

ORIGINAL ARTICLE

Evaluating the impact of interprofessional forums on dental medicine students' collaborative practice skill perception

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Abstract

Purpose: This study evaluates third-year dental medicine students' perceived competencies related to interprofessional collaborative practice (IPCP) after completing two exposure level experiences with students from other professions across a large academic health center.

Methods: Two cohorts of D3 dental medicine students (2018–2019 and 2019–2020) completed the Interprofessional Collaborative Competencies Attainment Survey (ICCAS) after participating in in-person 2.5-h Interprofessional (IP) Forums in the Fall and Spring semesters. Self-reported competencies were compared between pre-and post-IP Forum ratings and between Fall and Spring.

Results: Prior to the IP Forums, dental medicine students ($n = 185$) reported perceived skill in the interprofessional competencies to be from Good to Very Good using the ICCAS. After participation in the Fall IP Forum, students' ICCAS scores increased in all ICCAS subscales with large effect sizes. Students reported a perceived decline in these skills in the four months between Fall and Spring IP Forums and restoration of IP skill levels after participating in a second IP Forum (Spring).

Conclusions: Participation in IP Forums has a positive impact on students' IPCP skill perception. Our data suggest that perceived skill level requires repeated IP learning experiences. If dental medicine students are expected to embrace collaborative practice to enhance patient outcomes, then dental school educators must provide opportunities for students to engage in collaborative practice experiences at all levels of their training.

KEYWORDS

attitudes, collaborative practice, dental medicine students, interprofessional practice, oral-systemic connection, perceptions

1 | INTRODUCTION

Advances in science have demonstrated the correlation of certain systemic disease states with oral health. For example, diabetes and cardiovascular disease are linked with intraoral bacterial levels associated with periodontal disease.¹ This is commonly referred to as the oral-systemic connection. These discoveries have propelled dental professionals to assume a more active role in the provision of primary medical services by monitoring health risks such as elevated blood pressure, smoking, and diabetes.¹⁻³

A significant number of patients seen by dentists do not have a medical home. Integrating primary medical care with oral care can impact the proliferation of chronic disease burden on already stressed healthcare systems.⁴ The availability of reliable in-office screening assessments and diagnostic tests has enhanced dental providers' ability to provide primary medical care to detect chronic systemic conditions, like diabetes, and hypertension. Interventions designed to improve overall health like nutrition counseling, and smoking cessation have also been implemented as part of the screening process of dental patients. This shift in patient care has leveraged the power of early intervention in diagnosing disease.

Even with enhanced screening and testing capacity, a gap remains on how to best provide patients with resources to engage the healthcare system in addressing their needs. Resources include providing patients with a comprehensive network of professionals to assist in addressing barriers to care. This network should have the capacity to facilitate enrollment into health insurance plans, address the social determinants of health, and provide referrals to providers and healthcare systems to address their needs. Educating dental medicine students on the importance of their patients' general health and how to engage with primary care providers could help patients receive more consistent and coordinated care.⁵

Educational programs across all healthcare professions have modified curricula to include opportunities for students to learn about and engage in interprofessional collaborative practice (IPCP) in order to better meet the comprehensive needs of the patients, and accreditation standards. The Commission on Dental Accreditation implemented standard 2-20, which mandates that dental medicine students must demonstrate competency in communicating and collaborating with other healthcare team members to facilitate providing primary medical care before they graduate. Allied dental education and most other healthcare professions have added similar accreditation requirements for collaborative practice to their respective education programs.⁶

Educating healthcare professionals to deliver patient-centered care as interprofessional (IP) team members presents a challenge for educational programs.⁶ The American Dental Association defines patient-centered care as, providing care that is respectful of and responsive to individual patient preferences, needs, and values. It ensures that patient values guide all clinical decisions. To help meet this challenge, the University at Buffalo (UB) Office of IP Education (IPE) implemented their IPE Program in 2016 which included the IP Forum as an exposure level learning experience. The IP Forum brings students together from nine different healthcare professions across the academic health center to participate in an interactive, collaborative practice experience. All professions must attend both Fall and Spring forums, which explore two different case studies.

The current study seeks to understand dental students' perceived IP collaboration-related competencies before and after participating in two IP Forums. The study addressed the following research questions: 1. How proficient in IPCP skills do dental medicine students perceive themselves to be before IPE activities?; 2. How does participation in one IP Forum impact IPCP skill perception?; 3. Are changes in IPCP self-perceived skills retained over four months?; and 4. How does participation in a second IP Forum impact IPCP skill perception?

2 | MATERIALS AND METHODS

This study was approved by the UB Institutional Review Board, Protocol 00002834.

2.1 | Study design

Two cohorts of third-year dental medicine students (D3) participated in IP Forums in the Fall (2018 and 2019) and Spring (2019 and 2020) terms. Individuals attending the IP Forum were required to complete the IP Collaborative Competency Attainment Survey (ICCAS) after the forum. Students earned credit within their professional program for completing the forum and the assessment measures.

2.2 | Participants

Participants ($N = 185$) included in these analyses had complete data from both Fall and Spring IP Forums. Students ($n = 45$) who did not complete the ICCAS for both forms were excluded from analyses. Participants were 50% women and 49% men, one participant identified as gender-fluid, and one participant identified as

genderqueer/gender non-conforming. The participants were 27 years old on average (standard deviation [SD] = 4), ranging from 22 to 44 years old.

2.3 | IP Forum learning experiences

The Fall and Spring IP Forums bring ~900 students together from nine different healthcare professional programs across the academic health center and university to participate in 2.5–3-h interactive and collaborative practice experiences. These professions include dental medicine, medicine, nursing, pharmacy, social work, physical therapy, occupational therapy, athletic training, and dietetics. This paper only focuses on the dental medicine students' experience.

The Fall IP Forum, *Confronting Opioid Use Disorder – An IP Strategy*, was comprised of online learning and an in-person session. The online learning provided students with information about IPCP and the roles and responsibilities of the health professions students participating in the IP Forum (2 h) as well as foundational knowledge about opioid use disorder (30 mins). The 2.5-h in-person session commenced with two keynote addresses (~50 min). The first keynote address, provided by the County Health Commissioner, discussed the epidemiology of opioid use disorder at the national and local levels, and the public health initiatives that have successfully reversed the increasing trend of opioid overdose deaths in our county. The second keynote address examined the negative impact of stigma and bias when caring for an individual with a substance use disorder and stressed the importance of using harm reduction approaches. These keynote addresses were followed by a 1.5-h small (7–8 students), IP, faculty facilitated discussion. During the small group discussion, the students start with an icebreaker activity, where students discuss the similarities and differences of their professions. The process of comparing and contrasting their professional roles helps students to begin to realize they have more similarities than they may have previously assumed, and they typically learn something new about professions they may not interact with regularly. This activity is followed by the case discussion of a person with opioid use disorder. The case is discussed in the same way as the ice breaker, with students comparing and contrasting how each profession would approach the person's problems and the similarities and differences between professions. Each profession provides what they could do to help the patient and strategies that multiple professions could perform. Collaboratively, the students developed an IP plan of care. Following this discussion, students examined population health strategies and health system improvements to

optimize outcomes for individuals and communities experiencing opioid use disorder. The final 15 min are spent debriefing as a large group.

The Spring IP Forum, *Improving Healthcare through IP Collaboration*, followed a similar format to the Fall IP Forum, without the online learning. The 2-h in-person session began with a large group session during which students viewed a 22-min film developed by the UB Office of IPE. This film allowed students to see a day in the life of a man with chronic physical and mental health problems and his family. Following the film, students engaged in a 1.5-h small group discussion as described for the Fall IP Forum, with the discussion focusing on the issues identified in the film and approaching their resolution at the individual, population, and health system levels.

The goal of these forums is to expose students with an introduction to the principles of IPCP. Learning activities emphasize IP teamwork skills, knowledge of the scope of practice of other professions, and the impact of culture on healthcare delivery. Although the topics are different for each forum all case studies have been reviewed by the IPE Committee consisting of faculty and administrators from each profession to ensure the relevance and actionability of each case.

2.4 | Instruments

2.4.1 | Demographic form

Prior to each IP Forum, a four-question demographic form was administered to capture the participants' age, gender identification, education program, and previous IPE experience.

2.4.2 | IP Collaborative Competency Attainment Survey

The UB utilizes the ICCAS to assess the IP Forum's impact on participants.^{7–8} The ICCAS tool documents the perceived skill in performing the IP collaboration-related competencies in healthcare students and practicing clinicians before and after IPE interventions. This measure was selected because the evidence suggests that scores on the ICCAS are reliable and predict meaningful outcomes with regard to perceived skills toward IP competency attainment.⁹ After the IP Forums, the ICCAS was used to retrospectively measure pre- and post-IP Forum skill perceptions using an online survey presented in a format identical to the paper version of this instrument.¹⁰ Participants rated their abilities before and after the learning

TABLE 1 Results for Interprofessional Collaborative Competency Attainment Survey (ICCAS) – total scores and skill construct scales scores

	Fall			Post			Spring			Post		
	Pre			Post			Pre			Post		
	M	SD	α	M	SD	α	M	SD	α	M	SD	α
Total ICCAS Score	3.63	0.76	0.980	4.21	0.68	0.986	3.80	0.82	0.988	4.20	0.83	0.993
<i>Skill construct scales</i>												
Communication	3.74	0.74	0.938	4.22	0.72	0.958	3.83	0.85	0.968	4.21	0.87	0.970
Collaboration	3.55	0.87	0.935	4.18	0.74	0.941	3.78	0.87	0.947	4.16	0.86	0.958
Roles and responsibilities	3.61	0.81	0.916	4.21	0.70	0.943	3.82	0.82	0.945	4.21	0.82	0.968
Patient-centered care	3.54	0.87	0.929	4.19	0.74	0.934	3.77	0.87	0.962	4.20	0.88	0.972
Conflict management, team functioning	3.65	0.84	0.952	4.25	0.72	0.965	3.78	0.87	0.971	4.20	0.83	0.982

Note: M = mean score, SD = standard deviation, α = Cronbach's alpha measure of internal consistency indicating inter-item scale reliability.

activity on a fully labeled scale five-point scale from Poor to Excellent. The ICCAS has 20 questions related to five constructs: Communication, Collaboration, Roles and responsibilities, Patient-centered care, and Conflict management and team functioning.

2.5 | Statistical analysis

Data for Fall and Spring ICCAS were merged using unique student identifiers. There was no significant cohort by Pre/Post Forum interactions, so data from the two cohorts were combined. Cronbach's alpha was computed to assess inter-item reliabilities for every IPCP skill construct and total ICCAS scores (Table 1). Descriptive statistics were calculated for each skill construct scale and presented in Table 1. A repeated-measures ANOVA examined differences in skill perceptions across constructs for the Fall Pre-IP Forum ratings. Effect sizes were calculated to determine the magnitude of differences between constructs in skill perceptions. These analyses addressed the first research question of students' perceived skills prior to IPE activities. Within subjects, *t*-tests examined differences between Fall Pre-IP Forum and Fall Post-IP Forum, between Fall Post-IP Forum and Spring Pre-IP Forum, and between Fall Post-IP Forum and Spring Post-IP Forum to address research questions 2–4. Effect sizes were calculated to determine the magnitude of differences for each skill construct and total ICCAS scores (Table 2).

3 | RESULTS

3.1 | Internal consistency

Cronbach's alphas were above .90 for every IPCP skill dimension in every wave of data, indicating excellent inter-

item reliability (Table 1). Cronbach's alphas for the entire ICCAS were above .98 for every wave of data.

3.2 | Pre-IP activity skill perceptions

On average, participants rated themselves in the Good (3) to Very good (4) range in IPCP skills prior to IPE activities for all scales. Participants rated themselves higher on some constructs than on others, see Section 3.6 below.

3.3 | Perception of IP skill gains from one IP Forum

Participants perceived substantial gains in IP skills from participation in the Fall IP Forum (Table 2), with the majority of students reporting IPCP skills to be Very Good. These differences between pre- and post-IP Forum skill perceptions were significant with generally large to very large effects across all constructs. The effect for the pre- and post-IP Forum comparison for total ICCAS scores was over one SD.

3.4 | Perceived decline in IP skills across 4 months

Participants perceived significant declines in IP skills from after the Fall IP Forum to prior to the Spring IP Forum (Table 2). There were significant differences between Fall post-IP and Spring pre-IP Forum skill perceptions with generally medium effects across all constructs. The decline in skill perceptions between the forums was about 70% of the perceived gain in skills from the Fall IP Forum.

TABLE 2 Results for Interprofessional Collaborative Competency Attainment Survey (ICCAS) comparisons

	<i>t</i> (184)	<i>p</i>	<i>d</i>
Fall pre-IP Forum to Fall post-IP Forum			
Total ICCAS Score	14.02	0.001	1.03
<i>Skill construct scales</i>			
Communication	9.64	0.001	0.71
Collaboration	12.86	0.001	0.95
Roles and responsibilities	13.93	0.001	1.02
Patient-centered care	13.49	0.001	0.99
Conflict management, team functioning	12.17	0.001	0.89
Fall post-IP Forum to Spring pre-IP Forum			
Total ICCAS score	7.58	0.001	0.56
<i>Skill construct scales</i>			
Communication	6.72	0.001	0.49
Collaboration	6.37	0.001	0.47
Roles and responsibilities	7.14	0.001	0.53
Patient-centered care	6.69	0.001	0.49
Conflict management, team functioning	7.86	0.001	0.58
Spring pre-IP Forum to Spring post-IP Forum			
Total ICCAS score	9.73	0.001	0.72
<i>Skill construct scales</i>			
Communication	8.20	0.001	0.60
Collaboration	8.19	0.001	0.60
Roles and responsibilities	9.63	0.001	0.71
Patient-centered care	8.85	0.001	0.65
Conflict management, team functioning	8.79	0.001	0.65
Fall post-IP Forum to Spring post-IP Forum			
Total ICCAS score	0.26	0.793	0.02
<i>Skill construct scales</i>			
Communication	0.33	0.745	0.02
Collaboration	0.31	0.755	0.02
Roles and responsibilities	0.13	0.895	0.01
Patient-centered care	0.19	0.847	0.01
Conflict management, team functioning	0.94	0.348	0.07

Note: *t*-statistics and *p*-values indicate results for within-subjects comparisons; *d* indicates effect sizes; .20 = small, .50 = medium, and .80 = large.

3.5 | Restoration of IP skills from a second IP Forum

Participants' perceived IP skill levels returned to post-Fall IP Forum levels after the Spring IP Forum. Skill perceptions in the post-Forum ratings did not differ for any construct between the Fall and Spring Forums (See Table 2). On average, participants rated themselves Very good in IP skills across domains after the second forum.

3.6 | Differences among construct ratings

Participants reported differences among their perceived levels of skills across domains in baseline Fall pre-Fall

IP Forum ratings, $F(4, 736) = 11.58, p < 0.001$, partial- $\eta^2 = 0.059$.

Participants rated themselves higher on Communication than on Collaboration, $t(184) = 5.58, p < 0.001, d = 0.41$, Patient-centered care, $t(184) = 4.97, p < 0.001, d = 0.37$, Roles and responsibilities, $t(184) = 4.67, p < 0.001, d = 0.34$, and Conflict management and team functioning, $t(184) = 2.50, p = 0.013, d = 0.18$. Participants rated themselves higher on Conflict management and team functioning than on Patient-centered care, $t(184) = 4.04, p < 0.001, d = 0.30$, and Collaboration, $t(184) = 2.68, p = 0.008, d = 0.20$. Participants rated themselves higher on Patient-centered care, $t(184) = 4.04, p < 0.001, d = 0.30$, than on Roles and responsibilities, $t(184) = 2.08, p = 0.039, d = 0.15$.

After the Fall IP Forum, the overall difference was reduced from a large to a small effect, $F(4, 736) = 2.40$, $p = 0.049$, $\text{partial-}\eta^2 = 0.013$. Participants rated themselves higher on Conflict management and team functioning than on Patient-centered care, $t(184) = 2.38$, $p = 0.018$, $d = 0.18$, and Collaboration, $t(184) = 2.15$, $p = 0.033$, $d = 0.16$. Participants rated themselves higher on Communication than on Patient-centered care, $t(184) = 3.23$, $p < 0.001$, $d = 0.24$. There were no overall differences among domain ratings for the Spring Pre-IP Forum, $F(4, 736) = 1.55$, $p = 0.185$, $\text{partial-}\eta^2 = 0.007$, or Spring Post-IP Forum skill perceptions, $F(4, 736) = 1.67$, $p = 0.154$, $\text{partial-}\eta^2 = 0.009$.

4 | DISCUSSION

The UB Office of IPE strives to prepare highly competent healthcare professionals who will collaborate to improve health outcomes by excelling in IP communication, teamwork, and the provision of safe, ethical patient care. To accomplish this, students are trained within a framework that progressively develops collaborative practice skills by providing exposure, immersion, and competency-generating experiences embedded within the curriculum and clinical training programs.¹¹

The exposure level IPE learning experiences consist of online training programs in the Foundations of IPCP and the two IP Forums. The IP Forums provide a unique opportunity for students beginning clinical rotations to engage in a small group, patient case-based discussions. Learning activities emphasize IP teamwork skills, knowledge of the scope of practice, and the impact of culture on healthcare delivery.¹¹ By participating in this initial exposure experience, dental medicine students have expressed positive perceptions of collaborative practice. As part of the IPE learning experience, all students were assessed for competency in the small group discussion by their group facilitator. This is completed using a rubric which is submitted after the experience.

Dental medicine students rated themselves from Good (3) to Very good (4) in IPCP skills prior to the IP Forums (Table 1). Oral healthcare professionals provide care focusing on both oral and overall health conditions. Still, this care is frequently provided with limited interaction with other healthcare professionals in the clinical setting.⁵ Furthermore, the current comprehensive needs of patients exceed the skill set and knowledge base of any single healthcare professional.¹² Curriculum reform, urgency in constructing effective IP programs, and the modification of accreditation standards are strategies to push dental educators in broadening the scope of how dental care can

be integrated with primary medical care in dental school clinics.

The most significant finding was the difference between pre and post-Fall IP Forum skill perceptions. Students reported substantial gains in their skill perception after participation in the fall IP Forum across all constructs (Table 2). This result is consistent with the findings of others and supports the effectiveness of having students participate in an IP case study experience to improve IP competencies and attitudes toward providing collaborative care.¹³

Interestingly, dental medicine students perceived substantial declines in IP skills when comparing the post Fall IP Forum data to the pre-Spring IP Forum data across all constructs. In reviewing the opportunities available for engagement in collaborative practice offered to dental medicine students during the 4 months between the Fall and Spring IP Forums, it was not surprising to discover that the opportunities were extremely limited. The authors believe this was due to the lack of exposure in the curriculum to more professions and the opportunity to collaborate. Only a small number of students who were fortunate enough to be assigned to the school's screening rotation, which includes pharmacists as attending faculty, had any exposure to in-person collaborative practice training. Still, there was some retention of perceived IPE skills above Pre-IP Forum levels, indicating that participants did not revert to baseline abilities.

The American Dental Education Association has reported that substantial progress has been made by the US dental schools in offering IP experiences.¹⁴ Despite these gains, dental school faculty and students report the need for more authentic experiences, constructive faculty-led clinical environments, and the importance of small group work to develop and reinforce skills to deliver care as part of a multidisciplinary team.¹⁵⁻¹⁶ The fact that dental medicine students' perceived IP skills levels, across all constructs, returned to post-Fall IP Forum levels after the Spring IP Forum reinforces the importance of continued exposure of these concepts during the training.

As with any study, there were limitations to this study. In taking a closer look at how the IP Forum student groups were comprised, it was not possible to have every profession represented in every group, and in some cases, due to class size, there were two students from the same profession in one group. To accommodate, faculty facilitators were provided supplemental materials to assist with filling in the gaps from unrepresented professions during the small group discussion sessions. Despite not engaging with all possible professions, dental medicine students demonstrated increases in IPCP skill perception after participating only in the IP Forums. As discussed, the Forums

were designed to provide initial exposure experiences in IPCP upon which further experiences can be structured. Programs and curricula modifications need to be implemented and assessed to determine the best methodology to assure that students across all professions are provided opportunities to engage in meaningful IPCP experiences.

5 | CONCLUSION

These findings suggest that IP Forums are effective in the short-term improvement of self-perceived IP skill competency. Our study also illustrated the need for continual IPE activities and opportunities to be embedded within the dental medicine curriculum to optimize skill development. By providing opportunities for all students to interact and engage with students from other professions or emphasizing the importance of IPCP within the dental setting may reduce these perceived declines in skills.

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