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"Two heads are better than one"- pharmacy and nursing students' perspectives on interprofessional collaboration utilizing the RIPE model of learning

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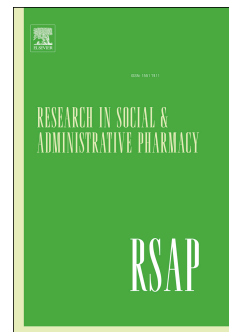
Title Page

Concise title of the manuscript:

Pharmacy and Nursing Students' Perspectives on Interprofessional Collaboration Utilizing the RIPE Model: a quasi-experimental, mixed methods pilot study.

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"Two heads are better than one"- Pharmacy and Nursing Students' Perspectives on Interprofessional Collaboration Utilizing the RIPE Model of Learning

ABSTRACT

Background: Simulation is an effective strategy for enhancing interprofessional education (IPE) and collaboration (IPC).

*Objective*s: A novel interprofessional learning model, The RIPE Model (Reflective Interprofessional Education Model) was applied for a pilot study during a simulation laboratory aimed to (i) enhance pharmacy and nursing students' understanding of the roles and responsibilities of professions within the multidisciplinary healthcare team; and (ii) enhance the importance of working collaboratively in team-based care.

Methods: The pilot study using a mixed-methods approach, including the administration of a 6-item student survey on a 6-point Likert-type scale as a pre-test (prior to participation in the simulation laboratory) and post-test (after participation in the simulation laboratory), and a debriefing session eliciting a follow up written reflective statement.

Results: Sixty-four students (n=56 pharmacy; n=8 nursing) participated in the study which resulted n=52 pharmacy students and n=8 nursing students matched data to a pre-test and post-test survey, analyzed via paired t-tests. Statistically significant results (p<0.05) reported a positive increase in pharmacy students' perceptions from the pre-test and post-test survey for all six items indicating the extent of agreement of IPC; and for one item on the nursing student survey. Qualitative analysis of reflective statements (n=62) was conducted via thematic analysis utilizing Braun and Clarke's 6-phase process. Thematic analysis generated one overarching theme: IPC: Developing appreciation and respect for healthcare team members to improve patient outcomes; and three subthemes: (i) Enhanced decision-making; (ii) Communication and collaboration; (iii) New understandings of roles and responsibilities.

Conclusions: Students perceived that utilizing the RIPE Model of learning involving simulation to enhance interprofessional collaboration assisted their understanding of the roles, functions and responsibilities of other healthcare professionals involved the patient

care team. Effective collaboration was perceived to be beneficial to enhancing confidence with engagement and communication, appreciation and respect for the expertise of other healthcare professions.

1. Introduction

Simulation plays a significant role in health education and can be utilized as an effective tool for enhancing interprofessional education (IPE) and interprofessional collaboration (IPC). [1, 2] Interprofessional education occurs when two or more participants (health professional students or practitioners) learn about, from, and with each other to enhance collaboration and healthcare. Interprofessional collaboration is the process whereby relationships are developed and maintained between two or more healthcare professionals to enable optimal health outcomes.[3, 4] Enhanced collaboration amongst health professionals has the potential to lead to improved communication, collaborative decision making and better informed clinical judgments, which is likely to affect and improve health outcomes and patient safety.[5] Thus, there is a need to develop the knowledge and skills required to effectively work in healthcare teams and positively affect patient health outcomes.[6] One of the ways in which health educators can prepare students for collaborative clinical decision making between professionals is to ensure students' exposure to these collaborative models of learning.[7] Some of these collaborative models of learning involve simulation. [8] Simulation is considered to be a "technique not a technology" [9] and as such there are a vast range of simulation learning modalities and approaches used for healthcare professional education. These include but are not limited to the following: the use of 'medium-fidelity' or the more technologically advanced 'high-fidelity' human simulators or manikins (manikins which are interfaced with a computer program to produce simulated responses such as heart rate and rhythm or respiratory patterns);[1, 2, 10] the use of standardized patients for case studies which may include (i) use of actors that "play" the role of the patient or the use of other healthcare professional students or practitioners who are coached to simulate a specific patient's symptoms and illness in a standardized way; and/or (ii) an actual patient who is coached to

2

present their symptoms and illness in a standardized way. [2, 11-14] Some simulation educational programs may include "virtual online" processes such as gamified learning scenarios, augmented and virtual reality and others may include part task trainers and/or hybrid simulation i.e. combinations of two modalities in one simulation, for example, a standardized patient and part task trainer. [2, 15]

Previous research has demonstrated that interprofessional simulation programs embedded into curriculum can assist students' understanding of the scope of practice, roles, functions and responsibilities of other healthcare professionals; and instil respect and improve communication between healthcare professional students and patient safety.[5] Furthermore, extensive research investigating student and practitioners attitudes,[7, 16-19] readiness for interprofessional education [20-23] and perceptions of its perceived value exist in the literature.[19]

Despite extensive literature on interprofessional education, particularly with respect to medical and nursing students, there have been relatively limited studies involving pharmacy and nursing students utilizing simulation laboratories and/or strategies;[5, 24-26] and a paucity of evidence related to simulation based interprofessional programs investigating perceptions and/or outcomes of collaborative decision-making between healthcare professional students.[26] To our knowledge there are few studies to date that investigate pharmacy students' perceptions working together with other healthcare students utilizing simulation laboratories to "replicate" a real-life clinical environment to develop collaborative clinical decision-making skills. An Australian pilot study investigating pharmacy and nursing perceptions of a simulation case, reported positive outcomes for IPC.[25] Although the study reported the utilization of a simulation learning environment to enhance IPC, the simulation involved two in-class tutorials: with only one conducted in a clinical simulation laboratory and with a focus primarily on pharmacy activities (for example: medication reconciliation and a pharmacist's recommendation of administration of an intravenous (IV) drug) rather than nursing activities. In real world contexts, IPC has the potential to enhance collaborative decision making between healthcare professionals, yet there is very little research in the

literature regarding educational programs that enhance this skill set in healthcare professional education.

This study aimed to explore the perceptions of both pharmacy and nursing students with regards to their understanding of (i) the roles, functions and responsibilities of professions within the healthcare team; and (ii) working collaboratively in team-based care.

2. Methods

2.1. Context

Clinical Practice 3 for Pharmacy is a compulsory 6 credit Unit of Study (UoS) offered to first year Masters of Pharmacy (MPharm) students at a large metropolitan Australian University during their Summer Program. The UoS focuses on preparing pharmacy students for clinical placements in the hospital setting via an intensive two-week simulation program and involving a myriad of simulation-type activities. These include the use of hospital simulation laboratories with standardized patients and high-fidelity manikins; online assessment activities, "hands-on" activities including experimentation with international normalised ratio (INR) monitoring equipment, blood pressure, blood glucose, and cholesterol monitoring, vaccination training, and other point of care monitoring training. Embedded in the intensive two weeks "Virtual Hospital Placement" are interactive workshops provided by current hospital pharmacists relating real life case studies and medication charts (de-identified) to showcase the types of issues addressed during a typical "day in the life of a hospital pharmacist"

Prior to 2017, the simulation placement known as the "Virtual Hospital Placement" only included pharmacy students. As a new initiative to enhance IPE and IPC with the objective to developing students' skills for collaborative decision-making, the RIPE Model was developed, utilized and integrated into the Virtual Placement curriculum for Clinical Practice 3 to enhance IPC.

2.2 Instrumentation: The RIPE Model

The RIPE Model (Reflective Interprofessional Education Model) is a novel model of learning which was developed to be applied during simulation laboratories to enhance IPC between

4

the pharmacy and nursing students.[8] Reflection plays an important role in this model of learning as it allows the students and/or practitioners to critically review their own thought processes in relation to external influences (for example considering the viewpoints of other healthcare professionals) which may challenge their previously held beliefs and assumptions. [8] The RIPE Model of learning involves an unfolding, authentic clinical case study as pharmacy students' progress through 10 workstations in the simulation laboratory. Four of the ten workstations were allocated simulated hospital bedside stations, which included either a medium or high-fidelity manikin or a standardized patient (Figure 1). As the purpose of the study was to enhance interprofessional collaboration, it was decided that the unfolding case be developed by academics from diverse healthcare professions. Therefore, the unfolding case which involved a stroke patient case was developed by two academics, one from the pharmacy profession (CL) and the other from the nursing profession (CF) and checked for discrepancies by an experienced clinical practising hospital pharmacist (RS) and nursing academics (TP, CH). The idea behind the design of an unfolding case allowed for pharmacy students to gather information from the interactions at each workstation (i.e. the patient's bedside) which may include gathering information from the patient, carer and/or healthcare professional (in this case either a nurse or medical practitioner), and then deciding on how to collaborate with the healthcare professional. The collaborative decisions that are made at each workstation are designed to enhance the patients' health outcomes. For the purpose of this pilot study, nursing students remained at each workstation (or bedside) while pharmacy students (in groups of 5-7) progressed through each workstation (Figure 1). Nursing students were briefed regarding the details of the case and the information that may be "extracted" during communication at each workstation. It was the responsibility of the pharmacy students to communicate effectively with the nursing students at each workstation. Communication also included partnership with the patient and/or carer at each workstation to discuss any issues that arose in conjunction with the other healthcare professionals. The aim was to collaborate with the healthcare team to make better informed clinical decisions affecting the patient's health outcome.

5

As part of the 10 workstations, one workstation involved a research station (Station 2, Figure 1), so that students were able to gather further information for example: from medical progress notes, admission notes, recent pathology, scans; and to utilize the currents resources. Another workstation accessed midway into the model involved an 'Educational Station,' which allowed students to access videos and other resources, which may be helpful for the case (Station 6, Figure 1). Two workstations were designed as reflective stations: one as a reflective verbal debriefing workstation (Station 9, Figure 1) where pharmacy students could discuss with a nursing academic any issues that arose during the case and/or if further discussion was required regarding the process for IPC) and the other station related to a reflective writing station, facilitated by an academic pharmacist (Station 10, Figure 1). Further details of the Model and its development and process can be accessed via our previous publication.[8]

2.3 Sample

The research setting was the simulation laboratory utilised for the purpose of implementing the RIPE Model. The initial sampling frame for the study included 59 Master of Pharmacy students and 8 undergraduate nursing students at an Australian metropolitan university.

2.4 Study Design

A mixed methods study involved two phases: Phase 1 comprised of the administration of a pre-test-post-test design for quantitative analysis; and paired t-tests were employed to elicit changes in students' perceptions (before and after participation in the simulation laboratory). The pre-test was administered to both pharmacy and nursing students prior to station 1 of the simulation laboratory and the post-test was administered at the last station of the simulation laboratory (Figure 1). The student surveys comprised of a de-identified (students were asked to provide a pseudonym name and retain that name for the post-test to match the data at the two time points) 6-item on a 6-point Likert-type scale ranging from Strongly Disagree (SD) to Strongly Agree (SA). The survey related to student perceptions of their role and responsibilities, working collaboratively to enhance clinical decision-making, and the

roles and responsibilities related to other healthcare members of the team-based care (Table 1, Table 2).

Phase 2 comprised of a 15 min debriefing session between pharmacy and nursing students at an allocated station (Station 9) during the simulation laboratory (Figure 1). This session was for the students' benefit for further discussion and clarification of their roles and responsibilities as healthcare professionals and for any other issues that arose during the simulation. Each debriefing session included a minimum of five pharmacy student members and one nursing academic facilitator (TP). Following the debriefing session, students were provided with reflective prompts (Table 3) and asked to write a brief reflective statement. These questions have been adapted and derived from previous published literature citing reflective prompts which guide the reflective thinking process.[8] Students were asked to deposit their completed, de-identified reflective statements into a confidential box prior to leaving the simulation laboratory. These were collected by a representative student not involved in any aspect of the study. Thematic analysis was conducted for the qualitative aspect of the study as it is a method for searching across a qualitative data set (in this case 62 reflective statements) to identify, analyze and report repeating themes that describe the output of the data set in detail. It is also a useful method to identify similarities and differences across a data set.   Students' written reflections were coded via Braun and Clarke's 6-phase process (Table 4) for qualitative analysis.[27]

2.5 Data collection

Data collection took place during the simulation laboratory in December 2017. As this novel model was embedded into the pharmacy curriculum subject as part of their Master of Pharmacy degree by coursework (Clinical Practice 3), all pharmacy students were obliged to participate in the learning module, which included formative feedback on their reflective writing tasks. While pharmacy students did not have a choice but to participate in the simulation laboratory and written reflection, they were informed that this was a formative rather than a summative learning task. Contrary to this, the pre-test and post-test surveys were a voluntary activity and all students were given the opportunity to participate in the

study and provided with a Participant Information Sheet (PIS) prior to the laboratory. The PIS clearly stipulated that completing the pre-test and post-test was a voluntary exercise and that students were not under any obligation to complete these. Additionally, students who decided to participate in these surveys would be de-identified with a pseudonym name that would match the post-test. Students who chose not to participate were informed that this would not affect their future grades in any way. Nursing students were also given the opportunity to participate in the study and were provided with a PIS. As this module was not part of their nursing studies, they were given the opportunity to voluntarily participate in the pre-test and post-test survey and written reflections. No incentive was provided for the pharmacy and nursing students to participate in the research aspect of the simulation laboratory. Consent forms were signed by all participants to acknowledge their consent to the use of their reflective statement comments in a future publication.

2.6 Data Analysis

Participants with incomplete surveys or unmatched pseudonym names were excluded from the analyses. Quantitative data (paired t-tests) were analyzed using SPSS (Version 24) [28]. Paired t-tests were employed to compare pre and post-test scores. The significance level was set at $p<0.05$. Pharmacy and Nursing reflective statements were analyzed via thematic analysis using Braun and Clarke's framework (2006) [27] (Table 4) for emergent themes by the lead researcher (CL). As a collaborative judgement is necessary to determine what constitutes a theme, three additional researchers (TP, CH, CF) checked for discrepancies within that judgement until general consensus of the emergent themes was agreed upon.

2.7 Ethics

The study was approved by the University of Technology Sydney Human Research Ethics Committee. (Approval Number ETH17-1889).

3. Results

3.1 Quantitative results

From a cohort of n=59 pharmacy students, fifty-six participated in the study (Response rate 95%) along with n=8 undergraduate nursing students (Response rate 100%). As validated

data required student pseudonym names to be matched with the pre-test and post-test, those surveys which could not be matched were excluded from the study which resulted *n*=52 pharmacy student surveys with validated matched data to a pre-test and post-test and *n*=8 matched nursing surveys. Sixty-two student written reflections were completed (pharmacy students n= 54. nursing students n=8)

There was a statistically significant difference between the pre-test and post-test scores for both pharmacy and nursing student surveys. Pharmacy students reported positive increase in their perception post their participation in the simulation laboratory to all items on the 6-item survey. (Table 1, Table 5). These items related to their awareness of the roles, responsibilities of their own profession and that of the other HCP (nurses) in team-based care, clinical decision making and with communication and teamwork. Nursing students reported a statistical significant result for only one item of the 6-item survey, namely: "I am aware of the roles and responsibilities of registered/licensed pharmacists in team-based care" (Table 5).

3.2 Qualitative results

Sixty-two student reflections (pharmacy students n= 54; nursing n=8) were thematically analyzed for emergent themes across the data set, using Phase 1 through to Phase 5 of Braun and Clarke's (2006) 6-phase process (Table 4).

One overarching theme and three subthemes emerged from the study. The overarching theme demonstrated a heightened appreciation and respect for other healthcare professionals derived from participation in the RIPE model. Subthemes included: (i) Enhanced decision making (ii) Communication and collaboration; and (iii) New understandings of roles and responsibilities.

3.21 Overarching theme: The study elicited an overarching theme, namely: Interprofessional Collaboration: developing appreciation and respect for other members of the healthcare team to improve patient outcomes through enhanced decision making; effective communication and understanding the roles, responsibilities and functions of other healthcare professionals.

9

3.22 Enhanced decision-making

One positive outcome of the interprofessional simulation, included pharmacy students acknowledging the limits of siloed healthcare practices and the advantages of collaborative decision making for better patient health outcomes. Although they valued the specialized nature of each profession, students of both professions now recognized the value of interprofessional knowledge sharing to improve patient outcomes. As one pharmacy student wrote:

"Pharmacists are medication experts while nurses are experts on the individual patients. They need to combine knowledge to optimise patient care." (PSP # 14)

Another student also recognised the importance of collaboration when making clinical decisions:

"Two heads are better than one [when making clinical decisions]." (PSP # 32)

For nursing students, pharmacists were viewed as a medication administration resource to aid decision-making.

"It seems like a no brainer- it is essential for pharmacists to liaise with nurses re: medication administration, especially for complex patients, just as it is essential for nurses to liaise with pharmacists re: options and correct administration of medications." (NSP # 2)

Students from both professions drew correlations between collaborative decision-making and enhanced patient safety.

"It is important for pharmacists and nurses to collaborate with clinical decisions [as collaboration] minimises errors and enhances patient care." (PSP # 2)

"Neither the nurse or the pharmacist should make decisions critical to the patient without interdisciplinary consultation." (NSP # 3)

3.23 Communication and Collaboration

Nursing students also perceived collaboration as the key to better communication, in relation to socialisation into the team environment.

10

"Interdisciplinary relationships [improve] communication ... not only for the patient

but for the cohesiveness of the whole care team." (NSP # 2)

Similarly, pharmacy students recognized the value of effective communication and

collaboration with other healthcare professionals such as nurses.

" ... building strong relationships [with HCPs] improves patients health outcomes"

(PSP # 24)

Additionally, pharmacy students recognized the RIPE learning model was an effective tool to

enhance collaboration.

"it provided insight into how to communicate with other HCPs" (PSP #44)

3.24 New Understandings of Roles and Responsibilities

Prior to their participation in the simulation, a number of pharmacy students perceived that

interaction between nurses and pharmacists on the ward would be minimal.

"Initially I thought the nurses would just hand the patient over to us and let us know of

any important things. I did not think there would be much interaction." (PSP # 10)

Pharmacy students tended to see their role as advising doctors on medication prescription

rather than collaborating with nurses who administer the medications.

"[I thought] interactions with nurses would be less so compared to medical

practitioners … Just every now and then." (PSP # 19)

However, after the simulation, students recognized that nurses spend a great deal of time

with patients as part of their role and that interaction between nurses and patients was an

intrinsic element of nursing practice.

"Nurses are involved with patient centred care [and are more involved with patients]

compared to prescribers and pharmacists." (PSP # 19)

This realization, and the practical aspects of communicating with nurses and the patient and

carer during the simulation, led pharmacy students to understand that nurses represent a

vital conduit to understanding the patient and their medication needs. This understanding

resulted in increased respect for the nursing profession.

11

"I hadn't taken into account that nurses are one of the best resources to understand our patient best." (PSP # 17)

Appreciation for the supportive nature of the nurse/pharmacist relationship in the clinical setting was acknowledged and enhanced.

"This is a crucial interaction. Nurses rely on pharmacists for medication advice, likewise pharmacists rely on nurses for patient information." (PSP # 13)

A greater depth of interprofessional respect and understanding was also articulated by the nursing students.

"It is interesting to see the work behind clinical pharmacy decisions- [I have] gained a greater appreciation [of their role] and further emphasised the importance they play in clinical service delivery and patient care." (NSP # 4)

Although pharmacy students appreciated the simulation experience, they also saw it as an opportunity to transfer learning to practice.

"I felt I didn't utilise their [nurses'] skills enough, but next time [when in clinical practice] I would be more ready…I didn't realise how much we can learn from nurses and their role with [understanding] the patient's current condition and about medication administration." (PSP #27)

The simulated experience was likewise appreciated by nursing students, with several attributing the experience to lessening anxiety for future clinical practice.

"Pharmacists are intimidating in a clinical setting for a nurse. [Collaboration] has soothed that a bit." (NSP # 5)

In addition to enhancing the appreciation and respect for other healthcare professionals in other areas of practice, pharmacy students also identified their appreciation for the diversity of roles within their own profession:

"[This experience enhanced] my understanding significantly to differentiate between the different types [of roles] between pharmacists (hospital/community)." (PSP #6)

4. Discussion

12

Nurses and pharmacists work collaboratively in the clinical practice setting, yet in tertiary education there appears to be limited opportunities to learn about each other's roles, functions and responsibilities. Furthermore, there is a paucity of research conducted with nursing and pharmacy students working collaboratively. This may have been attributed to faculty having curriculum scheduling difficulties;[29] and undefined IPE learning outcomes,[17] which is an essential component to mapping competencies.[30] Logistics for implementing the RIPE model of learning to enhance interprofessional collaboration for this pilot study were also considered. For example, as this was a collaborative approach to the learning, the multidiscilplinary case also involved collaboration from the representative healthcare professional academicians to write the unfolding case. This involved considerations for the type of collaborative discussions that would be addressed at each "station." Furthermore, time to schedule the activity and defining the learning outcomes for the representative professions added to the challenges for successful implementation into several curricula. An overarching theme and three subthemes emerged from the qualitative thematic analysis. One of the outcomes from our research identified that both pharmacy and nursing students developed an enhanced appreciation and respect for the other healthcare professions. This sentiment has also been acknowledged in previous research where nursing and pharmacy students in Qatar, identified nursing students having an appreciation of pharmacy students' pharmacological knowledge and pharmacy students appreciating nursing students medication administration skills.[16] Other similarities included, students recognizing that communication between their professions was going to be a feature of their future working lives and that nurses held intimate knowledge of the patient, a result of which this study identified. Some pharmacy students from the current study identified that they did not utilize the expertise of the HCP (nurse in this case) as a primary point of contact between the patient and other HCPs (pharmacists), especially since it was the nurse who was the primary HCP monitoring the signs and symptoms since admission; and was privy to further information regarding the patient's social and family interactions. Post the simulation laboratory, many pharmacy students failed to make the necessary connections, for example

between the medications prescribed and the family interactions which contributed to other unlisted medications taken by the patient, ultimately affecting their vital signs. It was perceived by both pharmacy and nursing students that effective communication between the nurses and pharmacists would have been beneficial to resolve any discrepancies and/or issues that arose due to family interactions with the patient.

Another important outcome of this study indicated changes in pharmacy students' perceptions related to their awareness of their roles, responsibilities of their own profession as well as for the other healthcare professions (nurses); in team-based care, with regards to making clinical decisions and related to communication and teamwork. Results of our study showed that there were statistically significant positive changes to their perceptions from the pre-test and post-test surveys for all 6-items on the survey. However, only one item on the survey elicited a statistically significant result for the nursing students. This is likely to have been attributed to the fact that the nursing students involved in this study previously had a minimum of three hundred hours of experience within a real-world clinical environment, and as such were more likely to have been exposed to the operations around team-based care. Conversely, this was the first time pharmacy students were exposed to a clinical experience with other HCPs. Although small positive changes were reported, all 6 survey items reported a statistically significant positive change, indicating that the pharmacy students perceived this a valuable learning exercise that improved their awareness of the roles, responsibilities, functions, and their perceived value in working collaboratively with the other healthcare professional during this exercise.

Despite the positive student outcomes from our study suggesting the collaboration as an important skill development to improve patient outcomes, previous research demonstrated a decline in pharmacy students' desire to collaborate following a joint clinical experience.[29] The researchers attributed this to a number of factors including: students being responsible for organizing their own interdisciplinary partnerships; pharmacy students having limited time in the clinical arena previously; and the collaborative contact being limited to eight hours. However, in the present study, feedback was overwhelmingly positive despite the

experience only being six hours long. Likewise, a study conducted in the United Kingdom (UK) limited to a half day experience involving medicine, nursing and pharmacy students collaborating in medication safety workshops, evaluated the collaborative experience positively and reported developing greater insight into each other's roles and responsibilities,[31] indicating that the time allocated for IPC within a curriculum may not be related to the learning experience, but rather a well-designed model may have a greater impact in student engagement and educational experience. When healthcare students and/or practitioners are not provided with the tools to develop IPC skills, professional stereotypes can prevail which may be associated with diminished professional respect for the other HCP roles, functions and responsibilities.[32] It is important to provide opportunities for IPC as when siloed, this limits opportunity to develop understanding of the importance of each healthcare professional's roles within the healthcare team.[32]

This study showed positive results for implementing the RIPE Model, which may be attributed to a well-designed interprofessional learning model for the educational experience. As such, tasks involved in the model equally challenged students from each healthcare professional group, facilitators worked as a cohesive group; and were drawn from all professional groups involved in the study. This allowed the facilitation of students to work together to problem solve for patient safety. Although a plethora of data collection utilized in published research papers involve surveys that indicate an agree versus a disagree response, previous published literature suggest that there are drawbacks to survey data when respondents are asked to agree or disagree with a statement as opposed to using construct-specific response sets [33] and/or phrasing survey items as statements rather than questions.[34] This poses a possible limitation to the study. Limitations of the study also included the fact that primarily only two healthcare professional groups (pharmacist and nurses) were represented. Future studies should include a number of healthcare professional groups such as Speech Pathologists, Physiotherapists and Clinical Psychologists, which would further contribute to the authenticity of the case and study. Furthermore, limitations extend to the fact that there were an unbalanced number of

pharmacy students vs nursing students involved in this pilot study. This was due to the fact that the model required the pharmacy students to progress throughout the stations while the nursing students remained at each station of which only 8 interactive stations existed (with two reflective stations). Future studies may benefit from a select and equal number of the same health professional students to progress through the stations at the same time. This way there would likely be a more collaborative approach between the health professional students and/or practitioners. While 10 workstations appeared to provide the students with a process to deliver the required outcomes, it was recognized that perhaps additional reflection stations midway through the model would benefit the students from a variety of disciplines and could be utilized as a resource for the collaborative decision making between a diversity of healthcare professional students. Furthermore, communication conducted at the reflective collaborative stations could be observed by a facilitator from each of the healthcare disciplines to track the progression and effectiveness of the conversations. Future research utilizing the RIPE model is currently underway and include research into the communication strategies between healthcare professionals when for example, medication doses, dosing schedules, and/or inappropriate medication administration discrepancies are detected.

5. Conclusion

This pilot study applied a novel learning model, namely, the RIPE model (Reflective Interprofessional Education Model) to a simulation laboratory to enhance pharmacy and nursing students' interprofessional collaboration skills. Students perceived this model as a possible effective strategy to enhance their IPC skills. The model enhanced their understanding of other healthcare professionals' roles, and functions, and their understanding of responsibilities in multidisciplinary team based care to deliver better informed clinical decisions for better patient health outcomes.
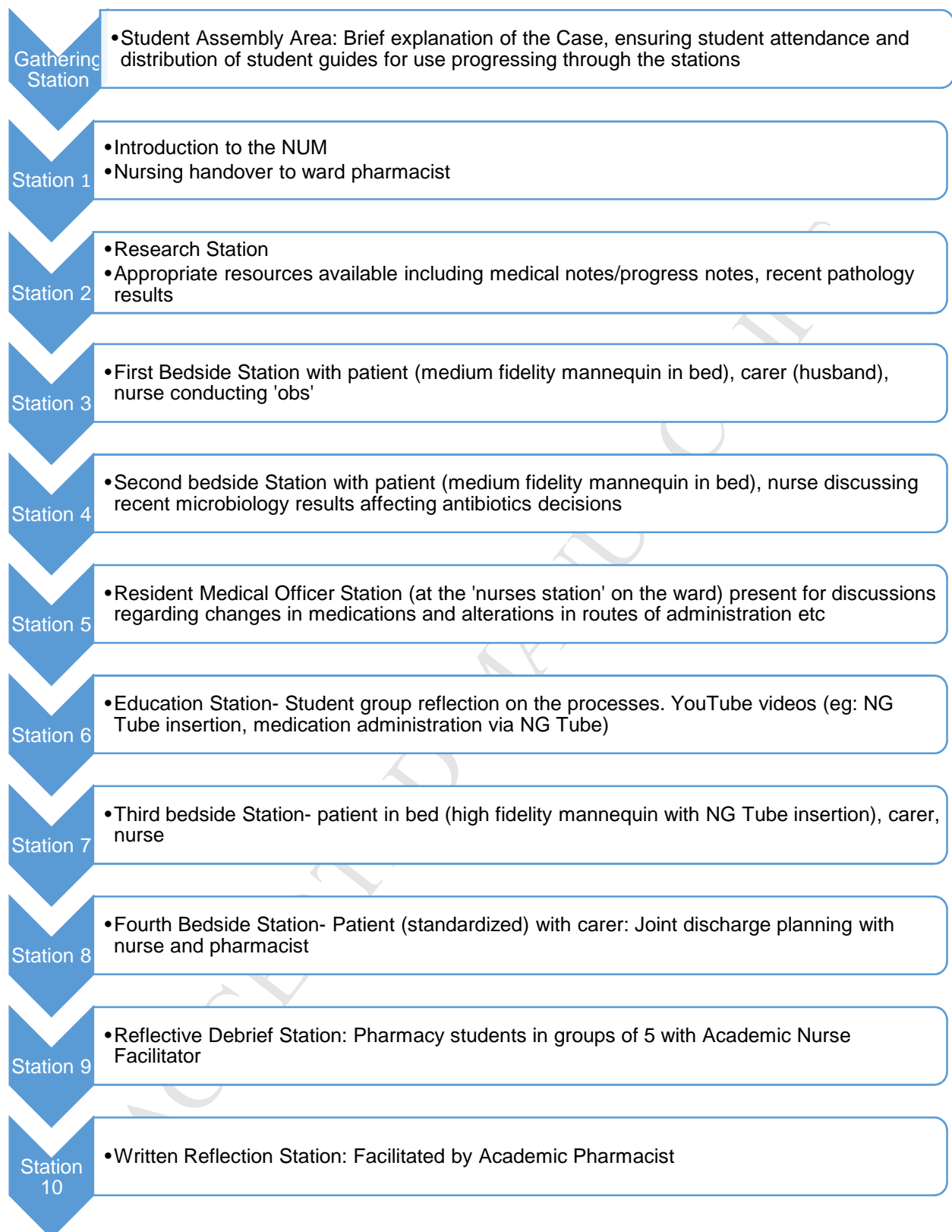
Funding

Disclosures

None

Previous presentation of the data

Brief highlights from the study were presented at the 20th ISPW International Pharmacy Conference, Leuven, Belgium, 23-26 July 2018.[35]

Figure 1. Description of the RIPE Model [a]

Gathering Station	• Student Assembly Area: Brief explanation of the Case, ensuring student attendance and distribution of student guides for use progressing through the stations
Station 1	• Introduction to the NUM • Nursing handover to ward pharmacist
Station 2	• Research Station • Appropriate resources available including medical notes/progress notes, recent pathology results
Station 3	• First Bedside Station with patient (medium fidelity mannequin in bed), carer (husband), nurse conducting 'obs'
Station 4	• Second bedside Station with patient (medium fidelity mannequin in bed), nurse discussing recent microbiology results affecting antibiotics decisions
Station 5	• Resident Medical Officer Station (at the 'nurses station' on the ward) present for discussions regarding changes in medications and alterations in routes of administration etc
Station 6	• Education Station- Student group reflection on the processes. YouTube videos (eg: NG Tube insertion, medication administration via NG Tube)
Station 7	• Third bedside Station- patient in bed (high fidelity mannequin with NG Tube insertion), carer, nurse
Station 8	• Fourth Bedside Station- Patient (standardized) with carer: Joint discharge planning with nurse and pharmacist
Station 9	• Reflective Debrief Station: Pharmacy students in groups of 5 with Academic Nurse Facilitator
Station 10	• Written Reflection Station: Facilitated by Academic Pharmacist

[a.] Lucas et al. Development of the RIPE Model (Reflective interprofessional Education Model) to enhance interprofessional collaboration. *Research in Social and Administrative Pharmacy (In Press)* [8]

19

Table 1

Pharmacy students' pre-test (prior to the simulation laboratory) and post-test (after the simulation laboratory) questions. [a]

1. I am aware of the roles and responsibilities of registered/licensed pharmacists in team-based care

2. I am aware of the roles and responsibilities of registered/licensed nurses in team-based care

3. The role and responsibilities of a registered/licensed pharmacist is very important in team-based clinical decision making

4. The role and responsibilities of a registered/licensed nurse is very important in team-based clinical decision-making

5. Working collaboratively with registered/licensed nurses will enhance communication skills and interprofessional teamwork

6. Working collaboratively with registered/licensed nurses will improve clinical decision-making

[a] Style of table questions adapted from Simko et al (2017) [19]

Table 2

Nursing students pre-test (prior to the simulation laboratory) and post-test (after the simulation laboratory) questions.[a]

1. I am aware of the roles and responsibilities of registered/licensed nurses in team-based care

2. I am aware of the roles and responsibilities of registered/licensed pharmacists in team-based care

3. The role and responsibilities of a registered/licensed nurse is very important in team-based clinical decision-making

4. The role and responsibilities of a registered/licensed pharmacist is very important in team-based clinical decision making

5. Working collaboratively with registered/licensed pharmacists will enhance communication skills and interprofessional teamwork

6. Working collaboratively with registered/licensed pharmacists will improve clinical decision-making

[a] Style of table questions adapted from Simko et al (2017)[19]

Table 3

Reflective statement prompt questions for pharmacy and nursing students [a]

1. What were your initial thoughts of the roles and responsibilities of pharmacists in relationship with nurses?

2. Have those thoughts and feelings changed as a result of the simulation lab? If so how?

3. What are your thoughts of pharmacists and nurses making joint clinical decisions for patient care?

4. Do you think the simulation lab helped develop your joint clinical decision-making skills? If so, how and if not why?

5. Have you come to new insights or understandings as a result of your participation with the simulation lab today?

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[a] Reflective questions adapted from Lucas et al. (In Press) [8]

Table 4

Thematic analysis approach[a]

Phase	Description of the Process
1. Familiarisation of the data set	Reading and re-reading the data set (eg: reflective statements)
2. Generating initial codes	Highlighting interesting aspects in the data set and ensuring each data has been given equal attention in the coding process
3. Searching for Themes	Matching codes to potential Themes
4. Reviewing Themes	Reviewing Themes in relation to the matched codes
5. Defining and Naming Themes	Generating concise definitions and refining the final Themes- often conducted in consultation with additional researchers
6. Write up analysis- Reporting the Themes	Final analysis relating back to the research question(s)

[a]Adapted from Braun and Clarke's (2006) 6-phase process of Thematic Analysis: Braun, V. and Clarke, V. (2006) Using thematic analysis in psychology. Qualitative Research in Psychology, 3 (2). pp. 77-101

Table 5
Results (pre-test and post-test) of students' perceptions

Student Type	Survey Item	Pre-test	Post-test	Sig

		mean (sd)	Mean (sd)	
Pharmacy students' responses N=52 matched data	I am aware of the roles and responsibilities of pharmacists in team based care	4.7(0.89)	5.4(0.63)	p<0.05
	I am aware of the roles and responsibilities of registered/licensed nurses in team based care	4.4 (1.03)	5.4(0.60)	p<0.05
	The role and responsibilities of a pharmacist is very important in team based clinical decision making	5.4(0.57)	5.7(0.48)	p<0.05
	The role and responsibilities of a registered/licensed nurse is very important in team based clinical decision making	5.2(0.66)	5.8(0.38)	p<0.05
	Working collaboratively with registered/licensed nurses will enhance communication skills and interprofessional teamwork	5.4(0.60)	5.9(0.32)	p<0.05
	Working collaboratively with registered/licensed nurses will improve clinical decision making	5.4(0.60)	5.8(0.38)	p<0.05
Nursing students' responses N=8	I am aware of the roles and responsibilities of registered/licensed pharmacists in team based care	4.7(0.51)	5.8(0.38)	p<0.05

24

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