



## Promoting oral health in nursing education through interprofessional collaborative practice: A quasi-experimental survey study design



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### ABSTRACT

**Background:** Optimal oral health education is limited in nursing curricula and may therefore, not translate as a priority for nurses in clinical practice.

**Objectives:** To evaluate the influence of an educational intervention on knowledge, confidence, practice behaviors, and perceived barriers of nursing students regarding preventive oral health services.

**Design:** Quasi-experimental pre-post survey study design.

**Participants:** Sixty-four first-year Accelerated Bachelor of Nursing (ASBN) students at the University of North Carolina at Chapel Hill.

**Methods:** Students were asked to complete oral-health-related questionnaires following didactic and clinical simulation on principles of oral health, oral screening, counseling, and referral to a dentist. A post-survey following clinical rotations was completed testing long-term effectiveness.

**Results:** Fifty-five (86%) ASBN students completed the pre-survey, 49 (77%) completed the post-survey; 44 (69%) completed both. Participants' showed a significant increase in knowledge from pre-post questionnaires for two of five questions ( $p = 0.04$ ;  $p < 0.0001$ ). Confidence scores in performing oral screenings ( $p < 0.0001$ ) and counseling ( $p = 0.006$ ) increased; while scores regarding referrals decreased ( $p = 0.718$ ). Post-intervention, 37% reported performing oral screenings, 45% counseling, and 8% dental referrals. Respondents reported a significant increase in willingness to implement oral health services during clinical visits ( $p < 0.0001$ ).

**Conclusion:** Mixed educational methods can successfully influence oral health knowledge and confidence among ASBN students and their willingness to perform in clinical practice.

### 1. Introduction

In the constantly changing world of health care, providers are encouraged to work collaboratively and deliver person-centered care. Despite the statement released by the World Health Organization (WHO) regarding the importance of interprofessional education (IPE) and practice (World Health Organization [WHO], 2010), full IPE integration has not been achieved at the student level, specifically relating oral health to overall health. Nurses can play a critical role in the provision of routine oral screenings and counseling to identify conditions that may require further care and lessen health disparities. However, optimal oral health education is limited in nursing curricula (Dolce et al., 2012; Pai et al., 2016) and may therefore, not translate as a priority for nurses in clinical practice. This study evaluated the

influence of an educational intervention on nursing students' knowledge, confidence, practice behaviors, and perceived barriers of nursing students to deliver preventive oral health services.

### 2. Background

#### 2.1. Oral health in nursing education

Nurses are frequently the first member of the primary care team to see patients and are in a prime position to complete oral health assessments by screening, counseling and facilitating necessary referrals to oral health care providers for their patients. As deficiencies in oral health education for primary care teams have been identified, programs such as Smiles For Life: National Oral Health Curriculum (SFL)

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(Douglass et al., 2007) were developed to disseminate peer-reviewed oral health curriculum in primary care disciplines. Frameworks designed specifically for the primary care team, such as the *Qualis Oral Health Delivery Framework*, have further assisted in simplifying and providing a calibrated and structured process for preventive oral health services performed by the primary care team. (Hummel et al., 2015) However, oral health concepts are still lacking in curricula and innovative ways are needed to promote oral health in primary care settings. (Clark et al., 2017; Dolce, 2014; Douglass et al., 2007)

A recent four-part report in *Teaching and Learning in Nursing* released oral health content for nursing educators to add to curriculum. (J. K. Mitchell et al., 2017; J. Mitchell and Shoemaker, 2017) These resources serve to provide specific content for nurses treating patients at various stages in their life with content focusing on the integrated health team and the role of the nurse in providing preventive oral health services such as observing, counseling and providing on time referrals. (J. K. Mitchell et al., 2017; J. Mitchell and Shoemaker, 2017) The report further discussed common oral health manifestations, disease processes, oral health effects of systemic disease, and preventive oral health services a nurse can provide for each of the four stages of life. (J. K. Mitchell et al., 2017; J. Mitchell and Shoemaker, 2017)

## 2.2. Interprofessional education and collaborative practice

IPE and collaborative practice is essential for health care professionals and has evolved to become a required component of many health care accreditation standards. (Czarnecki et al., 2014) Research supports that IPE provides a better understanding of oral health promotion and guidelines and improves quality of patient care. (Abou El Fadl et al., 2016; Czarnecki et al., 2014; Otsuka et al., 2016; Sharif et al., 2016; Silk, 2018; Wooten et al., 2011) Therefore, incorporating interprofessional collaboration (IPC) in the health care curricula may be an effective method of promoting both oral and systemic health in the medical and dental professions. (Abou El Fadl et al., 2016; Dolce, 2014; Silk, 2018) Research in health care further supports the inclusion of mixed methods learning approaches such as interactive workshops and other forms of content delivery. (Thomson O'Brien et al., 2001)

Nurses are an integral aspect of the primary health care team, and should be trained to provide oral screening, counseling, and referrals. According to the WHO, “Nursing encompasses autonomous and collaborative care of individuals of all ages, families, groups and communities, sick or well and in all settings. It includes the promotion of health, the prevention of illness, and the care of ill, disabled and dying people.” (World Health Organization [WHO] | Nursing, 2019) This definition of the nursing profession charges nurses with the role of providing comprehensive, promotional, and preventive care that encompasses oral health. Inclusion of this information in nursing curricula would enhance translation of knowledge, increase confidence, and provide information for referrals. IPE would be a logical method to provide knowledge regarding oral screening, oral health counseling, and referrals. While true IPE is defined as learning from and with other professions, interprofessional learning experiences can be building blocks in attaining cross-discipline training. (World Health Organization [WHO], 2010) Accordingly, the purpose of the study is to evaluate the influence of an educational intervention on knowledge, confidence, practice behaviors, and perceived barriers of nursing students prior to and after an oral health interprofessional learning (IPL) experience.

## 3. Methods

Using a pre-, immediate-post-, and post-intervention quasi-experimental survey research design, we evaluated oral health education in nursing curriculum. This study was reviewed by the University of North Carolina at Chapel Hill Office of Human Research Ethics and was deemed exempt from further review (IRB# 16-3087).

The study included 64 first-year nursing students enrolled in the accelerated undergraduate nursing program (ABSN) at the University of North Carolina at Chapel Hill School of Nursing registered in a Health Assessment Course. Pre-, immediate-post, and post-intervention surveys were modified using a survey developed for the Prenatal Oral Health Program at the University of North Carolina at Chapel Hill School of Dentistry. (Leone et al., 2017) The original survey, utilized for medical students with a similar intervention, was revised and tailored towards a general oral health assessment for nursing students. Survey questions focused on the constructs of knowledge, attitudes, and behaviors, and was formatted as one-page, front and back. Individual questions included: demographics; true/false questions on oral health knowledge; four-point Likert scale-type questions (1 = strongly disagree, 4 = strongly agree) on confidence in providing oral health services, level of agreement regarding their oral health responsibilities as a nurse, willingness to provide oral health services, opinions on current level of oral health in nursing education, and practice behaviors. Additional questions were included in the delayed post-survey to assess the self-reported implementation of learned oral health principles during student rotations. The immediate post-survey also included open-ended questions to gather comments. Responses from the open-ended questions were collected and put into a *Wordle*© (Feinberg, 2014) to identify commonly used words and phrases. The surveys were pilot tested on three nursing students not enrolled in the Health Assessment course in spring 2017. Surveys were transferred to a Teleform paper design and responses scanned to ensure accuracy.

All ABSN students enrolled in the Health Assessment Course offered in spring 2017 were asked to participate ( $n = 64$ ). This course, based on the initiation of caring and decision making in nursing practice, addressed concepts and methods of comprehensive health assessment of children, adults, and geriatric patients. The Health Assessment Course is three-credit-hours; consisting of two lecture credits and one lab credit. The lecture precedes the clinical simulation component with both 2 h in duration. Surveys administered were coded to maintain anonymity and students were informed that participation in the research was voluntary. Students not completing the surveys still received the didactic lecture and clinical simulation. Their decision to not participate did not have any negative consequences on their class performance. Clinical simulation groups included approximately eight to ten students and were held in laboratories at the nursing school. All students were asked to complete a written consent form to voluntarily participate in the intervention. Once written consent was obtained, a pen and paper pre-survey containing questions regarding knowledge of general principles of oral health and confidence of providing general oral health counseling was given at the beginning of a class period. A didactic lecture-based intervention was then presented via PowerPoint during the lecture component. The presentation included (1) extraoral and intraoral anatomy, (2) oral diseases such as oral cancer, gingivitis, periodontitis, and dental caries, (3) common oral health manifestations through the life course, and (4) expectations of health care providers in providing oral health services. A short instructional video from SFL (Douglass et al., 2007; Quinonez et al., 2017) was shown demonstrating the Qualis framework for oral screenings by primary care providers (Hummel et al., 2015; “Oral Health Integration | Qualis Health”, 2016). Students then dispersed into groups held in the nursing school laboratories for a practical session under the supervision of dental hygiene (DH) instructors.

Five DH instructors participated in a calibration session that included oral and written instruction for facilitating case-based learning and utilizing uniform terminology when presenting the oral screening demonstration to the nursing students. The DH instructors were responsible for presenting the oral screening demonstration based on the framework shown in the SFL video to the nursing students (“Oral Health For The Primary Care Provider”, 2016). During the clinical simulation, the DH instructors then demonstrated the calibrated oral screenings using gloves, tongue depressors and flashlights.



**Table 2**  
ABS N students' self-reported confidence change in providing preventive oral health services (screen, counsel, refer).

	Pre-survey N (%)	Delayed-post-survey <sup>a</sup> N (%)	Total number	Median (Q1–Q3)	p value
Oral Screening					
Not at all	28 (65.12%)	4 (9.30%)	43	1 (2–0)	<i>p</i> < 0.0001
Only a Little	9 (20.93%)	20 (34.88%)			
Somewhat	6 (13.95%)	15 (34.88)			
Very	0 (0%)	4 (9.30%)			
Oral Counseling					
Not at all	4 (9.30%)	1 (2.33%)	43	1 (0–1)	<i>p</i> = 0.0063
Only a Little	15 (34.88)	7 (16.28%)			
Somewhat	18 (41.86)	25 (58.14%)			
Very	6 (13.95%)	10 (23.26%)			
Dental Referrals					
Not at all	5 (11.63%)	6 (13.95%)	43	0 (–1–1)	<i>p</i> = 0.7158
Only a Little	10 (23.26%)	9 (20.93%)			
Somewhat	15 (34.88%)	20 (43.51%)			
Very	11 (25.59%)	8 (18.60%)			

(a) Five months post intervention following clinical rotations.

**Table 3**  
ABS N students' self-reported preventive oral health services performed during clinical rotations (*N* = 43).

	Frequency (N)	Percent %
Oral Screening		
No patients	31	63.27 63%
Less than half	9	18.37 18%
About half	5	10.20
More than half but not all	1	2.04
Every patient	3	6.12
Oral Counseling		
No patients	27	55.10
Less than half	16	32.65
About half	5	10.20
More than half but not all	0	0
Every patient	1	20.04
Dental Referrals		
No patients	45	91.84
Less than half	2	4.08
About half	1	2.04
More than half but not all	0	0
Every patient	1	2.04

(a) Five months post intervention following clinical rotations.

## 5. Discussion

This study aimed to evaluate knowledge, confidence, self-reported practice behaviors, and perceived barriers of nursing students regarding preventive oral health services before and after a didactic and hands-on clinical simulation intervention. Study investigators first gathered baseline information about students' oral health knowledge, willingness to implement oral health services in practice, confidence in providing these services, and whether they had provided these services before intervention. Pre-survey data indicated that 60% of the respondents were knowledgeable on concepts of oral health but were not confident in providing preventive oral health services such as oral screening, counseling, and dental referrals. Students indicated a willingness to implement oral health services in practice and believed that it was within the nurse's role to provide these services in practice. These findings remain consistent with previous similar intervention-based studies in IPE as students tend to feel optimistic about implementing services but do not have the confidence to do so before participating in the study. (Golinveaux et al., 2013) Research shows that students have higher level of motivation in providing services when receiving adequate instruction. (Golinveaux et al., 2013)

Immediate-post-survey results demonstrated that students viewed the IPL experience as very positive. They responded enthusiastically to the multifaceted approach through the didactic and clinical simulation components. Students expressed that working through the clinical simulation case along with the DH educators allowed them to grasp a true understanding of the scope of practice of a DH, and an understanding of their own scope and responsibilities as nurses' in oral health delivery. These findings remain consistent with IPE research regarding the cultivation of the collaborative team environment. (Anders et al., 2016; Haber et al., 2017) This introduction to IPL is important as the success of interprofessional practice is dependent upon the ability of health care professionals to work in teams, which can only begin with an understanding of roles and responsibilities and potential contributions to the team from each individual discipline. The delayed-post-intervention showed an increase in knowledge among students in concepts of oral health. Self-reported levels of confidence and willingness also increased for oral screenings and counseling, suggesting that students may be more likely to provide preventive oral health care.

Although the intervention proved successful in many aspects, there were a few areas of weaknesses and barriers that were identified in the delayed-post-intervention survey, primarily related to dental referrals. This could be due to the fact that this intervention was a pilot study conducted for the first time at the School of Nursing, meaning students and faculty were equipped with limited resources and calibration for providing dental referrals. Student rotations were primarily held in hospital medical-surgical nursing setting in various services, which means that student/patient interaction varied greatly. This setting does not afford many opportunities for the provision of these specific preventive oral health services. Additionally, faculty may not have been receptive or knowledgeable about referral information and may not have had the information to provide for the students. Regardless, the students did self-report an increased willingness to provide care and did so when opportunities arose. Additional barriers to take into consideration would be a lack of oral hygiene supplies, lack of oral health calibration between nursing clinical faculty, and limited time for delivering preventive oral health care in these settings.

Despite these challenges, this study provides a model for IPL activities that can influence improved patient health outcomes. IPL activities may increase competence of health care providers as they are able to truly understand their roles in practice and the roles of other health care providers. While we strive for true IPE, IPL activities can assist in the building and expansion of future IPE experiences. These concepts can be taken into the workforce as health care is so quickly approaching an integrated model of collaborative practice. Future studies should include more interaction between students in both health

disciplines. Such interaction may include pre-assigned case study reviews accompanied with round-table discussion of roles and responsibilities of each discipline in addition to possible shared clinical care opportunities. Students from other health disciplines may also be included in this process thus allowing for further expansion of IPL. Future studies must also include an ongoing evaluation of oral health content in health disciplines to ascertain that all students are receiving calibrated information.

The inclusion of the concepts of IPL in students' first year of nursing school should be considered a strength as these students can include the received information throughout their program and upon graduation. Having oral health educators delivering the information was very well-received as students were able to understand the relevance and importance of preventive oral health services and the relationship to systemic health specifically from the perspective of an oral health educator.

The oral health care delivery system is constantly changing, (Weintraub, 2017) and educators must work as a team to train health care professionals who will be practice ready for the developing infrastructure and expectations. Nurses provide care to all people in many different environments. They have the ability to reach patients in long-term care facilities, hospice, and intensive care units where patients would be less likely to visit a dental practice for routine care. Such environments present opportunities to provide oral care services that may otherwise not be provided. This puts the burden of identifying and treating oral complications on the primary care providers. If they do not have the correct training, they may overlook or misdiagnose an oral finding that could delay or prolong care, causing unnecessary pain or an increase in the complexity of restorative treatment for the patient. It is important to provide resources for primary care providers such as SFL (Douglass et al., 2007; Quinonez et al., 2017) as programs like these can be easily incorporated into nursing curricula. Not only do these programs add oral health content, but they are also safe resources that can be taken to practice and be used for patient care.

Another example is access to dental care services for children. Most children are covered by private or public insurance and receive regular well-child visits. The US Preventive Service Task Force reviewed and supported fluoride in the medical home. (Chou et al., 2014) These appointments with primary care providers can serve as an opportune time to provide oral screening, educational counseling about oral health, and referrals, when indicated. As the students from this intervention were provided with the unique opportunity of practicing fluoride application, they are now equipped with the knowledge to provide fluoride varnish therapy as well. Thinking from a broader perspective and a more comprehensive person-centered approach to care can enhance patient outcomes and ultimately improve delivery of care for patient care.

This study should be assessed in the context of its limitations. The first is the absence of a control group. As a pilot for inclusion of IPL experiences into the nursing curricula and Health Assessment course, it was a greater benefit for the students to receive the content and clinical simulation so that all students would be getting consistent material as part of their curriculum. Future studies should identify groups of students in a similar program that did not receive an oral health intervention so as to have a means of comparison for practice behaviors post-clinical rotations. Utilizing a larger sample size will also provide results that can be more generalizable and allow for more sophisticated statistical analysis to move us towards predictors of success in oral health education, which can further inform more personalized education. Although inclusion of interprofessional teamwork so early in nursing curriculum may be a benefit, it may also be considered a limitation as student had not yet had patient interaction prior to the intervention. IPE experiences should also include students from additional disciplines with opportunities to teach one another and learn together. Additionally, reporting-bias may have played a role in responses from the questionnaires but was necessary as there were no pre-

established methods of documenting preventive oral health services.

## 6. Conclusions

Mixed educational methods, including didactic and hands-on simulated oral health educational opportunities, increased knowledge and confidence among ABSN students to deliver preventive oral health services in practice. Incorporating oral health content early in nursing curriculum is recommended to increase student willingness to provide oral care in their future profession. IPL experiences and early participation in collaborative practice allow students to develop optimistic attitudes towards open communication between health disciplines and also allows students to achieve a better understanding of scopes of practice. Such interventions can have a positive impact on clinical behaviors as future nurses may have increased self-confidence and understanding of their own roles in providing preventive oral care in the medical home. Future research should include and evaluate more IPL experience opportunities with multiple disciplines so true collaborative practice and recognition of the value of individual professional roles can be achieved.

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## Declarations of Competing Interest

None declared.

## Ethical approval

This study was reviewed by the University of North Carolina at Chapel Hill Office of Human Research Ethics and was deemed exempt from further review. (IRB# 16-3087)

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