

ORIGINAL RESEARCH

Interprofessional learning: Perceptions of first year health students

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ABSTRACT

Background: Shared learning among health professional students has the potential to improve collaboration and reduce medical errors resulting in improved patient outcomes. While organizational difficulties pose significant challenges to implementing interprofessional learning, negative student attitudes may pose the greatest barrier to change. Thus, the aim of this qualitative study was to determine perceptions of first year health students (medical, nursing, and physician associate) toward interprofessional learning.

Methods and findings: Content analysis was used to identify the repetitive themes regarding the facilitators and barriers to interprofessional education (IPE). Krippendorff's method was used to analyze comments written in an open-ended survey completed by first year medical (48/101 or 48%), nursing (59/81 or 73%) and physician associate (19/35 or 54%) students representing a response rate of 58% from one university in New England.

Conclusions: Five interrelated themes emerged: Barriers included: History as prologue and Misunderstanding of "others", versus Resistance to "others". Facilitators included: Personal characteristics, Professional characteristics and Educational characteristics. Unique to medical students is Self-conscious emotions, while Optimism is unique to nursing students. While students may be ready to transform our educational systems, attention must be focused on the learning environment and complex factors that will facilitate this transformation.

Key Words: Qualitative method, Content analysis, Interprofessional collaboration, Education, Krippendorff method

1. INTRODUCTION

Over the past twenty years, global health care systems have placed greater emphasis on improving patient care delivery^[1] in response to averting medical errors.^[2] And more than a decade ago the Institute of Medicine (IOM) suggested that coordinated and collaborative efforts to improve patient outcomes can best address the changing health care paradigm.^[2-5] The awareness that interprofessional education (IPE) plays a critical role in preparing future health care professions for collaborative practice has been recog-

nized for years^[6] and research studies link positive patient outcomes with improved coordinated and collaborative practices among health care providers.^[7,8] D'Amour & Oandasan^[9] proposed the concept of "interprofessionality"^[9] in establishing important partnerships between IPE and interprofessional practice which "will enable educators and practitioners from different professions to work together".^[9] Although some universities world-wide have championed the cause for IPE, systematic implementation has been varied^[10] and sporadic.^[5]

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Unfortunately, most health profession students are never provided the opportunity to learn together during their education.^[4,11] Upon graduation; however, there is any implied expectation that they work seamlessly as a team.^[11] Because various programs of study require different skills sets and expertise, individual schools offer distinct and wide ranging educational approaches to curricula development.^[12,13] But even when content commonalities do exist, students continue to learn separately.^[13] Learning interactively not only encourages students from various health professions to value one another's skills but to enrich their understanding of each other's professions.^[14] Currently, however; many health care programs do not provide opportunities for learning about and understanding the roles of other health professionals.^[13]

Although IPE is proposed as a solution toward bridging attitudinal gaps between health professional students^[15] integrating various groups of students presents challenges in both the development and execution of IPE.^[13] Curricular redesign demands attention to synchronizing course content, class scheduling, identifying areas of faculty expertise, and a system of shared credit among the various programs.^[11,13] But also important is a culture among students and faculty who appreciate the worth of shared learning.^[13] Our current health care system necessitates improved communication and understanding among health professionals and that awareness and knowledge should be developed within our educational institutions^[4,11] less we risk, "sleep walking into a mine-field of trouble".^[16]

The issue of timing and when to best implement IPE presents additional challenges.^[15] Since students may enter universities with preconceived stereotypes of other professions, some argue that assessment of attitudes should be part of the medical school admission process.^[15] O'Keefe suggests one's attitudes are an important predictor of behavioral intent^[17] and still questionable is whether stereotypes are so fixed that efforts toward IPE are unattainable^[18] impacting future interprofessional collaborative practice.^[19] Through serial questionnaire, Coster, *et al.* found that attitudes and readiness for IPE among undergraduate health students were high on program entry but markedly declined over time with the exception of nursing students, supporting early implementation of IPE.^[19] Still others consider students need to identify with their unique professional roles as a significant factor in the timing of IPE introduction.^[20,21] But when implemented too late, negative stereotyping may be prolonged posing communication difficulties among professions later.^[21] Moreover, students have reported their negative attitudes toward other health professional students may have formed as a result of adverse perceptions conveyed by faculty.^[22] Faculty and student acceptance is an important factor in implement-

ing IPE^[11] but also important is the quality of classroom or clinical facilitators^[23] with particular emphasis on creating a non-threatening environment among students.^[24] An essential first step in developing successful shared learning is "... fostering awareness and enthusiasm for IPE among students and faculty...".^[11]

The Core Competencies for Interprofessional Collaborative Practice was developed for the U.S. health care system with the intent of preparing health professional students for "deliberatively working together".^[25] This document cites four collaborative practice competency domains which include:^[25]

- Competency Domain 1: Values/Ethics for Interprofessional Practice
- Competency Domain 2: Roles/Responsibilities
- Competency Domain 3: Interprofessional communication
- Competency Domain 4: Teams and Teamwork

Many of the features researchers have studied regarding student's attitudes toward IPE merge with the four competency domains for interprofessional collaborative practice.^[20,23,26] Horsburgh *et al.* measured health student's attitudes toward shared learning and found pharmacy and nursing students believed learning together would improve teamwork while medical students appeared least certain of their professional role.^[20] Although studies have shown that health professional students believe effective communication is important for teamwork and patient care^[23] and positive attitudes among health professional students toward shared learning do exist,^[20,26] understanding the value of each other's professions appears to remain problematic.^[26]

It has been suggested that negative perceptions of health professional students to their own and other professions may impact negatively on future work behaviors.^[15] Research supports some health care students enter their educational programs with diverse attitudes and stereotypic views related to personal and professional culture and communication^[15,18] and strongly identify with their own profession early on in their education.^[19] These attitudes toward others may impact student's readiness toward shared team collaboration.^[19] While organizational barriers pose significant challenges to the implementation of IPE, it is essential to first understand student attitudes and prejudices toward one another's professions since negative student attitudes may pose the greatest obstacle to change.^[20]

2. METHODS

Qualitative methodology was used to survey first year medical, nursing and physician associate students with the intent of developing a better understanding of the student's atti-

tudes regarding facilitators and barriers to IPE needed for designing and implementing the curricula.

The study was approved and deemed as exempt by the Human Subjects Research Review Committee. All first year students enrolled in an Advanced Practice Registered Nurse (APRN) program for non-nurse college graduates, medical, and physician associate (PA) students were invited to participate in this study by completing a two item open response survey. The Survey questions were formed based upon current research findings, and the overall aims of this study. To facilitate recruitment a roster of all eligible participants along with their class schedule was obtained and members of the research team met with potential participants at each site. Approximately three weeks prior to the on-line survey via Survey Monkey[®], an email invitation was disseminated formally inviting participation. On the day of the meeting,

participants were introduced to the study, a written study description was reviewed, and oral informed consent was obtained. Completion of the survey served as documentation of consent. A total 217 first year students (101 medical; 81 nursing and 35 PA students) were invited to participate, and a total of 126 students responded to our request for a return rate of 58%. Specifically 48 medical students (48/101 or 48%), 59 nursing (59/81 or 73%) and 19 PA (19/35 or 54%) participated. Respondents were primarily female (N=88 or 70%) with an average age of 25 and a range of 22-38 years. Educational preparation was primarily a bachelor's of Arts degree (N=70 or 56%) versus bachelors of Science (N=57 or 45%), with 19 students possessing advanced degrees (15%). Table 1 details students' demographic data. At the time of data collection, all students were in their graduate program for five months.

Table 1. Demographic data

	Medical	Nursing	PA*	Total
Age range	22-30	22-38	22-34	22-38
Age average	23.9	26.1	24.8	25
Gender	25-male	6-male	6-male	37-male
	23-female	53-female	12-female	88-female
Educational preparation		BS-16		BS-57
	BS-27	BA-44		BA-70
	BA-22	MS-1	BS-14	MS-3
	MSH-1	MA-3	BA-4	MA-3
	MPH-1	MEd-1	MS-2	MSH-1
	PhD-2	MPH-7		MPH-8
		JD-1		Med-1
				JD-1
				PhD-2

*One student did not enter demographic data

Data analysis

Content analysis was used to identify the repetitive themes regarding participants' perceptions of the facilitators and barriers to interprofessional learning. Initially, all participants' written responses were sorted by profession. Comments ranged in length from one to 188 word responses per question, with an average length of 20 words per question, and a total data set of nearly 5,000 words (4,736).

Because we could not assume that each profession had similar perceptions, each group was initially analyzed separately. The authors' read in entirety each of the professions' comments from the transcribed document so a sense of the whole could be determined and inductively coded the comments by selecting passages related to the research questions. A line-by-line analysis of transcripts was conducted, which entailed

highlighting exact words, phrases, or sentences that related to each research question, noting unique and recurrent passages. These comments were then coded or labeled with a term that denoted the description of the quote. Categories were developed with each data set (medical, nursing and PA students); however because of the considerable congruence among the three health professions coded comments and emerged categories, the three datasets were merged. Table two details the parallel responses from the students and is offered as illustration of the rationale for merging of data sets. Using Krippendorff's^[27] analytical technique of clustering, the categories were clustered if they had shared characteristics, patterns, or attributes and collapsed. Dendrograms, or tree-like diagrams, were then created to illustrate how data collapsed into thematic units (see Table 2).

Table 2. Comparison of medical, nursing, and PA students perceptions of barriers and facilitators of interprofessional collaboration

Medical students coded comments	Nursing students coded comments	PA students coded comments
The perception that one profession is more important than another, physicians thinking that they are above nurses... I don't want to fall into this trap	Ignorance, judgmental attitudes toward "lesser" professions	Some people of certain professions may see themselves as higher than others
Misunderstanding of each other's roles in caring for patients, we are all familiar with our own education but very unfamiliar with the type of education our other peers are receiving	Not understanding the role of students in other professions	A lot of professionals don't even know the roles of their "team members"
Lack of collaboration during training; as I said above, it's difficult to develop strong ties later on in our training, after we've already developed our skill sets and predispositions	Lack of collaboration between professions. Lack of understanding about how goals are very similar amongst professions, not working well in teams	Barriers to interprofessional collaboration include the reluctance to work with people in different fields or the reluctance to approach clinical care from a team approach.
I think medical schools can help to facilitate inter professional collaboration by giving students the chance to interact with other health care professionals before they reach the hospital	Working with other healthcare students in clinical settings as well as having lectures with them. Having more exposure to other healthcare students.	We need an environment that promotes cooperation among different professions and it needs to start during education not once we're already in practice
Getting to know each other. Getting to know what the roles, capabilities, and limitations of different professions are. Working together as a team in order to maximize efficiency and outcome.	Learning the roles and mindset of the other health professions is extremely beneficial in building professional relationships in the health-care community. Every health care profession has a role in patient care and those roles need to be appreciated across the schools.	We need to know each other's roles and be familiar with the skill sets each professional brings to the table (that should be part of our education.

Methodological integrity is important in considering the trustworthiness of findings. To that end, an audit trail was created to record reflections, evidence of consistency in coding and interpretations of data. The authors reviewed the audit trail and had discussions about selection of key characteristics, relationships, categories, and the development of themes until an agreement was reached. In addition, numerous participant quotes from the study participants were included in the results to enhance the credibility of the findings.

3. FINDINGS

Five interrelated themes emerged: Barriers to IPE included: History as prologue, Misunderstanding of "others", versus Resistance to "others". Facilitators included: Personal characteristics, Professional characteristics and Educational characteristics. Unique to medical students is the barrier Self-conscious emotions, while Optimism is a facilitator that is unique to nursing students.

History as prologue details students' acknowledgement of the "historical tension" between healthcare professions as a precursor for understanding the challenges of implement-

ing interprofessional collaboration in present day healthcare. Their comments detail notions of different levels of class distinction, hierarchy and power disparities, professional bias, stigma, stereotyping, and "isms"- that is, "sexism, classism, racism" as precursors to interprofessional battles and are preconceived notions that students have about the "other health professionals," as they enter their educational systems. Their comments suggest that the past influences and sets the context for the present day educational system. While, they personally may not acknowledge tension working collaboratively with other health professions, the students' note their educators do not demonstrate mutual respect for each other's profession, and propagate "old professional feuds". They note that the "silo" education of each profession only generates professional separation. One medical student details the impact of current silo education on interprofessional teamwork. "Imagine if a baseball player, who was a third baseman, trained by themselves for 10 years. Also, maybe during their training they watched baseball games during their exhaustive 10-year training period. Now you throw him/her into a professional baseball game and hope they can

play with the team and get better over time. Most of the third-base skills that they've learned were learned in isolation. They may even think the game revolves around the third base or that given the opportunity; they could play any other position on the field because they saw a bunch of baseball games while they trained. It could take a while for this person to really play well with the rest of the team, particularly if they've all been playing together for years. Unfortunately, this is sort of what we do in health care."

Additionally they recognize that members of the health care team currently working in health care settings function in a strict hierarchy where doctors are superior to nurses, which has resulted in an "entrenched health care culture." And that "old school misunderstanding is passed onto future generations of health care providers" where their educational experience is shaped.

The students comments reveal that negative stereotypes of physicians as "arrogant", "defensive", "full of hubris", "pride" are current perceptions, and some medical students fear that the "superiority complex... may already be developing." While the nursing and PA students comments detail that they have already perceived "judgmental attitudes" that insinuate their professions are viewed as a "lesser" qualified provider. And the notion, that they chose their profession deliberately rather than attend medical school is a decision they must legitimize. One advanced practice nursing student describes, "I feel often that there is an assumption by some that one chose to become a nurse practitioner because they could not get into medical school, which is not the case." Thus the historical hierarchical culture among healthcare providers influences our neophyte students. See Table 3 for comments support this theme.

Table 3. Partial dendrogram for theme history as prologue

Participant statements	Categories	Theme
Existing prejudice between medicine and nursing; people who are already in the workforce have not had this sort of education. Therefore, nurses, doctors, therapists, APRNs, PAs, and all other members of the healthcare team were essentially educated in isolation from one another. Therefore, the most difficult portion would not be in the education and mindsets of new graduates, but instead would be changing the perspectives of the people already working in these professions. (nursing student)	Existing Prejudice in healthcare environment	<i>History as prologue</i>
At times I feel that our curriculum (in course material and professors)...steers us to look unkindly upon MDs. (nursing student)	Existing Prejudice in academic environment	
A challenge will be how to confront these background hierarchical norms and not have them disrupt the learning experience. (medical student)	Existing hierarchical structures	
Professional attitudes seem deeply entrenched in the culture of healthcare. (medical student)	Deeply entrenched healthcare culture	
I see attitudes and preconceived notions as being a major barrier to inter-professional collaboration. (PA student)	Preconceived notions as barrier to IPE	
I think stereotypes are a barrier to interprofessional collaboration. Different healthcare professionals have stereotypes as to what the role of other professions consists of, which leads to misunderstandings about the different professions. For example, I think it is safe to say that not every first year medical student understands the role of a PA, or that every medical/PA student understands the role of RNs. I think educating each profession on the other professions will help break down the barriers. (PA student)	Stereotypes as barrier to IPE	

The theme Misunderstanding of "others" versus Resistance to "others," describes what students' perceive as a barrier to IPE. Despite the fact that three separate programs exist in this university setting (medical, advanced practice nursing and

PA programs), there is a general lack of understanding about each other's "educational background", "role", "training", "scope of practice", and professional "limitations". Without specific curricula on the roles, responsibilities and scope of

practice of each profession, students are constructing their knowledge of their colleagues based upon personal perceptions. But in addition to this knowledge deficit, there is also a “reluctance/resistance to team approach” and an “inability to understand the importance of other”. Students note that for some, a “non-cooperation” attitude, “mistrust” and “disrespect” exists about other providers that will limit the “delivery of quality health care!” The following quotes support this theme.

Not knowing what the roles, capabilities and limitations of the different professions and a lack of knowledge and sub-par understanding of medical principles are barriers to successful medical care (medical student).

Ignorance on the part of doctors and medical students with regard to the limitations of nursing students and the function of this school of nursing in general (*e.g.* I have encountered multiple medical students who do not know what a nurse practitioner is and further do not know that this university trains NPs) (nursing student).

Closed-mindedness or coming in with a set impression of other professionals that one is not willing to change; not being open to sharing ideas or experiences (nursing student).

Professional barriers be they artificial or socially constructed *e.g.* physician’s resistance to allow nurses into their scope of practice (nursing student).

General interprofessional distrust; doctors only trust doctors (medical student).

Barriers to interprofessional collaboration include the reluctance to work with people in different fields or the reluctance to approach clinical care from a team approach (PA student).

Facilitators to interprofessional collaboration clustered to three inter-related themes: Personal characteristics, Professional characteristics and Pedagogical characteristics.

Students’ comments suggest that there are personal characteristics that will facilitate IPE, such as “humility”, “respect”, “a cooperative nature”, an egalitarian perspective, “open-mindedness”, “listening skills” and “strong interpersonal skills”. When a student enters their profession with these attributes, it is suggested that they will have the basic tenets upon which interprofessional collaboration will be valued and can be built. The following comments support this theme.

[Facilitators to IPE are] Put ego aside; humility; Remove thoughts of superiority (PA student).

Respect and trust are the two most important things to establish between all clinicians; respect for diverse backgrounds; respect of each other’s skill sets and clinical knowledge. There is not one medical profession that is not part of this “team”. Therefore as a healthcare professional I believe each person has to recognize that they all contribute to this team and also each person should “want” to work as a team (nursing student).

Understanding that providing adequate healthcare requires team work and communication. It should not matter what degree one professional may have, it should matter what they are bringing to the table regarding patient care (nursing student).

Strong interpersonal relationships, trust, communication working together with with other healthcare students (medical student).

Professional characteristics essential for IPE include articulating and valuing of each professions expertise and role in the provision of quality health care. Students note a cultural shift is needed within and among all programs from territorial “issues of competition” to regarding “each professions importance related to the shared goal of patient centered care”. Inherent in this shift is the notion that all providers are a member of the team where no members’ contribution is marginalized. Additionally, if the focus becomes the patient rather than the provider, resources must be distributed equally across all schools, since, “all three schools must be treated equally and none are provided with more than the other”. This necessitates “looking at each other’s roles as equally prestigious, equally valid, and all critical to patient care, not like one role is better than the other”. Commitment of each school’s faculty is essential if the goal is “cooperation”, “collaboration”, and “teamwork”. And the students’ comments note that the mission of each institution should articulate the “promotion of cooperation among different professionals”. Their comments suggest that they recognize that “every member of the team brings a different perspective” that is necessary to provide the complex medical care required for today’s providers. The necessary step is for the professions to acknowledge this understanding. The following quotes support this theme.

Common goals and mission statements mean that the basic undercurrent of our educations are the same; Acknowledging that each health care

professional plays a vital role in patient care (medical student).

Recognizing that all healthcare professionals are on the same level despite their actual level of education and each is important to the health of patients (PA student).

A team based upon integration and health care givers from all different backgrounds would be really special, and could be a step in the direction of treating holistically. I see a desire to provide the best optimal care to the patient. In my works, social workers, nurse practitioners, doctors, psychologists and nutritionists all had to work together because they recognized the patient is a whole person and one cannot look simply at the medical problem but rather one needs to educate them and address and possible barriers to their education, in order to provide optimal health care. Opportunities to develop positive interactions where each member of the team is valued for their contribution (nursing student).

Pedagogical characteristics involve understanding each professional's identity while gaining an "understanding of other health professional's roles, responsibilities, competencies and scope of practice." Curricula must include the "development of communication competency", "team building skills", "leadership skills" and "conflict resolution". They suggest curricular mapping in order to find areas of overlap in course content so that students can learn together in the academic and clinical environment. Although they recognize the significant structural issues that will be required to "find time" in their current curriculum for IPE, a preponderance of the comments suggest that this shared learning experience must begin early in their training. Curriculum should focus on the role of all providers in caring for the patient, rather than "competition". Students suggest that developing teams of health care providers from the beginning of their education would be a "good start toward integration/collaboration".

And alternative clinical experiences should be considered outside of hospitals since they are "inherently hierarchical and it's sometimes harder to learn how to be collaborative in that kind of environment". The following quotes support this theme.

An understanding of the limitations of one's role and how interdependent we are; an understanding of roles and responsibilities facilitates collaboration (medical student).

We need to know each other's roles and be familiar with the skill sets each professional brings to the table (that should be part of our education) (PA student).

There are specialized educational resources used in other professions (such as sales, marketing, management) that are rarely employed by medical professionals. Having utilized these types of professional education resources in my past career, I can attest to the learning and skills gained by engaging outside support on communication skills development (medical student).

Requiring all students to take the same class would level the playing field, I think it would be a great equalizer courses taken together would support the idea that all professions have the same clinical knowledge (nursing student).

Unique to medical students is the theme self-conscious emotions, while the theme of optimism is unique to nursing students.

Self-conscious emotions refers to the merged categories of student hesitancy, "awkwardness" and "embarrassment" that were noted only in the medical school students comments related to IPE. Their tentativeness highlights the need for educators and clinicians to recognize that feelings of uncertainty are common in professional education and that we need to provide an environment that protects the student's self-esteem.

We barely know what we're doing in our first year in medical school and we're already somewhat uneasy and shy even in groups of only 1st year medical students, maybe 2nd year would be a better time to introduce those in the other schools into our small group learning; getting to know other students in the other schools may (or may not, depending on who we're exposed to) increase the favorability with which we view them, I do not see the utility in this stage of our training of learning with students from the other schools. I would rather learn how to do a complete physical exam by myself so that I am not dependent on anyone else to perform certain components. Everyone needs to be able to do a complete physical. For the basics, we should learn everything solo. We should only be practicing things we will be doing with other professionals with non-medical students (medical student).

I believe we should be trained with others within our own school because of the intimate nature of doing physical exam on each other. This would be a more awkward experience with less familiar faces (medical student).

The final theme of optimism, unique to nursing students' comments, about the opportunity to begin IPE in this university and confidence in its positive outcome on the future of healthcare. The value of optimism in the context of our challenging educational environment and healthcare systems would seem to be an attitude that should be fostered.

I look forward to the interdisciplinary respect this could foster between professional schools (nursing student).

Things are moving in this direction in the educational system right now (nursing student).

This is a wonderful idea. We need to all realize that as health care givers we can learn from one another. Joining ideas and mixing treatment plans could really help patients for the better. A team based upon integration and health care givers from all different backgrounds would be really special, and could be a step in the direction of treating holistically (nursing student).

4. DISCUSSION

The results of this study suggest health care professional students are both ready and willing to participate in IPE. Respondent's comments in history as prologue echo the traditional structural separateness among health care professionals which have been deeply embedded in the context of competition.^[28] Comments from students provide evidence that the historical hierarchical culture among health-care providers influences our neophyte students. Students are keenly aware of the stereotypical roles of different types of providers, which are deeply rooted in the Western health care system^[29] and this awareness may shape their educational experience from the early stages of training. This impacts team collaboration in that the focus may be placed on professional divisiveness rather than on care of the patient.^[29] Respondents also comment that cultural conflicts between professional training programs negatively influences open communication among providers from different professions. Indeed, this is supported by "the hidden curriculum"^[30] referring to the unspoken aspect of curriculum "which characteristically includes prolonged periods of exposure to the predominant culture".^[29] Tabby^[31] describes the physician's role as "the captain of the ship"^[31] and nurses have long been viewed as their subordinates.^[32] Our students suggest that a

paradigm shift in healthcare education necessitates focusing on our mutual goal of patient-centered care, rather than the providers as a first step in envisioning our future.

It is interesting to consider that some respondents view faculty as malefactors in breeding distain among professions and in perpetuating existing prejudices. Moreover, respondents view those already in the workforce as propagating old professional feuds, blocking communication at even the most basic level. Therefore, the most difficult part of instituting IPE may not be in the mindsets of students, but in changing attitudes and perspectives among those already working and teaching in the professions. Indeed, D'Amour & Oandasan cite faculty may serve as either advocates or obstructionists with respect to facilitating IPE.^[9] Future research efforts should explore perceptions of faculty related to IPE in order to manifest necessary curricular revisions.

The second barrier to IPE termed misunderstanding of "others" versus resistance to "others" describes barriers to IPE which include a limited understanding of one another's roles, scope of practice and a general lack of knowledge regarding educational backgrounds of others. Mistrust, a lack of respect, poor understanding of skill-set, non-cooperation, knowledge deficits and a reluctance to team approach resonated among respondents. Lie *et al.* described a similar lack of knowledge among other health care providers in understanding the professional role of physician assistant (PA) students.^[33] It is thought that health care professionals possess insufficient understanding of one another's contributions, thus, traditional role perceptions are sustained.^[34] Similarly, Curran *et al.* found "... that significant differences in the attitudes of health sciences students from different professions continue to persist".^[35] It would seem that this barrier can be attenuated by clear, open discussion of each professions role and scope of practice early in the educational process. What is needed is recognition by all educators that without this discussion, students are constructing an inaccurate portrait of "other" providers.

Facilitators of interprofessional collaboration were clustered into three inter-related themes: personal, professional and pedagogical characteristics. Personal characteristics include: humility, eradicating thoughts of superiority, listening with respect to other's viewpoints, trust, and a willingness to work together. In a study on entry level medical students' perceived characteristics of doctors and nurses, Rudland & Mires found that medical students considered nurses inferior to them; specifically related to social status, competence and academic proficiency.^[15] D'Amour & Oandasan infer that successful collaboration requires attaining particular competencies, not yet defined, but which may embrace an appre-

ciation of one another's professional roles, mutual respect and trust, a willingness to collaborate and enhance communication skills; all which must be modeled and learned.^[9] Our study supports the finding of other researchers who note that communication is a skill that should be learned with other students^[20] and successful interprofessional collaboration practices should include elements of active listening, developing trusting relationships, supporting mutual decision making, and maintaining respect for all team members.^[36] An interesting finding in this study relates to the structural hierarchy detailed by our students in hospitals and conflict witnessed among team members, which negatively impacts team collaboration and suggests that the environments where we place students for clinical practice in an additional confounder that must be considered as we build IPE.

Pedagogical characteristics include understanding one another professional identity, roles and scopes of practice. Respondents reiterated the need for collaboration early on in their training and cited curricula must include communication competency, team building leadership skills and conflict resolution; most of which align with the core competencies to promoting IPE.^[25] In his article describing cultural humility, Alsharif cited one panelist's remark during an IPE discussion at Creighton University, who commented "our health profession graduates would walk across the stage without knowing what the other graduates from the other health professions do or how they would contribute to the health care team".^[37] Our IPE efforts are not meant to create new professions^[9] or eliminate the differences between providers^[38] but instead to recognize how professionals might cultivate more collaborative, less fractured practices^[9,38] ultimately improving patient outcomes.^[39]

Unique to medical students emerged the theme self-conscious emotion where students commented on feelings of embarrassment and awkwardness leading to feelings of uncertainty. Some of the medical students preferred to learn solo rather than in a shared learning environment. In their study on attitudes of health care students to shared learning, Horsburgh, Lamdin & Williamson found that first-year medical students were least certain of their professional role when compared to nursing and pharmacy students but also believed their profession required more knowledge and skills than did the other groups.^[20] Similar to our study, Cooke et al. found that some medical students preferred professional distancing from other health students and one medical student felt that learning with nurses might expose his/her "shortcomings".^[40] Likewise, Tucker et al. found that some students fear they do not have sufficient knowledge or competency to participate in shared learning.^[41] Comparable to other findings,^[18] the medical students in our study were younger

(mean age 23.9) than nursing and physician associate students which may account for their feelings of awkwardness or embarrassment.

Lastly, unique to nursing students was the theme of optimism. Students felt that joining and combining treatment plans was advantageous to patients and that holism, interdisciplinary respect and collaboration cannot exist without IPE. Our findings support those of Almas & Odegard who found that nursing (and occupational therapy) students possessed the most positive attitudes toward IPE.^[12] Others disagree citing nursing is no more favorable to professional collaborative efforts than is medicine.^[38] Nurses have long been viewed as collaborators and coordinators in the healthcare field^[12] whose work embodies "strong team player and interpersonal skills".^[42] It is conceivable that students possessing these attitudes and characteristics might be drawn to the nursing profession, thus explaining the nursing students' optimistic outlook toward IPE.

Limitations

This study was conducted at one medical, nursing and physician associate institution; surveying a larger, more diverse group of students would provide a broader overview of student attitudes. Students who chose to answer the survey may be those who view IPE more positively or most negatively, thus skewing the range of responses. Another study limitation was the unequal response rate across student groups with 48% medical, 78% nursing and 54% physician associate students answering the survey. While this difference may have impacted responses, it may also provide insight into the support of IPE among the groups. Additionally, the limited number of questions in the survey and inability for researchers to prompt students for additional information should be considered.

5. CONCLUSION

IPE provides the means to restructure the delivery of health education thereby fostering future collaboration among professionals. While student attributes of respect, trust, humility, and a mutual appreciation for one another's contribution to the healthcare team are essential, so too are faculty who must exhibit role modeling, sensitivity and respect in their interactions with other health care providers.

Future research should focus on qualitative analysis of faculty attitudes to gain insight into faculty beliefs, perceptions and vision toward shared learning. Faculty development is likely necessary to best facilitate IPE in both the classroom and clinical settings. Since understanding student and faculty attitudes is essential to the successful implementation of IPE, beginning content may focus on self-reflection, role aware-

ness, conflict resolution and communication among faculty and students. Faculty development through online modules, guest lectures, and continuing education with respect to IPE will be necessary to change faculty and practitioner attitudes as they interact with trainees from various professionals. Similarly, increased funding from national organizations such as Health Resources and Services Administration (HRSA), Association of American Medical Colleges (AAMC) and Agency for Healthcare Research and Quality (AHRQ) will help to reduce financial burdens faced by various institutions as they implement IPE projects. Longitudinal studies should be conducted to examine if and why student attitudes change over the course of their education and thoughtful analysis of best educational practices related to pedagogy that influences

the interprofessional learning environment.

While students in this study understand the importance of introducing IPE into the health professional curriculum, they also voiced concerns as to curricular roadblocks. They are aware of attitudinal barriers of both other students and faculty. As institutions of higher learning and their faculty implement IPE, a necessary first step is understanding the observations and attitudes of the future leaders in health care—our students.

CONFLICTS OF INTEREST DISCLOSURE

The authors declare that there is no conflict of interest to disclose.

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