



Original Article

## Reducing health provider stereotypes through undergraduate interprofessional education

Kerry Wilbur, FCSHP<sup>a,\*</sup>, Alla El-Awaisi, PhD<sup>b</sup> and Maguy S. El-Hajj, BCPS<sup>b</sup>

<sup>a</sup> The University of British Columbia, Faculty of Pharmaceutical Sciences, Vancouver, BC Canada

<sup>b</sup> Qatar University, College of Pharmacy, Doha, Qatar

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### المخلص

**أهداف البحث:** يمكن للقولب النمطية للمهنيين الصحيين أن تؤثر سلباً على تقديم الرعاية الصحية التعاونية والنتائج الإيجابية للمرضى. ومع ذلك، يمكن أن يكون التعليم البيئي مفيداً في تعزيز التوضيح المبكر لأدوار العاملين الصحيين والتفاهم والاحترام المتبادل بين المتدربين من مختلف التخصصات الصحية. درسنا تأثير أنشطة التعليم البيئي على آراء ومواقف طلاب الصيدلة تجاه الممرضين والأطباء المتدربين.

**طرق البحث:** أكمل طلاب الصيدلة تمريناً منظماً تأملياً بعد نشاطين منفصلين للتعليم البيئي مع طلاب التمريض وطلاب الطب، وكلا النشاطين حول رعاية مرضى السكري. لقد أجرينا تحليلاً استقرانياً للمحتوى لخواطر التآملات لتحديد الموضوعات الرئيسية وفقاً لمجالات الإطار النظري لفرضية الاتصال: السلطة التنظيمية، والأهداف المشتركة، والتعاون بين المجموعات، وحالة المجموعة المتساوية، والحالة بين المجموعات. سُئل طلاب الصيدلة أيضاً عن كيفية تأثير أنشطة التعليم البيئي على تصورهم لممارسة الصيدلة مستقبلاً.

**النتائج:** شعر طلاب الصيدلة أن مجموعاتهم قد تعاونت لحل أهداف رعاية المرضى المشتركة في كل أنشطة التعليم البيئي دون تمييز ملحوظ بين طلاب التمريض أو الطب. ومع ذلك، عن طريق التفاوض الصريح أو الضمني حول الأدوار المتداخلة، اتخذ الكثيرون في النهاية مواقف تفضيلية بالنسبة لطلاب الطب بشكل عام، تم تغيير مواقف طلاب الصيدلة وجهات نظرهم تجاه قدرات وأدوار طلاب التمريض والطب في رعاية المرضى بشكل إيجابي من خلال أنشطة التعليم البيئي. على وجه الخصوص، اكتشف طلاب الصيدلة المعرفة الدوائية والقدرات التشخيصية للممرضات، وكذلك الإمام بالأدبيات الأولية وأنظمة وصف الأدوية من قبل الأطباء.

**الاستنتاجات:** تم تغيير وجهات النظر النمطية لطلاب الصيدلة تجاه طلاب التمريض والطب بشكل إيجابي عندما تم تحسين ظروف نشاط التعليم البيئي للتواصل بين المجموعات. على نطاق أوسع، يعد البحث المستمر ضرورياً لفهم الآثار طويلة المدى للتعرض المبكر لمجموعات الأقران من المهنيين الصحيين على الصور النمطية التي قد تظهر في الرعاية القائمة على الفريق في المستقبل.

**الكلمات المفتاحية:** القولب النمطية؛ الشرق الأوسط؛ التعليم المهني؛ تعاون؛ رعاية المريض

### Abstract

**Objective:** Stereotypes among health professionals can jeopardize the delivery of collaborative healthcare and the achievement of positive patient outcomes. However, interprofessional education (IPE) can promote early clarification of roles, and understanding and mutual respect among trainees from different health disciplines. We studied the effects of IPE activities on the views and attitudes of pharmacy students toward nurse- and physician-trainees.

**Methods:** Pharmacy students completed a structured written reflection exercise immediately following two separate IPE activities with nursing and medical students, both oriented around diabetes care. We conducted an inductive content analysis of these texts to identify key themes according to the domains of the contact hypothesis theoretical framework: organizational authority, common goals, intergroup cooperation, equal group status and intergroup status. Pharmacy students were also asked how these IPE activities have influenced their views regarding their future pharmacy practice.

**Results:** Pharmacy students felt that their groups had cooperated to solve the common patient care goals in each IPE activity, and noted no distinction between the

\* Corresponding address: UBC Faculty of Pharmaceutical Sciences, 2508 Wesbrook Avenue, Vancouver, BC V6T 1Z3 Canada.

E-mail: [kerry.wilbur@ubc.ca](mailto:kerry.wilbur@ubc.ca) (K. Wilbur)

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nursing and medical students. However, through either explicit or implicit negotiation of overlapping roles, many pharmacy students ultimately assumed deferential positions relative to medical students. Overall, pharmacy students' attitudes and views regarding the abilities and roles of nursing and medical students in patient care were favorably altered through the IPE activities. Notably, nurses' drug knowledge and diagnostic abilities of nurses and physicians' familiarity with the primary literature and prescribing regimens was previously under-rated but became recognized after IPE activities.

**Conclusion:** Pharmacy students' stereotypical views towards nursing and medical students were positively shifted when IPE activity conditions were optimized for intergroup contact.

**Keywords:** Collaboration; Interprofessional education; Middle East; Patient care; Stereotypes

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## Introduction

Respect and esteem for physicians is notoriously strong in the Middle East region. Although pharmacists may be routinely considered among the most trusted health professionals in various settings worldwide, in Gulf Council Countries, such as Oman, KSA, the United Arab Emirates and Qatar, members of the general public are inclined to rely primarily on the advice of physicians and often characterize pharmacists as “drug sellers” or “vending machines.”<sup>1–7</sup> Unfortunately, nurses are no better positioned. Laypeople have a poor understanding of nurses' knowledge or scope of practice of nursing, and tend to view nursing as a low-status profession.<sup>8–10</sup> Negative biases in the region can be so pervasive that students may be discouraged by community or family members from pursuing nursing as a career.<sup>11,12</sup> Such unfortunate societal attitudes are also reflected in the personnel and health infrastructures of Middle East care contexts, wherein imbalances in perceived stature can contribute to hierarchies in the workforce.<sup>13–15</sup> Physicians' dominance within patient care teams may persist partly because of a lack of local allied health training opportunities and resultant practice, and decision-making in relative isolation. Under-represented professions in the region include social work,<sup>16</sup> physiotherapy<sup>17</sup> and occupational therapy.<sup>18</sup> Although patients themselves may typically exhibit a preference for receiving care from physicians, interprofessional care is associated with positive health outcomes.<sup>19</sup>

Indeed, collaboration among health disciplines is now necessary more than ever, given the increasing complexity of contemporary clinical care as populations age, chronic diseases become more prevalent and treatments become further specialized. Patients may be managed in decentralized systems with many health workers in various team or network

configurations.<sup>20</sup> Communication among care providers, patients and families has been well established to be essential to minimize medical error and improve patient safety.<sup>21,22</sup> Interprofessional care has the potential to additionally positively influence the well-being of team members.<sup>23</sup> Despite its merits, enacting interdisciplinary health care models is not always straightforward and can be impeded by factors including a lack of awareness regarding roles and competencies, poor information sharing, conflict and organizational structures.<sup>24</sup> Incorporation of interprofessional education (IPE) programming into undergraduate training is intended to mitigate such challenges through early acclimation to other disciplines' overlapping complementary expertise and roles in patient care. When students in two or more disciplines learn about, from, and with one another in joint learning activities, interdisciplinary perceptions and attitudes improve, and collaborative knowledge and skills increase.<sup>25</sup>

Various frameworks exist to guide the integration of IPE programming into health professional curricula worldwide.<sup>26</sup> A commonly used model involves learning opportunities designed to promote exposure, immersion and mastery of interprofessional concepts and patient care.<sup>27</sup> Activities are designed with specific stages of the trainees' trajectory in mind, advancing from early year professional students' learning of both their own and others' roles to more collaborative interactions later in the curriculum. Mastery is typically considered a status of “judgements, attitudes, skills and values” for health professionals to continually strive toward.<sup>27</sup>

Early exposure and immersion exercises with health professional students may be particularly powerful curricular tools for dispelling the interprofessional myths that abound in Middle East contexts. In fact, the premise of Allport's contact theory<sup>28</sup> is that intergroup prejudice and negative attitudes can be mitigated by bringing groups together under specific conditions, particularly a facilitated atmosphere of equal status, cooperation, positive expectations and common goals. These features are clearly achievable in the purposeful design and delivery of IPE activities.<sup>29</sup> In this study, we sought to explore how IPE activities designed to optimize conditions of contact theory might practically alter pharmacy students' attitudes and views toward nursing and medical students after immersion experiences with these peer groups.

## Materials and Methods

### Study setting

Qatar is a small emirate state with nearly 3 million residents, located in the Arabian Gulf. The country has experienced relatively recent economic prosperity due to oil and natural gas revenues, which the government has partly devoted to infrastructure expansion of health care services and associated education programs necessary for its growing population.<sup>30</sup> Consequently, several health discipline training programs of modest class sizes (20–60) have proliferated over the past 20 years in the capital city, Doha. The majority represent cross-border partnerships

with North American programs (dental hygiene, medicine, medical radiography, nursing, paramedicine, dental and pharmacy technology, and respiratory therapy) or domestic curricula with North American accreditation (laboratory sciences, pharmacy and nutrition).<sup>31</sup>

### *IPE curriculum*

A multidisciplinary Interprofessional Education Committee centrally coordinates integration of IPE in the country's 15 healthcare training programs.<sup>32</sup> Activities are included in curricula across different professional years with various levels of exposure, immersion, and mastery and partnering of as many as six different disciplines at one time. Health topics and the modality of delivery (e.g., case-based discussion, simulation or games) are chosen through committee consultation. Learning objectives are selected from shared IPE competencies including role clarification, interprofessional communication, shared-decision-making and patient-centered care.

### *Shared care: Diabetes patient cases*

The prevalence of diabetes mellitus in Qatar is among the highest worldwide. In 2016, a national diabetes strategy<sup>33</sup> was released promoting a coordinated approach to patient care. Consequently, IPE activities incorporating diabetes are particularly relevant to the future roles of health professional trainees. During the 2016–2017 academic year, third-year pharmacy students engaged in diabetes-oriented IPE with second year nursing and second year medical students (Table 1). The learners' professional year was chosen according to when diabetes content was covered in each program's curriculum.

In the first activity, pharmacy and nursing faculty co-created an IPE activity involving the shared care by pharmacy and nursing students of a patient with diabetic ketoacidosis, an acute and potentially life-threatening complication of type 1 diabetes.<sup>34</sup> The teaching case encompassed patient progress through four stages of care: (1) diagnosis and initial emergency department management, (2) critical care admission, (3) transition to a general medicine ward and (4) planning for discharge home. Later in the academic year, these same pharmacy students joined medical students for an IPE activity jointly developed by pharmacy and medical faculty using a simulated collaborative diabetes care experience with standardized patients portraying either an ambulatory clinic visit or an in-patient encounter.<sup>32</sup>

### *Reflection in IPE assessment*

Reflection is an established instructional strategy in health professional education.<sup>35,36</sup> Students' recording or "journaling" can stimulate affective learning associated with interprofessional encounters, and its utility as a summative assessment tool has been demonstrated.<sup>37</sup> After each IPE activity, pharmacy students completed a structured reflection assignment. Specific prompts were incorporated to elicit reflection at the personal, professional, and interprofessional levels, reveal potential pre-existing

stereotypes and explore their possible resolution.<sup>38</sup> All pharmacy students submitted the reflection as part of the mandatory pharmacy coursework associated with this IPE activity and received formative feedback from the course instructor.

### *Data analysis*

The text of the submitted reflections was analyzed through a qualitative approach. Inductive content analysis was used to identify key themes in the responses to structured prompts according to the contact hypothesis theoretical framework.<sup>39</sup> All reflections were repeatedly read by the researchers during analysis to discern patterns and themes. Two authors (KW and AE) independently reviewed the same two randomly selected reflections and compared results to develop preliminary codes. Another three reflection documents were independently coded by all three authors (KW, AE and ME) through this framework, who convened to discuss and arrive at a final coding structure. The remaining reflections were coded by one researcher (KW), and the initial five reflections were recoded. The research team then regrouped the code-set into themes, examined similarities and differences, and selected representative quotations.

## **Results**

We present our study findings within the framework of contact theory with representative quotations from pharmacy students to illustrate the key concepts, including organizational authority, common goals, intergroup cooperation, equal group status and intergroup perceptions. We additionally summarize pharmacy students' overall impressions and implications for future practice.

### *Organizational authority*

Each of these two activities was part of an emerging nationwide formal IPE program. Therefore, institutional support—or organizational authority as described by Alport—was inherent.<sup>28</sup> Rotating host campuses, shared introductory icebreakers, and mixed-discipline facilitators all reinforced the collective endorsement.

### *Common goals*

Similarly, our activity structure and instructions necessitated cooperative effort to achieve the case objectives. In contact theory,<sup>28</sup> common goals are the expectations joining two or more groups; through active collaboration, prejudice can be reduced. The common goals purposely incorporated into the IPE design were indeed borne out among the student groups, as evidenced by the participants' reflections. The pharmacy students felt that their teams were working together to solve patient care issues, and noted no distinction between the nursing and medical students.

Everyone in the team contributed by identifying his/her professional role and sharing knowledge about diabetic ketoacidosis, the source of knowledge and the proper

management of the patient's case. We discussed the questions together [with nurses] and then recorded the answers. (Participant 14)

We were working together [with nurses] to find the association between the lab values and the changes in the dosage regimen and the medications for the patient. (Participant 15)

Overall, both pharmacy and medical students were working co-operatively to achieve our patient-centered goals. (Participant 5)

In some instances, this mixed-discipline approach to patient-centered care shed light on how the participants viewed their own processes as pharmacists and how they might modify these in the future.

We evaluate the patient profile ... but we always assume there must be a problem in patient medication. This can [have] advantages and disadvantages at the same time: Advantage because we are the medication experts and we are the ones who should discover drug-related problems; however, it can be a disadvantage when we just focus on medications and forget about other patient problems/concerns. (Participant 1)

### Intergroup cooperation

Intergroup cooperation is inextricably linked to the attainment of common goals; members must rely on one another to accomplish tasks without intergroup competition. More favorable attitudes toward outgroup members arise when this interdependence is positive.<sup>28</sup> The pharmacy students offered many examples of how members of their various teams collaborated through both sharing and division of tasks, including the planning and execution of the standardized patient interview and the discharge plan design. By contrast, several participants identified specific ways in which they relied on their student peers to bridge gaps in their own skills and knowledge, such as physicians' physical assessments or nurses' abilities to "care about the patient and think about what will make him comfortable rather than just making a care plan and managing the case" (Participant 1).

While pharmacy students reflected on how the groups drew upon complementary expertise to solve these diabetes patient cases, they also considered the negotiation of overlapping roles.

The medical students worked with us on the whole case, we have similar roles but with different "thinking corner".

**Table 1: IPE activity descriptions.**

Pharmacy and Nursing Students		Pharmacy and Medical Students	
Time	Content	Time	Content
20 min	<p><i>Introduction</i></p> <ul style="list-style-type: none"> <li>- student welcome and facilitator introductions</li> <li>- outline of the activity plan/timelines</li> <li>- organization of students into pre-assigned mixed groups (25 pharmacy students + 47 nursing students)</li> </ul>	25 min	<p><i>Introduction</i></p> <ul style="list-style-type: none"> <li>- student welcome and facilitator introductions</li> <li>- outline of the activity plan/timelines</li> <li>- organization of students into pre-assigned mixed groups (25 pharmacy students + 40 medical students)</li> </ul>
30 min	<p><i>Icebreaker</i></p> <ul style="list-style-type: none"> <li>- game for the small groups to mingle</li> </ul> <p><i>Small Group Activity</i></p> <ul style="list-style-type: none"> <li>- four student groups are assigned a patient case to answer specific questions regarding one aspect of collaborative care for diabetes ketoacidosis:               <ol style="list-style-type: none"> <li>(i) diagnosis and initial emergency department management</li> <li>(ii) critical care admission</li> <li>(iii) transition to a general medicine ward iv) planning for discharge home</li> </ol> </li> </ul>	40 min	<p><i>Icebreaker</i></p> <ul style="list-style-type: none"> <li>- game for the small groups to mingle</li> </ul> <p><i>Small Group Activity</i></p> <ul style="list-style-type: none"> <li>- student groups review written medical summary and plan their interview for one of two cases: a patient with diabetes visiting an ambulatory clinic or an in-patient encounter (15 min)</li> <li>- each small group is assigned to the standardized patient for interview (10 min)</li> <li>- students collaborate to create a treatment plan (15 min)</li> </ul>
60 min (15 min × 4 groups)	<p><i>Large Group Debrief</i></p> <ul style="list-style-type: none"> <li>- a spokesperson from each group shares treatment plans (verbally and with flipcharts)</li> <li>- a small group spokesperson ± other small group members answer questions from facilitators and students in the other groups</li> </ul>	20 min	<p><i>Small Group Debrief</i></p> <ul style="list-style-type: none"> <li>- a pharmacist- and a physician-facilitator guide each small student group through a structured discussion of their treatment plan</li> </ul>
10 min	<p><i>Closing</i></p> <ul style="list-style-type: none"> <li>- parting remarks by facilitators</li> </ul>	15 min	<p><i>Large Group Debrief</i></p> <ul style="list-style-type: none"> <li>- open discussion by all students</li> </ul>
		10 min	<p><i>Closing</i></p> <ul style="list-style-type: none"> <li>- parting remarks by facilitators</li> </ul>

For instances, we both interpreted the lab values, but they relate them to patients' symptoms and used them for diagnosing purposes, while we used them to measure medications effectiveness. (Participant 7)

It is hard to split what we did in to two separate roles because we were working as a good team; we were integrating our knowledge and skills together. (Participant 15)

Each member of the team was able to take the lead when the issue was involving their area of expertise, leading to an overall enhanced patient outcome while trying to make optimum use of the overlap. Our collaboration was enhancing for each of our roles. (Participant 5)

### *Equal group status*

According to contact theory, positive effects are further facilitated when participants perceive their positions and contributions to be comparable to those of members of the disparate groups.<sup>28</sup> Pharmacy students consistently reported a sense of mutual respect in their various teams and a generally harmonious atmosphere during the two activities. However, the actual input that they described when working with the medical students may belie true parity. Through either explicit or implicit negotiation of overlapping roles, several pharmacy students ultimately assumed deferential positions. One student disclosed the resultant negative ramifications for her.

My team members were very collaborative; we discussed every aspect of the case together. But they essentially contributed in interviewing the patient and assessing the signs and symptoms and health problems. (Participant 17)

Medical students started the interaction with the patients, which limited the amount of information that we gathered from the patient. Even though we have been taught in the college to ask about a lot of things when we meet the patient, but the medical students asked about everything including the chief complaint, family history, social history, medical history and left us to address the medications only! (Participant 9)

Although each professional has a unique role, there is so much overlap between the roles of the clinical pharmacist and the physician. It was apparent from the repeated questions to the patient. Also, medical students believe that they are the leaders, "controllers" and superior to other medical professions. This influenced my decision about my future job as I decided now to not work in clinical settings. (Participant 14)

Pharmacy students outlined various ways through which they sought to establish equal status with medical students, to varying degrees of success. By contrast, some felt they held dominant roles over the nursing students, which made them uncomfortable.

I learned that I should always support my opinion with evidence to strengthen my recommendation and to reduce the time and effort spent to convince them [physicians]. (Participant 17)

Showing confidence in what I say and showing physicians that I have a level of knowledge close to theirs (about pathophysiology of the disease, diagnosis, lab data) ... improves communication, breaks barriers and provides more trust. (Participant 3)

Excessive enthusiasm! They made a comment on the feedback that pharmacy students just want to show us that we know better than them. (Participant 14)

I think that this event needs the involvement of physician also to simulate the real life. Physician's involvement will release some of the stress, because in this case the nurses were completely relying on our recommendations. (Participant 4)

### *Intergroup perceptions*

For intergroup attitudes to be effectively changed, the contact must facilitate information and experiences that dispel prevailing stereotypes.<sup>40</sup> Pharmacy students noted their under-estimation of the scope of nurses' medication-associated knowledge and clinical skillset. Familiarity with drug classes and adverse effects, and abilities to interpret patient laboratory data were unexpected, yet favorably received.

I did not have a deep understanding of how nurses can help pharmacists figure out things that they know better. (Participant 9)

Pharmacy students in turn felt that their nursing peers learned that pharmacists also have an understanding of physical assessment and laboratory data interpretation. Similarly, medical students were surprised by pharmacy students' abilities beyond drug therapy information, including patient history-taking and disease diagnosis. Through the IPE activity, pharmacy students gained a new appreciation of medical students' familiarity with the biomedical literature and treatment regimens. They had not foreseen how positively (for the most part) medical students would approach their working relationship.

I had a stereotype that medical students would be a little arrogant and would see themselves better than us. But fortunately I was amazed by how kind and lovely they were. So, I learned a lesson, which is I should not judge others until I meet them and see how they react. (Participant 8)

Responses were mixed when pharmacy students were asked if they had a preferred IPE experience. Relative satisfaction with nursing or medical student collaboration was attributed to a variety of factors beyond the distinct disciplines encountered, and included each case's particular diabetes focus, interaction with standardized patients, small group and facilitator dynamics, location and even the time of day of the activity.

### *Students' perceived implications for future practice*

Together, our results indicated that these IPE activities clearly influenced pharmacy students' impressions regarding future collaborative care. Pharmacy students indicated how

the simulated diabetes case exercises increased their confidence and comfort regarding their knowledge and allowed them to practice interprofessional communication. Our findings also suggested how the participants intend to approach their future practice. The pharmacy students believed that they will work more closely with nurses to monitor patients and will involve nurses when making drug therapy decisions. They identified how the patient information that nurses possess can contribute to their own patient care, and indicated that they valued reciprocal learning and information-sharing.

I now appreciate how nurses might know things about patient more than the physician since, she spend all her time near the patient to provide him with full types of care needed. (Participant 10)

We should be closer to nurses to answer their questions about drugs and to take the important patient information from them. (Participant 17)

Pharmacy students also better appreciated how to capitalize on shared care opportunities and develop trusting relationships with physicians. Once again, they forecasted that their interactions with other team members would enhance their own roles in medication-associated patient care.

This event gives me an idea about what might physician expects from pharmacist in providing patient care. For example, I now appreciate the importance of knowing the recent guidelines and major clinical trials, because I used them a lot in my discussion with the medical students. (Participant 1)

I learned from the medical students how to pick up clues about the patient regarding medication adherence. Also, I realized the importance of communicating with physicians to enhance drug prescribing. (Participant 17)

Pharmacy students generally genuinely looked forward to interprofessional care opportunities when they graduate. Several students even referred to "excitement." These immersive IPE activities helped reinforce the concepts of collaborative team-based care and practically foster the necessary skills.

Asking others is not consider as limitation; [it] will help in prevent many problems ... which effects the patient in good way. (Participant 3)

I realize the important of setting the goals of therapy with the physician and nurses to be patient-centered and work together to achieve them. It is not competition, but it is patient life. (Participant 6)

I will have the courage to intervene in cases requiring a direct action, as I will be able to discuss and interact freely with other health care providers. I will be able to interact, listen, and intervene in cases as to provide the best well-designed care plan. The more IPE sessions we have, the more professional we get. (Participant 2)

There is a significant difference [between] knowing and practicing teamwork. (Participant 11)

## Discussion

In this study, we synthesized pharmacy students' reflections on IPE activities with nursing and medical students. Through their documented experiences, we identified how pharmacy students' perceptions of nursing and medical students were shaped by working together to manage diabetes patients in simulated scenarios. Of note, nurses' previously under-rated drug therapy knowledge and diagnostic abilities, and physicians' familiarity with primary literature and prescribing regimens, became recognized. Pharmacy students believed that they were also able to exhibit disease knowledge and patient-centered care approaches that might have previously been overlooked by these peers. Our findings are consistent with those of other local studies evaluating the effects of a smoking cessation IPE activity in X with pharmacy, medical, nursing, respiratory therapy and public health trainees on student stereotypes.<sup>41</sup> Favorable changes in Student Stereotype Rating Questionnaire (SSRQ) scores with respect to baseline implied that the exercise corrected misconceptions and clarified outgroup members' professional roles and competencies.

Stereotype formation can be rapid and persistent. Preconceived notions of different health and social care students have been found to be evident even among first year students across diverse health profession programs.<sup>42</sup> Nurses are repeatedly perceived as most "caring," whereas physicians tend to be portrayed as more "competent."<sup>43</sup> Meanwhile, pharmacists continue to be linked to providing drug products and not patient care.<sup>44</sup> These characterizations reflect existing attitudes and influence expectations of behavior and performance.<sup>45</sup> When health care providers carry inaccurate stereotypes into practice, interprofessional collaboration and communication among team members is undermined.<sup>46</sup> Managing stereotypes, through not only dispelling negative or inaccurate perspectives but reinforcing positive ones, is imperative for optimum shared and safe patient care.<sup>47,48</sup>

However, the premise that the learning conditions outlined in contact theory can promote interprofessional understanding and future team function is debated. In a synthesis of IPE theoretical frameworks, Barr has found that the application of contact theory is not consistently associated with positive relationship modification.<sup>49</sup> Others additionally have contended that the potential benefits of students' group work in IPE may be overestimated, particularly when genuine equal group status among mixed-discipline participants proves elusive.<sup>50</sup> Unfortunately, this aspect did arise in our IPE activity with the medical students, and one pharmacy student indicated that it will have negative ramifications in her future career decisions. Simultaneously, most pharmacy students' views regarding nursing students were favorably shifted. Reservations regarding the advantages of IPE programming founded on the principles of contact theory are certainly not without merit. However, we argue that the greater threat to the value of an IPE curriculum is that these early shifts toward more positive intergroup perspectives might not sustained by students in actual practice. Constructive working relationships and collaborative patient care may be partly threatened when

the interprofessional contact variables of contact theory are absent in an organization.<sup>51</sup> These risks exist in health care delivery environments globally, including regions where models of less physician-centered team care are established.

Although IPE is being widely used worldwide, the literature supporting its benefits is decidedly based in the West.<sup>52</sup> IPE's origins as an educational construct may be traced to the United Kingdom and the United States; consequently, the body of published experience stems from these countries.<sup>53</sup> Therefore, our work contributes to broadening the perspectives regarding IPE programs enacted beyond these initial contexts. Ongoing systematic exploration of the development, delivery and outcomes of IPE globally will be necessary, given that a shortage of healthcare workers is coupled with increased expectations for collaborative care and improved patient safety.<sup>52,54</sup> How IPE initiatives can influence professional stereotypes and promote mutual respect among trainees who will join diverse care models in societies worldwide remains underappreciated. As more data from typically underrepresented regions such as the Middle East are reported, we must also keep sight of the wider research agenda for IPE, namely collectively moving beyond the characterization of student reactions in structured or simulated patient care activities to evaluating resultant team behaviors in the workplace and ultimately patient outcomes.<sup>37,55</sup>

Our study sheds light on how IPE activities can affect disciplinary stereotypes among health professional learners. However, the study's limitations are worth noting. Use of a structured question guide to prompt student reflection immediately after each of the two IPE activities permitted in-depth examination of pharmacy students' perspectives on one discipline. However, how perceptions and experiences with nursing or medical students might be influenced after engagement in activities with these two professions together, or in an expanded group of mixed-discipline students, remains unknown. We chose diabetes as a consistent condition for shared decision-making across the IPE activities, but the format for problem-solving varied from static cases with nursing students to dynamic standardized patient encounters with medical students. How the latter higher fidelity simulation might have influenced pharmacy students' impressions is unclear. Similarly, we cannot account for the possibility of an order effect, because we were unable to split the participant cohort and alter the sequence of IPE activity delivery. Finally, although students' submission of reflection documents was anonymous and therefore explicitly excluded from course scores, we cannot entirely discount the contribution of social desirability bias to documented attitudes toward the other students.

## Conclusions

Pharmacy students' attitudes and views regarding the abilities and roles of nursing and medical students in patient care were favorably altered after structured IPE encounters. We found that stereotypes were positively influenced when conditions optimizing intergroup contact were in place. Although Qatar benefits from formal IPE programming on a national level, we believe that an effective environment can be replicated with mixed-discipline educators cooperating

and delivering IPE activities within a given curriculum in any region. More broadly, ongoing research is necessary to understand the long term effects of early exposure to health professional peer groups on the stereotypes that may manifest in future team-based care.

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## Conflict of interest

The authors have no conflict of interest to declare.

## Ethical approval

Ethics approval was obtained from the Qatar University Institutional Review Board (QU-IRB-433-E/15), December 14, 2015.

## Authors contributions

KW and AE conceived and designed the study, conducted research and provided research materials. KW collected and organized data. All authors analyzed and interpreted data. KW wrote the initial and final drafts of the article. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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