Implementing a Prenatal Oral Health Program Through Interprofessional Collaboration

Jeffrey T. Jackson, DDS; Rocio B. Quinonez, DMD, MS, MPH; Amanda K. Kerns, DDS; Alice Chuang, MD; R. Scott Eidson, DDS; Kim A. Boggess, MD; Jane A. Weintraub, DDS, MPH

Abstract: Interprofessional collaboration has become a critical component of accreditation standards in dentistry and medicine. This article reports on implementation in an academic setting of a prenatal oral health program (pOHP) that addresses coordinated care, accreditation standards, and new clinical practice guidelines. The pOHP is an educational intervention for third-year medical students, residents, and faculty members to deliver preventive oral health information and referral to a dental home for pregnant women. At the same time, senior dental students and faculty members are introduced to prenatal oral health principles and delivery of comprehensive oral health care to pregnant women. A systems-based approach was used to guide the pOHP implementation during the 2012-13 academic year. Participants were 96 third-year medical students (50% of the total in an obstetrics and gynecology clerkship) and all 81 fourth-year dental students. During that academic year, 126 dental referrals were made to the School of Dentistry, and 55 women presented for care, resulting in 50% (n=40) of dental students participating in the clinical experience and delivery of simple to complex oral health procedures. The prenatal period is a frequently missed opportunity to address oral health care. The pOHP is an interprofessional collaboration model designed to educate dental and medical providers and provide a system of referral for comprehensive clinical care of pregnant patients, including educating women about their oral health and that of their children. Such programs can help meet interprofessional accreditation standards and encourage implementation of practice guidelines.

Keywords: dental education, oral health, prenatal care, educational models, interprofessional relations, interprofessional education

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Pregnancy provides an opportunity for women to initiate new healthy behaviors, including oral health practices. Historically however, dental and prenatal care providers have missed this critical window to promote oral health.\(^1\)\(^2\) Gaps in training,\(^4\) knowledge, and competing health demands of dental and medical professionals contribute to the disparities present in this population,\(^3\) subsequently impacting the low utilization of dental services reported among pregnant women.\(^5\)\(^8\) Because mothers with regular dental care are more likely to develop attitudes and behaviors that promote good oral health for themselves and their children,\(^9\) it is paramount to address oral health at every opportune moment, particularly at a time when low-income women are eligible for Medicaid dental benefits.

The development of national prenatal oral health guidelines\(^10\) and the recent American College of Obstetricians and Gynecologists’ statement on oral health in pregnancy\(^11\) emphasize the need for dental and medical providers to implement new practice behaviors. Specific to prenatal health, medical providers should promote oral health and facilitate referral to a dental home because of their frequent contact with patients, especially with high-risk populations. The medical home has been shown to
be an effective setting for oral health education and prevention.\textsuperscript{12,13} Likewise, dental providers should deliver comprehensive care for women as part of a health care team.

Consistent with these goals, the Liaison Committee on Medical Education (LCME), the Interprofessional Education Collaborative, and the World Health Organization (WHO) promote interprofessional team-based care as paramount to education.\textsuperscript{14-16} The Interprofessional Education Collaborative states that students “must engage diverse health care professionals who complement one’s own professional expertise, as well as associated resources, to develop strategies to meet specific patient care needs.”\textsuperscript{15} The Association of American Medical Colleges (AAMC) expects medical students to demonstrate competence in multiple domains within oral health, such as understanding the caries and periodontal disease process and its implications for systemic health, performing oral health screenings, promoting preventive strategies, and collaborating with dental professionals.\textsuperscript{17} Similarly, the Commission on Dental Accreditation (CODA) standards state that students must be “competent in providing oral health care within the scope of general dentistry to patients in all stages of life” and “competent in communicating and collaborating with other members of the health care team.”\textsuperscript{18}

In response to accreditation guidelines, professional standards, and practice trends, a prenatal oral health program (pOHP) at the University of North Carolina (UNC) at Chapel Hill School of Medicine (SOM) and School of Dentistry (SOD) was developed and implemented. The program is designed to educate medical and dental professionals about prenatal oral health, while establishing a prenatal oral health clinic at the SOD to diminish barriers for guideline adherence and referral of pregnant women to a dental home.\textsuperscript{19} The goal is to establish a systems change in the medical and dental academic communities to promote wellness by delivering preventive care, referral, and treatment of the unmet dental needs in pregnant women. The aim of this article is to describe initial implementation of the pOHP as a prototype to guide other academic institutions considering such interprofessional collaborations as a model of care.

**Methods**

Institutional Review Board approval of this study was obtained from the Office of Human Research Ethics at UNC (#12-1167). In June 2012, an educational project that included the establishment of a prenatal oral health clinic at the SOD was implemented. The intervention targeted third-year medical students and obstetrics and gynecology residents delivering prenatal care at the North Carolina Women’s Hospital (NCWH) for the 2012-13 academic year. In addition, fourth-year dental students received training in prenatal oral health and delivered services to pregnant women.

Third-year medical students were selected because they are required to perform a six-week rotation in obstetrics and gynecology. Students have the option of completing their clinical work at four UNC-affiliated locations. Only students involved at NCWH for their entire rotation were included in the intervention. All obstetrics and gynecology residents were targeted because, in the educational medical model, residents are partnered with medical students to provide collaborative care led by the resident and faculty member making referrals. Fourth-year dental students were selected because of curriculum timing and their advanced clinical skill set to address more complex patients’ needs. The current practice structure for senior students is four group practices led by full-time faculty members serving as group directors. The faculty members were responsible for overseeing the prenatal oral health clinic, thus allowing dental students to deliver comprehensive care under direct supervision of group practice directors.

**Intervention**

The pOHP was created as a collaborative effort between the SOD and SOM and was led by a pediatric dentist and an obstetrician and gynecologist. This program was pilot tested in three federally qualified community health centers in North Carolina. The program consists of training materials, including videos on oral health education for non-dental health care providers and pregnant women, and access to a prenatal-focused oral health education website that was completed mid-way through the academic year of the intervention.\textsuperscript{20} Additionally, the pOHP is designed to work in conjunction with the Baby Oral Health Program (bOHP), an initiative promoting guideline adherence to early preventive oral health care and to the establishment of a dental home by age one.\textsuperscript{21}

The initiative followed a multi-method, system-based approach to train medical prenatal providers consistent with the WHO’s interprofessional education guidelines.\textsuperscript{16} This model (Figure 1) included mixed interactive and didactic education.
Two additional clinical blocks in the group practice weekly schedule were created when the waitlist for appointment surpassed four weeks. One student was blocked into each clinic slot with one patient assignment, in keeping with the dental school’s patient care model. The administrative support staff were trained to process referrals into the appointment blocks, and patients were scheduled accordingly.

The clinical procedure for this initial appointment consisted of a comprehensive clinical dental exam, obtaining radiographs as needed; pregnancy-focused oral health education using the pOHP kit; dental prophylaxis (cleaning); and urgent dental treatment. A customary bundled fee was established for the exam, radiographs, oral health education, and prophylaxis. The pOHP educational kits were made available in the clinical dispensary for students to provide pregnancy-focused oral health education during their patients’ appointments. At the appointment’s conclusion, the dental student provided the referring physician an update on the woman’s oral health status with a form, allowing for coordinated

FIGURE 1. Multi-method model used to implement pOHP at the University of North Carolina at Chapel Hill Schools of Medicine and Dentistry
care. On the advice of the Office of Clinical Affairs, the patient could be scheduled back into the rotation block or assigned to another dental student for the completion of care when needed.

**Educational Process**

At the medical school in August 2012, the Department of Obstetrics and Gynecology hosted a one-hour grand rounds seminar on oral health led by one of the physician P0HP champions. This session included a statement about the prevalence of oral health problems during pregnancy, information about the relationship between the mother and the infant’s oral health, a training video, and discussion of the collaboration between medicine and dentistry. Because not all residents were in attendance, a five-minute refresher with obstetrics and gynecology residents was included as part of a weekly faculty and resident didactic session to reinforce P0HP and the referral process.

In addition, a one-hour educational session was presented to medical students whose clerkship was taking place at UNC as part of their formal didactic series during their six-week obstetrics clerkship block. At this session, students were introduced to the principles of perinatal oral health and the use of P0HP education materials, including topics such as having a healthy mouth and proper nutrition during pregnancy as a means to begin an oral health dialogue with patients. Students viewed an 18-minute training video on prenatal oral health that included various medical and dental providers, calibrating the information received by all groups, and modeling interprofessional collaboration. Students were instructed on the referral and clinical process implemented at the NCWH and the SOD and received handouts of the most current clinical guidelines. With the assistance of the obstetrics clinical coordinator, a separate session was conducted to include clinical and administrative staff in the obstetrics clinic to facilitate implementation of the referral process. Following the medical faculty, resident, and student training, we monitored the number of referrals for 12 months beginning on August 2012.

At the dental school, to prepare for the established P0HP clinic rotation, dental students and group practice directors attended a two-hour didactic session in fall 2012 led by an obstetrician, pediatric dentist, and head of the general dentistry clinic. The didactic session focused on perinatal oral health trends, relevant national guidelines, and clinic protocols for the new clinic. Each fourth-year dental student was assigned to a minimum of one to three hour-long clinical sessions within the academic year to the newly established prenatal oral health clinic for women referred by the SOM providers.

**Statistical Analysis**

Descriptive statistics were performed using Microsoft Excel 2010 (Seattle, WA, USA). During the 2012-13 academic year, the variables of interest included tracking participation of medical students, obstetrics and gynecology residents, and dental students from attendance records. The number of women referred from the medical to dental clinic, the length of time between referral and patient visit, the number of pregnant women visits at the SOD clinic, and the dental procedures performed were tracked using the SOD electronic health care records system.

**Results**

During the 2012-13 academic year, 96 medical students rotating at UNC for their obstetrics and gynecology clerkship participated in the prenatal oral health intervention (Figure 2); this was 50% of the total number participating in the obstetrics and gynecology clerkship. Of these residents, 45% participated in grand rounds and an additional 35% in subsequent update on the prenatal oral health program being implemented in their obstetric clinic. All fourth-year dental students (N=81, 100%) participated in the prenatal oral health education component, and half of them (N=40, 50%) participated in the clinical experience.

Over this 12-month period, a total of 126 pregnant patients (3.26% of all deliveries at NCHW) were identified as not having a dental home or not having been to a dentist in six to 12 months and were referred to the SOD prenatal oral health clinic. The women presented on average 36 days after their referral (SD: 26 days). Of these women, 55 (44%) participated in grand rounds and an additional 35% in subsequent update on the prenatal oral health program being implemented in their obstetric clinic. All fourth-year dental students (N=81, 100%) participated in the prenatal oral health education component, and half of them (N=40, 50%) participated in the clinical experience.

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Figure 2. Number of patients and students participating in Prenatal Oral Health Program, academic year 2012-13

Figure 3. Number of dental procedures by type performed by senior dental students in Prenatal Oral Health Program, academic year 2012-13
Discussion

Prenatal health has emerged as an area of interest between and within the medical and dental communities because of the opportunities it offers for promoting wellness for women and their children. Guidelines have been developed in the past decade to address oral health as a component of prenatal and perinatal health. Our study is the first to report on the impact of the establishment of a comprehensive interprofessional collaboration regarding prenatal oral health in an academic center. The multi-methods and systems-based approach resulted in referrals by medical providers and opportunities for dental students to have prenatal oral health clinical experiences.

Factors that influence the adoption and implementation of evidence-based practices have been researched. Innovation, organizational readiness to change, and optimized dissemination of infrastructure must be compatible with current clinical practices for new methods to be accepted. In our study, opinion leaders and champions were identified and recruited early in the implementation process. These key personnel served as transformational leaders for the new program. The support of the SOD associate dean of clinical affairs and the SOM director of obstetrics and gynecology clerkship were, and continue to be, critical to the success of this collaboration. Similar programs have demonstrated the importance of opinion leaders and champions in introducing innovations.

While 126 referrals should be acknowledged as an important benefit for these women and an accomplishment for the program, that number is low compared to the total number of pregnant women seen at the NCWH. Boggess et al. reported that, in a convenience sample of pregnant women at NCWH (N=599), 74% did not have a dental home. Given that NCWH obstetricians delivered 3,862 babies from August 2012 through 2013 and approximately 65% of them were delivered by residents, there remain many missed opportunities to refer women to a dental home at SOD. It is possible that more women may have been referred but they did not necessarily desire a referral to the SOD. It could be hypothesized that these women’s financial situation may have played a role in their desire to be referred or follow up with necessary care. It was not, however, within the scope of this project to assess this barrier or whether students and residents were providing the educational component of the intervention. Nevertheless, it is possible that some oral health education was occurring without the dental referral, limiting our ability to assess less proximal outcomes of the program.

Regarding the ability to refer, it is important to consider the differences in dental and medical education. The medical education model provides SOM students with the opportunity to participate in clinical care for prenatal patients. This prenatal care is usually provided by the residents with supervision from their faculty members. However, unlike dental students, medical students do not function as autonomous health care providers. They provide clinical care that lies within the scope of their abilities supervised by residents and/or faculty.

Implementation of oral health initiatives based on clinical practice guidelines often is a slow process in which barriers must be overcome before initiatives are widely adopted. The pOHP faced various barriers during implementation and in the process of ensuring sustainability. First, the initial targeting of medical students as the source for referral, while important to the educational mission, was misguided as it is residents in the medical model who direct the referral process. To address this limitation, a resident-focused educational session was introduced during incoming obstetrics and gynecology resident orientation, and a brief follow-up session occurred to emphasize the referral process and the collaboration between residents and medical students in the pOHP process.

Second, providers at the NCWH initially took a very liberal approach and referred all women without completely explaining the commitment or the process and without consideration of the timing of the referral relative to their stage of pregnancy. While the number of referrals was encouraging, some women could not receive an appointment before their delivery date for various reasons. The SOD clinical schedule, which closes when school is not in session, contributed to this delay. Strategies to promote year-round care for pregnant women have now been introduced at the SOD to address this issue. In addition, many women experienced a wait for their appointment because of a desire to schedule appointments at the NCWH and SOD for the same day. However, the number of days between referral and dental appointment may be inflated due to including time to actual appointment for women who missed their initial appointment and attended a later rescheduled one. The overall “no show” rate of approximately 55% often resulted in dental students’ having a less than positive perception of this rotation.
Third, the sustainability of the process is dependent on patients’ ability to pay for treatment. Boggess et al. described the patient population at NCWH as including a large proportion of women in households with significant economic challenges. Despite the SOD’s offering the initial pOHP visit for a reduced fee, all subsequent treatment was provided at the regular dental school rates, which are approximately one-third to one-half of usual and customary fees for North Carolina. Frequently, patients were unaware of the potential for Medicaid dental coverage during their pregnancy; however, those benefits terminate at delivery. Seeking opportunities for medical colleagues and their staff to emphasize this benefit with women during pregnancy may help promote oral health-care-seeking behaviors. Further research is required to identify and address barriers to pursuing recommended treatment and hopefully improve these women’s participation.

Since this year one implementation, the program has expanded to promote interprofessional collaboration by including dental hygiene students in the didactic and clinical component of the program. Also, establishing a pOHP patient care coordinator position has helped centralize patient referral, program administration, and sustainability. Finally, broader use of the pOHP website, which includes training information, implementation directions, and resource materials, has been encouraged for both medical and dental professionals. The website can now be accessed free of charge by anyone interested in this program and promoting interprofessional collaborations. The open access of this site and other resources such as that for Smiles for Life can assist medical and dental professionals.

The UNC pOHP program aims to train the next generation of medical and dental providers, so they will have experience in working as part of a health care team to benefit the oral and overall health of pregnant women. The program provides an educational experience in a previously missing component of the dental curriculum and, for the many medical students, one of the few oral health-focused education experiences during their education. Further research to assess the impact of the pOHP on providers’ oral health knowledge and self-efficacy can further inform ways to improve training and promote positive changes in oral health-related practice behaviors. The pOHP addresses the need and provided opportunities for communication and collaboration between the medical and dental homes that facilitate comprehensive patient care, thus supporting AAMC, LCME, WHO, and CODA standards requiring students to work as part of a multidisciplinary health care team.

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