



A pilot interprofessional program to promote oral health and wellness in Appalachian children



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ABSTRACT

In a first of its kind authentic clinical interprofessional education (IPE) experience, University of Kentucky (UK) health profession students joined dental students to implement a pilot program to promote oral health and wellness with children living in underserved Appalachian communities. Known as hCATS (Health Colleges Advancing Team Skills) to Appalachia, a total of 113 students participated in interprofessional teams of 48 health profession students paired with 65 dentistry students to provide health services. Although the UK College of Dentistry has provided sealant services (tooth decay prevention) to elementary school children for several decades in eastern Kentucky counties, funding through the UK Women and Philanthropy Network allowed services to expand to include general health screening and age-appropriate education on oral health, nutrition, exercise, and prevention of substance abuse. The UK Center for Interprofessional Health Education (CIHE) coordinated the efforts for students from the colleges of Communication and Information Sciences, Health Sciences, Nursing, Pharmacy, Public Health, and Social Work. In addition to the clinical experience in the elementary schools, nursing and other health profession students explored the health resources of the communities visited and reflected on their experience in collaborative practice that the program was designed to encourage. The authors noted positive outcomes with interprofessional education competencies, although more structure for collaboration is required to ensure students who work with other professions in an authentic clinical setting can gain early relevant practice in, and experience the benefits of, collaborative patient care.

Introduction

Deep in the heart of eastern Kentucky's Appalachian region, there are significant unmet health needs that impact children. This region of Kentucky has some of the poorest health outcomes in the country, 25.4% of the population live in poverty (Appalachian Regional Commission, 2019), access to healthcare is challenging and there are significant dental care shortages (United Health Foundation, 2017). Out of 120 counties in Kentucky, 24 have fewer than 1.7 dentists per 10,000 population compared to national rate of 6.0 dentists per 10,000 population (Center for Health Workforce Studies [CHWS], 2016). In addition, rates of periodontal disease, dental caries and oral cancer are greatest in the Appalachian region of Kentucky. Lack of access to care is another factor that partially explains why one out of three children have oral health problems and why only 13.2% of children ages 6–9 had a sealant placed on a permanent molar in 2014 (CHWS, 2016).

Although progress has been made since the 2000 Surgeon General's

report, *Oral Health in America* (U.S. Department of Health and Human Services [USDHHS], 2000), the suffering from dental and oral diseases, the reduced quality of life and the impaired self-esteem continues to significantly impact disparate populations (USDHHS, 2016). Specifically, the consequences of poor oral health have a negative influence on children's speech, function, growth, and social engagement. Meeting basic nutritional needs can be challenging from missing teeth, pain, and infection resulting in limited healthy food options. Pain caused by tooth decay also can result in missed days at school and impaired academic performance. Stated health objectives with a focus on health promotion and not just health care (DHHS, 2016; Robert Wood Johnson Foundation, 2016) helped to drive innovative thinking and planning to address the staggering oral health statistics in Kentucky.

Leadership from the University of Kentucky (UK) College of Nursing and UK College of Dentistry partnered with the UK Center for Interprofessional Health Education (CIHE) to mobilize efforts to address unmet oral health needs among children in rural Kentucky. Recognizing

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that untreated dental caries is substantially more prevalent among children living at or below the federal poverty level compared with children living above the poverty level (DHHS, 2016), this vulnerable population was targeted for our health intervention. Through inter-professional collaborative efforts the authors developed a holistic program dedicated to health and wellness integrated with oral clinical services. The long-term goal of this pilot work is to promote wellness, prevent oral pain and infection so schoolchildren could be more focused on learning and be better positioned for optimal adult health and wellness.

The World Health Organization (2010) defines interprofessional education (IPE) as students from two or more professions coming together to learn about, from and with each other to enable effective teamwork and improve health outcomes. At UK, IPE efforts are designed to meet the core competencies established by the Interprofessional Education Collaborative (IPEC, 2016) to better achieve the Triple Aim (improve the patient experience of care, improve the health of populations, and reduce the per capita cost of health care) for health-care delivery. Interprofessional education helps healthcare students to understand roles and responsibilities as well as the values and ethics of each discipline while at the same time advocating effective communication skills and promoting teamwork for patient care. Established in 2010, the UK Center for Interprofessional Health Education (CIHE) advances IPE, engaging approximately 1600 students annually. Located on one campus, 10 of UK's 19 colleges are actively engaged in IPE. Although positive outcomes at UK with CIHE efforts have been published previously (CIHE, 2018), we have not evaluated the effectiveness of IPE in a community health care setting. Recognizing this gap, College of Nursing faculty partnered with CIHE and the College of Dentistry to implement this authentic clinical IPE experience for health profession students at the University of Kentucky.

Developing a partnership with the College of Dentistry was a natural match as they have been on the forefront with leading oral health outreach in Kentucky for well over 30 years. Their fully equipped mobile dental clinics are staffed by faculty members and students to provide services to over 7000 children in 40 counties annually. With Kentucky continuing to lag behind other states for tooth decay prevention programs (The PEW Charitable Trust, 2015), a curriculum was designed to help promote dental student awareness on issues related to access to care, economic inequities and social responsibility in caring for vulnerable populations. The first oral health outreach experience for dental students, "Seal Kentucky" is offered during the first semester of their first year. During the month of October, teams of first year dental students join faculty to provide sealant services to over 400 children in eastern Kentucky.

Sealant services consist of the application of thin plastic liquid painted on the permanent six-year molars, to prevent tooth decay in children aged six to eleven years (elementary school grades 1–5). Four Eastern Kentucky elementary schools are invited each year to participate in the UK College of Dentistry sealant program. Over a two-and-a-half-day period, IPE students and faculty work as a team to convert elementary school cafeterias or auditoriums into oral health clinics. Services are free and/or paid through Medicaid which helps the "Seal Kentucky" program to be self-supporting with approximately six College of Dentistry faculty providers and 64 to 65 students annually.

To help improve health and wellness for citizens of Kentucky, funding opportunities were sought to expand UK health profession student learning experiences for team-based care delivery. This paper describes the outcomes from this innovative immersion experience to help bridge the gap with IPE and clinical practice in underserved communities through an academic-clinical partnership between seven health profession colleges.

Objectives

The purpose of the hCATS (health Colleges Advancing Team Skills)

to Appalachia pilot program was to develop, implement and evaluate educational outcomes from an innovative clinical service learning experience to help improve the oral health of, and to provide wellness education to, elementary schoolchildren in Eastern Kentucky, while developing competencies for collaborative practice.

Implementation and evaluation methods

In Fall 2016, faculty from UK College of Nursing received funding from the UK Women and Philanthropy Network to implement hCATS to Appalachia: An interprofessional service-learning program to promote health and wellness in Kentucky. Exempt IRB approval was obtained from the University of Kentucky for a retrospective analysis of the IPE program outcomes.

Partnering with faculty in the College of Dentistry's outreach program "SEAL Kentucky" and staff from the Center for Interprofessional Health Education (CIHE), nursing and other health profession students were recruited to be matched with first year dental students. The rural oral health outreach program provided clinical services to elementary schoolchildren in Boyd, Elliott, Letcher, and Rowan counties in Eastern Kentucky.

One hundred and thirteen students were grouped in four inter-professional cohorts, with each cohort participating in one experience lasting two and a half days. Dentistry students provided sealant to the molars of children while nursing and other health profession students performed health screenings and provided child-appropriate education activities such as brushing and flossing teeth, nutrition, exercise, and substance abuse avoidance. While these activities were largely done in parallel, efforts were made to involve the dentistry students in the health promotion activities led by the other IPE students during breaks in the sealant process. Similarly, other health professions students periodically shadowed the dentistry students when they were applying sealants. Furthermore, the health screening data generated by nursing and other IPE students informed the dentistry students in their initial evaluation of each child. In many cases, there was active communication across disciplines during the hand-off. Finally, there was much learning with, from, and about each other during the orientation experience and during meals and breaks on trips when students engaged in discussion and reflection.

Student participants completed a pre and post-survey to determine their perspectives on the development of the following specific core competency domains for interprofessional collaborative practice: values and ethics, roles and responsibilities, interprofessional communication and teams and teamwork (Interprofessional Education Collaborative [IPEC], 2016).

College of Dentistry staff and faculty obtained consent forms from parents for approval for UK to conduct the oral health services. Oral assessment records were documented with copies sent home to parents. College of Nursing faculty completed a form for health screening and educational offerings with copies sent home to parents. Over a six-hour period, elementary students rotated through six stations: sealant service; biometrics (blood pressure, body mass index); oral care (brushing and flossing teeth); exercise and movement, healthy eating, and self-care to avoid initiation of tobacco, drugs and alcohol. Elementary school teachers and staff members worked with UK faculty to navigate the children through the different stations.

hCATS curricular activities

CIHE curriculum

The Center for Interprofessional Health Education (CIHE) coordinated an orientation meeting at the beginning of the 2017 fall semester for all hCATS students and a "pizza and present" evening for each team during the week prior to their departure. During the orientation, an overview of the program was provided including a video

that described prior experiences of the dentistry students, identified roles and expectations, and shared aspirations for the trip. A pre-survey was administered for baseline awareness of community characteristics and collaborative skills. Students then broke out into small inter-professional teams, grouped by community destination, to get to know each other and plan community assessment presentations. Each team was given county and regional health data sources, topic areas related to the social determinants of health in communities, as well as economic issues pertinent to determine the need for developing a health practice in the region. Each team was then assigned a role in assessing the community and decided how to accomplish this for the next meeting. During the “pizza and present” session the interprofessional teams presented their community findings, discussed the context of health in each region, and finalized the plans for travel including distribution of t-shirts as hCATS team members.

Nursing curriculum

Senior BSN students were enrolled in, Community and Public Health Nursing, with the hCATS experience meeting a portion of the learning outcomes for the clinical component of this course. Faculty met weekly with students to review teaching plans, role play their health topic, and to identify strengths and needs of the community from county level data sources. Students were required to develop evidenced based interventions in four topic areas: oral health, nutrition, exercise, and prevention of substance abuse. Most interventions were developed using strategies from the Center for Disease Control and Prevention; Community Health Improvement Navigator (Center for Disease Control and Prevention, 2015). Nursing students developed materials for the teachers to keep and to send home with the children to encourage sustainability of the wellness activities. In addition, students completed a windshield survey to enrich their understanding of the social environment and how the community can influence health.

Dental curriculum

The sealant trips are a core element in Clinical and Community Dentistry, a required course for first year dentistry students. Students received training for set up of eight complete mobile dental stations to provide preventive care, which included: 1) clinical exam, 2) toothbrush prophylaxis, 3) dental sealants on cavity-free permanent six-year molars and 4) fluoride varnish. All children were initially screened by the faculty or dentistry resident to identify teeth present, gingival health, immediate dental needs or visual decay noted. The clinical findings were noted on the examination form prior to the child moving to one of the stations for a dental cleaning and preventive fluoride treatment performed by the dentistry students. Dentistry students were trained in pairs to apply preventive sealant onto the permanent six-year molars on all eligible children. After a final check and approval by the faculty, dentistry students escorted the children to the health education stations.

Curriculum for other students

A limited number of students from other health or health-related programs participated. For these students, the experience was voluntary (Pharmacy, Public Health, Health Communication and Physical Therapy), or met an experiential hours requirement (Social Work). Pharmacy and Physical Therapy students had completed our introductory experience in IPE, iCATS (Interprofessional Collaboration and Teamwork Skills) and had been exposed to this content area previously. For others, the hCATS Orientation was their first formal exposure to IPE and it was not part of a particular course as was the case for dentistry and nursing students.

Participants

There were 113 participants from seven colleges: Dentistry = 65; Nursing = 33; Pharmacy = 6; Social Work = 4; Public Health = 2; Health Sciences (Physical Therapy) = 2; Communication & Information (Health Communication) = 1. Distribution of students by destination was as follows: Boyd County = 28; Letcher County = 29; Rowan County = 25; Elliott County = 31. The average age was 22 and the majority of students were female (71%) and identified as White or Caucasian (74%).

Results

A pre and post-survey measured students' perception of their knowledge of community characteristics. The authors identified this knowledge as prerequisite to developing the following interprofessional subcompetencies: values/ethics VE1 and VE3, and teams and teamwork TT4 (IPEC, 2016). VE1 speaks to placing patient interests at the center of interprofessional health care delivery while VE3 speaks to embracing the cultural diversity of patients and populations. TT4 describes integrating knowledge and experience of health professionals while respecting patient and community values and priorities/preferences for care. Student post survey responses, on a 5-point Likert scale, ranged from 1 (nothing at all) to 5 (a great deal) indicated that they believed they had a greater understanding of the unique patient population and their needs after the experience, readying them for the acquisition of VE1, VE3, and TT4 subcompetencies (Table 1).

Student participants rated the experience as valuable to their development as professionals. Results indicated a perceived increase in knowledge and understanding of population health needs. This perception extended to understanding other health professions and of the impact of each on patient outcomes This was measured using a 5-point Likert scale with scores ranging from 1 (strongly disagree) to 5 (strongly agree) (Table 2). Further, Table 3 demonstrates positive perceptions of team members and their performance with collaborative care delivery. Mutual respect and positive team dynamics are reflected in these perceptions as well.

When students were asked to comment on the experience, feedback was generally positive. Common themes were enjoyment in working with pediatric patients, pride in community service, experiencing regional differences, learning about rural communities, appreciation for collaboration, and practicing newly acquired clinical skills in an authentic setting. When students were asked how teamwork contributed to patient care, their responses reflected insight into the importance of interprofessional communication for quality and completeness of care. In addition, the students acknowledged the importance of knowing and understanding the roles and responsibilities of team members and in the process developed respect and appreciation for the expertise of the various professions. Suggestions for improvement centered on logistics and clarifying interprofessional collaboration role expectations. Based

Table 1
Knowledge of community characteristics: pre/post perceptions.

Select the option that best describes the extent of your knowledge about these characteristics of the particular community you will visit (pre); visited (post).	Some/Much/A great deal	
	% PRE	% POST
Cultural diversity	49	80
Community agencies, resources, clinics/hospitals, schools	26	87
Community health needs	55	98
Community values and preferences for care	47	83
Economic conditions	56	84
Geographic features	53	89
Language differences	41	71
Regional diet	49	75
Quality of health care	47	85

Table 2
Perceived effectiveness of experience in strengthening collaborative skills.

Please indicate your level of agreement with the following statements	% Agree/Strongly Agree
This experience strengthened my knowledge and/or skills in patient diversity and cultural sensitivity.	93
This experience strengthened my knowledge and/or skills in professionalism and team cooperation.	87
This experience strengthened my knowledge and/or skills in providing care as part of a team.	91
This experience strengthened my understanding of population health needs.	96
This experience strengthened my knowledge of other health professions and the impact of each upon patient care and health outcomes.	85
Overall, the experience was valuable to my development as a professional.	96

Table 3
Perceived effectiveness of team members' collaborative skills.

Please indicate your level of agreement with the following statements	% Agree/Strongly Agree
Individual roles in the team were clearly defined.	88
I developed a trusting relationship with team members.	90
The unique contribution of each team member's profession was integrated into the team's work.	83
The team acknowledged comments and/or suggestions from each other.	77
The team was respectful to each other.	83
Team members demonstrated sensitivity to the needs of a culturally diverse population.	93
Team members demonstrated sensitivity to individual differences of patients.	96
Team members cooperated successfully to provide patient care.	93

on feedback, changes were implemented in each of these areas for continuation of hCATS to Appalachia.

Discussion

Although interprofessional education programs that purposely integrate collaborative practice and teamwork report positive outcomes (Ketcherside, Rhodes, Powelson, Cox, & Parker, 2017), this is the first to the authors knowledge of engaging seven health colleges and a dedicated center for IPE. This experience enabled students to see patients in a community setting to get a broader sense of the social determinants of health. Qualitative comments by the students supported the program expanded their understanding of the need for quality clinical services for underserved populations.

The opportunities that students identified in their qualitative comments to strengthen the program have led to change. A critical element of interprofessional collaboration is understanding discipline-specific roles, for which the students indicated a need for clarity. For example, a few students believed they were an “add on” and recommended clarity on the context of the purpose of the program and the value added for their discipline. In addition, although biometrics data was collected, improving the accuracy of the measurements and the consistency of follow-up will need to be implemented.

Dental faculty and staff overwhelmingly recognized the value of a partnership with nursing to increase awareness, prevention, and access to oral health services. Despite the oral health challenges Kentucky's children face, interprofessional outreach programs such as hCATS to Appalachia have the potential to help close the gap with oral health disparities and improve children's overall self-esteem and wellness. Throughout the country, > 47 million individuals are living in designated dental shortage areas, and 37% of currently practicing dentists are aged ≥ 55 years and nearing retirement (USDHHS, 2016). Intentional interprofessional education programming integrated with clinical practice, especially with vulnerable populations, holds promise for students to function more effectively in teams earlier rather than later in their programs of study. In addition, building strategic research platforms can help inform curricular decision making to promote collaborative practice and teamwork experiences for students to help impact quality and cost-effective care.

Conclusion

Gaps exist with IPE theory and the transfer to authentic clinical practice. Academic health centers with IPE programs have an opportunity to expand team-based learning activities among health profession students. Strategies to optimize health profession students learning together, especially in small groups through clinical immersion experiences, can increase shared knowledge of discipline-specific content and team skills to bridge the gap with IPE theory and practice. Although Kentucky continues to have unmet health needs, engaging health profession students early in their training with “hands-on” clinical experience can make a difference in vulnerable and underserved populations. With programs such as hCATS to Appalachia, goals for promoting a culture of health can be advanced with an interprofessional approach. Increasing the number of children who are free from dental pain and infection are better positioned for educational advancement and healthy adulthood, which are outcomes every profession can celebrate.

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