional Education Collaborative, 2011), and its use has repeatedly been called for, so that healthcare students can enter the workforce as effective collaborators (Frenk et al., 2010; Medicine, 2015; Reeves et al., 2016).

To meet these demands, the Bern Simulation and Cardiopulmonary Resuscitation (CPR) Centre at Bern University Hospital (Bern, Switzerland) implemented interprofessional hybrid simulation for obstetric emergencies for student midwives in their final year of training. The simulation was conducted with anaesthesia fellows or consultants with experience in obstetric anaesthesia, and an actress playing the role of the woman in labour. Simulated patients are lay persons or actors trained to portray specific medical roles or symptoms. These highly trained non-physicians, who take on the roles of patients, can use low-fidelity training as wearable or augmentative technology to realistically replicate patient encounters (Stillman and Swanson, 1987). Such combined use of humans and devices is defined as "hybrid simulation", which has been successfully used in the past in anaesthesiology (Berger-Estilita et al., 2020c).

Interprofessional simulation exposes students to interprofessional education experiences early in their training in a safe learning environment. Although current evidence shows a trend to introduce interprofessional education early in the healthcare curriculum (Berger-Estilita et al., 2020a; Berger-Estilita et al., 2020b), little is known about the repercussions of interprofessional education in midwifery. The present study addresses this gap in particular for the impact of an interprofessional education experience in hybrid simulation on the interprofessional attitudes of midwife students, with the use of the German-Interprofessional Assessment Scale (G-IPAS) (Pedersen et al., 2020), an interprofessional attitudes scale that has been validated for German speakers.

The aim of the present study was to determine the benefit of a hybrid interprofessional simulation on interprofessional attitudes of student midwives, as measured by the G-IPAS, and whether any beneficial effects were sustained over time.

2. Methods

The Cantonal Ethics Committee of Bern (Switzerland; registrations number Req-2016-00176/12.04.2016) waived the need for ethical approval. For this prospective cohort study, we recruited final-year midwife students from two Swiss midwifery schools: Division of Midwifery, Department of Health Professions, Bern University of Applied Sciences, in Bern (Bern cohort); and Health Division, Institute of Midwifery, Zürich University of Applied Sciences, in Winterthur (Zürich cohort). These midwife students were enrolled in the year 2017, and they provided written informed consent to participate.

2.1. Study design

In this prospective cohort study (Fig. 1), the G-IPAS questionnaire was completed by the participants from the Bern cohort immediately before (baseline) and immediately after the single session of the four-hour interprofessional hybrid simulation, and then again three months later. For the Zürich cohort, the G-IPAS was completed at a given point (baseline) and three months later, without participation in any simulation.

2.2. Participants and setting

We used convenience sampling without sample size calculation to recruit participants for this study. All final-year student midwives from the Bern University of Applied Sciences took part in the full-scale, interprofessional, hybrid simulation together with anaesthetists experienced in obstetric anaesthesia (Bern cohort). Participants in the Zürich cohort were final-year midwife students from the Zürich University of Applied Sciences in the same study year, who were not exposed to the simulation, as it was not part of their curriculum.

The Bern cohort participated in one session of 4 h hybrid simulation at the Bern Simulation and CPR Centre of the Department of Anaesthesiology and Pain Medicine at the Bern University Hospital (Bern, Switzerland) in May–July 2017, in groups of five to seven participants. Before the simulation, the participants were briefed on the process and goals of the simulation, to familiarise themselves with the simulation environment and equipment. A code number was assigned to each student, and all other faculty were blind to the code assignment, and the students were informed that their responses would not affect their academic grading. The students then provided their informed consent, and completed their first G-IPAS ("baseline").

After this initial briefing, a single session that included three different obstetric scenarios with a simulated patient playing a woman in labour was carried out. Immediately after the scenarios, an instructor-led video-assisted debriefing took place with the entire group. Although each scenario had pre-defined learning outcomes and a guided script, the scenarios had slight variations and were not standardised. The simulation was led by two interdisciplinary instructors (one midwife,

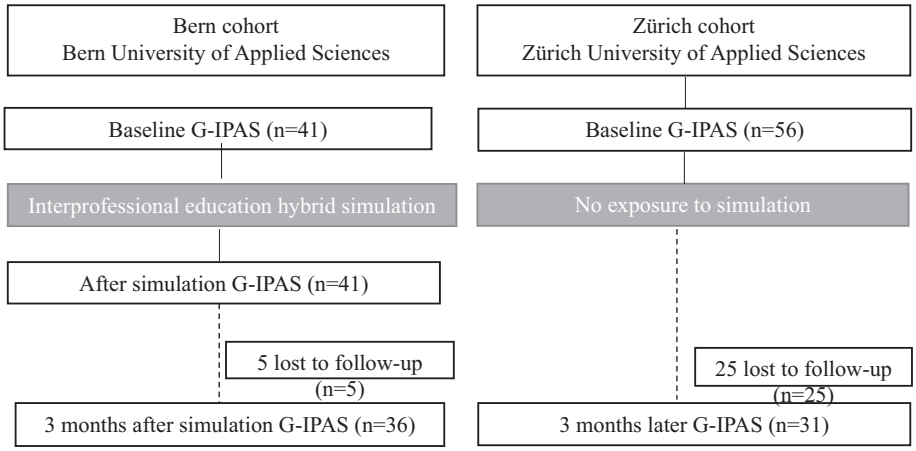

Fig. 1. Study flowchart. G-IPAS, German Interprofessional Attitude Scale.

one anaesthetist) who were trained and certified according to EuSim regulations (www.eusim.org). All of the debriefings reflected the medical processes involved with the cases, but focused specifically on human factors like leadership, teamwork, communication and mutual collaboration.

Immediately after the simulation and debriefing, the participants completed their second G-IPAS ("after"). Here the students rated their interprofessional attitudes at the moment after simulation. The follow-up assessment used the same G-IPAS and was filled in three months later. The follow-up was closed in September 2017.

The Zürich cohort comprised final-year midwife students from Zürich University of Applied Sciences (control, without simulation) who were also asked to fill in the same G-IPAS as baseline and then again three months later. Students who were not present at the time of the second G-IPAS were invited by email. Data from the Zürich cohort was collected in March and June 2017.

2.3. Measurements

The G-IPAS measures attitudes towards interprofessionality. The original American IPAS scale with five subscales (Norris et al., 2015) was translated and culturally adapted to German, giving rise to the G-IPAS (Pedersen et al., 2020). The G-IPAS is a 24-item questionnaire that consists of three subscales: "Teamwork, roles and responsibilities"; "Patient centeredness"; and "Healthcare provision". For each item, the participants are asked to reply using a Likert scale from 1 to 5, where: 1 represents "Strongly disagree"; 2, "Disagree"; 3, "Neutral"; 4, "Agree"; and 5, "Strongly agree". The G-IPAS has been shown to be a reliable instrument that is representative of the original IPAS dimensions, and it has been validated in German-speaking countries for assessment of interprofessional attitudes (Pedersen et al., 2020).

The primary outcome of the study was the difference in the total score of the G-IPAS before (baseline) and directly after the simulation. Secondary outcomes were: comparison of the primary outcome with the G-IPAS three months after simulation, in the Bern cohort; comparison of the G-IPAS between the Bern and Zürich cohorts at baseline and three months later; and analysis of the G-IPAS subscale scores.

2.4. Statistics

The data are presented as means ±standard deviation, median (interquartile range) [range], or percentages if not otherwise mentioned. The student demographics are reported as descriptive statistics. Parametric data were compared using Student's *t*-tests, and non-parametric data with Mann–Whitney *U* tests or Wilcoxon signed rank tests with Bonferroni corrections, as appropriate. A probability of <0.05 was considered significant. All of the statistics were calculated with Stata/SE 14.2 (Stata Corp. LP, College Station, TX, USA).

3. Results

3.1. Demographics

Forty-one midwife students from Bern who participated in the simulation were included, 36 of whom were also available for the three-month follow-up G-IPAS. Fifty-six students from the control group in Zürich were included, where 31 also participated in the follow-up (Fig. 1). All of these participants were female. In the Bern cohort, they had a mean age of 25.0 ± 5.2 years, and in the Zürich cohort, 24.4 ± 4.8 years ($p = 0.510$).

3.2. Primary outcome

As the primary outcome, the baseline median total G-IPAS score for

Table 1
Scores for the individual and total G-IPAS for the two different cohorts.

G-IPAS score	Bern			p-Value[a]			Zürich		p-Value		
	Simulation			Baseline vs. after	After vs. 3 months	Baseline vs. 3 months	No simulation		Bern vs. Zürich[b]		Zürich Baseline vs. 3 months[a]
	Baseline (*n* = 41)	After (n = 41)	3 months (*n* = 36)				Baseline (*n* = 56)	3 months (*n* = 31)	Baseline	3 months	
Teamwork, roles, and responsibilities[c]											
Median	34	40	34.5	**<0.001**	**<0.001**	0.363	34	32	0.427	**0.026**	**0.012**
Interquartile range	31–37	37–43	31.5				28–36	28–36			
Range	23–45	25–45	22–44				14–41	21–40			
Patient centeredness[d]											
Median	40	40	40	0.176	0.675	0.473	40	40	0.955	0.610	0.666
Interquartile range	40–40	40–40	40–40				40–40	40–40			
Range	31–40	31–40	36–40				34–40	37–40			
Healthcare provision[e]											
Median	29	30	29	**<0.001**	**0.009**	0.347	29	28	0.664	0.522	**0.042**
Interquartile range	27–31	29–32	27–31				27–32	25–30			
Range	21–35	21–35	21–35				22–35	23–35			
Total G-IPAS score[f]											
Median	103	110	104	**<0.001**	**<0.001**	0.721	102	100.5	0.499	**0.019**	**0.013**
Interquartile range	98–107	107–115	99–107				97–107	96–104			
Range	87–117	88–120	89–110				83–113	89–109			

Bold text: significant differences.
[a] Wilcoxon signed rank.
[b] Mann–Whitney.
[c] Minimum, 9; maximum, 45.
[d] Minimum, 8; maximum, 40.
[e] Minimum, 7; maximum, 35.
[f] Minimum, 24; maximum, 120.

the Bern cohort (i.e., before simulation) was significantly increased directly after simulation (103 vs. 110; $p < 0.001$) (Table 1).

3.3. Secondary outcomes

For the assessment three months after the simulation in the Bern cohort, the significantly increased median total G-IPAS after simulation had returned to baseline (110 vs. 104; $p = 0.721$; Table 1).

Over the three-month period from baseline in the Zürich cohort (without simulation), the median total G-IPAS showed a significant decrease (102 vs. 100.5; $p = 0.013$). This decrease was attributed to the two subscales of "Teamwork, roles, and responsibilities" (34 vs. 32; $p = 0.012$) and "Healthcare provision" (29 vs. 28; $p = 0.042$) (Table 1), with no change seen for the "Patient centeredness" subcategory (40 vs. 40; $p = 0.666$).

In the comparison between the Bern and Zürich cohorts, there was no difference in the baseline median total G-IPAS (103 vs. 102; $p = 0.499$) (Table 1). After the three-month period, the Bern cohort showed a significantly higher median total G-IPAS over the Zürich cohort (104 vs. 100.5; $p = 0.019$) due to the significant decrease in this control cohort (Table 1). This difference was a result in the significantly lower score in the Zürich cohort for the subscale "Teamwork, roles and responsibilities" (34.5 vs. 32; p = 0.012) (Table 1).

In the G-IPAS subscales for the Bern cohort, there was a significant increase in the rating after the simulation for "Teamwork, roles and responsibilities" (34 vs. 40; $p < 0.001$) and "Healthcare provision" (29 vs. 30; p < 0.001) (Table 1), with no difference in the "Patient-centeredness" subcategory. None of the subscales were different for the comparison from before simulation to three months later (Table 1).

4. Discussion

This study investigated the effects of a single four-hour interprofessional hybrid simulation on interprofessional attitudes of student midwives. This interprofessional simulation on obstetric emergencies was a mandatory part of the final year curriculum of the midwife education at the Bern University of Applied Sciences. The main findings show that midwife students improved their attitudes towards interprofessionalism directly after the interprofessional simulation session.

Here, the G-IPAS scores decreased over the three-month period in both of the cohorts. In the Bern (simulation) cohort, the G-IPAS scores returned to the level before simulation after three months, while in the Zürich (control) cohort, the G-IPAS scores were lower than at baseline after three months. Therefore, the simulation cohort showed less decay of attitudes towards interprofessionality, when compared to the control group.

This study is in line with previous investigations in other areas of medicine, which have also consistently shown immediate effects of simulation-based training, when compared with no training (Cook et al., 2011). Mowat et al. (2017) used the Readiness for Interprofessional Learning Scale and demonstrated that in an interprofessional continuing educational programme the attitudes towards interprofessionalism increased significantly directly after the programme for physicians, dentists, dental hygienists and nurses, but decreased to baseline 6 months later. In a similar pre-post test assessment, Wilcox et al. (2017) also reported an increase after simulation in attitudes towards interprofessionalism in nursing, social work and medical students, although they did not investigate the long-term effects of their intervention. Indeed, attitudes towards interprofessionalism are often measured at only one time point, with the goal to investigate differences between different healthcare professionals (Bode et al., 2016; Maharajan et al., 2017; Sollami et al., 2018; Woermann et al., 2016), and most studies have failed to measure mid-term and long-term outcomes (Berger-Estilita et al., 2020b). This thus leaves a gap in the literature that will be worth exploring in future studies.

Analysis of the different G-IPAS subscales revealed the areas where simulation made its impact. In particular, significant improvements were seen for student perception towards "Teamwork, roles and responsibilities" and "Healthcare provision". Two factors might have influenced these: first, the participants acted in their professional roles and responsibilities in an interprofessional team while working in an emergency scenario, which clearly directed the assessment to the specific interactions. Secondly, the video-supported debriefing directly after each simulation scenario focused on team collaboration and communication. Finally, the feedback from the simulated patient reinforced the reflection of the different roles and their perception from the point of view of the "customer" of the healthcare.

Most studies that have evaluated the immediate effects of interprofessional education are at risk of overestimation of the improved attitudes following simulation-based medical education. To determine the decay over time of the acquired changes in attitudes towards interprofessionalism after simulation, we also assessed participant attitudes three months after the simulation, in comparison with a control cohort without any simulation programme in their curriculum. It has been shown that improved healthcare provider skills decline three months after training (Govender et al., 2010), even in interprofessional simulation studies where obstetric emergencies are the object of the training (Walker et al., 2013). The factors postulated to contribute to the decline in interprofessional attitudes include being more experienced in the healthcare field (McFadyen et al., 2010), having previous interprofessional contact (Anderson and Thorpe, 2008) or previous less positive experiences in interprofessional education (Coster et al., 2008; Hudson et al., 2016a; Visser et al., 2017), and having parents working in healthcare (Cooper et al., 2005). However, a recent study that applied regression analysis to a large cohort of medical students failed to find these associations (Oza et al., 2015). This conflicting evidence on the retention or decline in the interprofessional attitudes needs to be specifically addressed in properly powered and designed studies. To our surprise, our control cohort also self-reported lower interprofessional attitudes after three months. This is puzzling, and might have been due to further exposure to profession-specific stereotypes in the later stages of their training (Berger-Estilita et al., 2020a; Hudson et al., 2016b). However, the decrease in attitudes was more accentuated for the control group. It appears that even a single short simulation exposure to interprofessional learning can increase the awareness and importance of interprofessionalism in healthcare directly after the educational event, which can lead to higher levels compared to programmes that do not provide such experiences for their students.

These findings nurture the discussion on the optimal strategies and timing to introduce interprofessional education in a midwifery curriculum, particularly whether immersion (i.e. continuous collaborative learning) or exposure (i.e., periodic collaborative activities) should be adopted (Hudson et al., 2016b). Gilbert (2005) suggested exposure during the early years and immersion in the graduation year, arguing that students need to develop a professional identity before they can be expecting to work collaboratively with others. In a recent single-centre study, we demonstrated the importance of early introduction of interprofessional education into the curriculum, as it facilitated early interactions and a network, which contributed to enhanced professionalism and reduction of stereotypes (Berger-Estilita et al., 2020a). On the other hand, introduction of interprofessionalism late in a curriculum might be deterred by the student focus on profession-specific clinical practice and their immersion in vocation-specific stereotypes or negative attitudes (Hudson et al., 2016b). Whether this will have a direct influence on maintenance of interprofessional attitudes still remains unclear. In the present case, offering interprofessional simulation to midwives earlier in their curriculum was not feasible due to the curriculum and its practical clinical rotation for the different obstetric departments.

A limitation of our study is the non-randomised design. As the simulation is a mandatory part of the midwife student curriculum, we were not able to randomise some of the students to simulation and the

others not. Therefore, we decided to compare the simulation participants to another cohort. Switzerland has four midwifery schools: Bern and Zurich (German speaking), and Lausanne and Geneva (French speaking). The two German-speaking midwifery schools that participated in our study are situated 150 km apart. The two groups of students were at the same level in their curriculum and previous interprofessional education, but only the cohort in Bern participated in the simulation. Indeed, we cannot guarantee that both cohorts are directly comparable, but they were not significantly different for age and professional educational programme. Our sampling and measurement method were the same for both study sites, and this represented the only feasible way to have a comparator in the given setting.

The measurement tool used, the G-IPAS, was translated and culturally adapted into German, and it has shown solid reliable data and factorial structure (Pedersen et al., 2020). This specific validation for this population allowed for internal generalisability. However, there might be a concern about this use of a new scale (Berger-Estilita et al., 2020a). The best way to measure attitudes after interprofessional education remains an open question, as "no single instrument offers an adequate solution to many educators and researchers in the field" (Gillan et al., 2011).

5. Conclusions

A novel interprofessional hybrid simulation for obstetric emergencies for midwifery students promoted improved attitudes towards interprofessionalism immediately after simulation. These attitudes were improved compared to a control cohort without simulation, and there was still a difference between the two cohorts three months after simulation, although the attitudes of the intervention group returned to baseline level. Future studies might focus on whether improved interprofessional attitudes leads to better healthcare and safety for women and children during childbirth. However, uncertainty remains regarding whether a such interprofessional curriculum should be implemented as continuous interprofessional education or as an isolated experience.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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