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The Journal of Dental Hygiene is the refereed, scientific publication of the American Dental Hygienists' Association. The JDH promotes the publication of original research related to the profession, education, and practice of dental hygiene and supports the development and dissemination of a dental hygiene body of knowledge through scientific inquiry in basic, applied and clinical research.

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Remembering my friend…

Jane L. Forrest, RDH, EdD

Numerous announcements of Denise (Nina) Bowen's passing on February 17, 2019, have already appeared in dental and dental hygiene publications. You may have already read about Denise's many accomplishments in dental hygiene and how she was considered one of the top leaders and thinkers in dental hygiene research. You may already be familiar with her many publications in the peer reviewed literature as well as her textbook contributions and authorships. Denise is also well known for her many years of service to Idaho State University Department of Dental Hygiene. Unlike those memorials that have recounted her life and the many contributions she made to dental hygiene education and research, or the recognition she received through many awards, this remembrance provides a more personal accounting of her work and our friendship.

In 1993, our research team at Thomas Jefferson University (TJU) received a grant to establish the National Center for Dental Hygiene Research (National Center). One objective of the grant was to assist dental hygiene researchers in mentoring a collaborative team of faculty and clinicians based at different universities across the U.S. who would use the American Dental Hygienists' Association's National Dental Hygiene Research Agenda to develop a protocol to advance our knowledgebase. We accomplished this through a 5-day Summer Research Institute (SRI) program over 3 years. I was very fortunate to have Denise and Peggy Walsh appointed as Visiting Professors at TJU to assist with the implementation of the SRI. Denise's project conceptualization and mentoring skills were very evident and much appreciated by the teams attending the SRI each summer.

Denise also served on the Advisory Board for the National Center. She was instrumental in shaping our mission and facilitating workshops at several of our Global Dental Hygiene Research Conferences. We worked together on the workshop, "Jumpstarting Your Research" at our last conference assisting dental hygienists who were, or interested in investigating behavioral, clinical, educational, public health, independent practice, and basic science issues.

Denise also was a prolific and hilarious storyteller. I have to chuckle everytime I think about her telling the stories of how the sleeve to her wedding dress was lost in a snow-covered parking lot, or when her luggage was left on the curb when a taxi driver forgot to put it in the trunk, or when she tried to check into a hotel for a meeting and the clerk couldn't find her reservation because she was a week early. You would need a box of tissues as you listened to her, for the tears of laughter that would always come with one of her stories. I also recall at the passing of her mom, Denise took charge of the memorial service when it needed some levity. Denise told the story of how her mom, Joanie (in New Jersey), would shop for her and send designer clothes to her in Idaho. Denise stated that she now had serious misgivings about how she would look and how quickly she would need to learn to put new outfits together to maintain her image. Somehow, she managed to do just fine. She also enjoyed telling the story of how the two doctors at the memorial (Peggy Walsh and myself) stood in the kitchen of her parent's house washing glasses and fine china dishes for hours as friends came to pay their respects. Using paper cups and plates were out of the question.

When both Michele Darby and Peggy Walsh were ill, Denise stepped in to finish all the edits to the 4th edition of their textbook, *Dental Hygiene Theory and Practice.* After their passing, Denise was asked to serve as the editor of the 5th edition, which she did along with her co-editor, Jennifer Pieren. When I was asked to update my chapter on "Evidence Based Decision Making" I decided to visit Denise to finalize it

(it was also an excuse to visit). I sat at her dining room table finishing my chapter knowing that when I left all the new features and style changes would be included in the correct format. What I didn't realize, nor would it ever have crossed my mind, was that this would be the last time I would ever see her, laugh with her or raise a glass with her. It's still hard to realize she is gone and reinforces how important it is to cherish the time you spend with friends and loved ones, and to tell them how much they mean to you.

I will miss her stories and laughter, but most of all I will miss her love, friendship and support. Rest in peace my friend.

A final celebration of Denise's life will be held on June 29, 2019 (the day after her 65th birthday!) in the Grand Rotunda of the Performing Arts Building, Idaho State University, Pocatello, ID.

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Workforce Policies and their Influence on School-Based Oral Health Programs: A synthesis of four case studies

Melanie L Simmer-Beck, PhD, RDH; Patricia J. Kelly, PhD, MPH, RN, FPN; Anthony Wellever, MA

Abstract

Purpose: Childhood caries disproportionately effects children who are poor, live in low-income rural and urban areas, and come from racial and ethnic minority groups. The purpose of this study was to explore the effect of public policy related to dental hygienists' level of supervision and policy uptake at the state level on the organization, delivery, and financing of school-based oral health programs (SBOHP).

Methods: A multiple case study methodology was used to compare SBOHPs in the states of Missouri and Kansas. Interviews were conducted with an administrator, dental hygienist, and dentist at each Federally Qualified Health Center (FQHC) that operated a SBOHP. Mixed methods were used to conduct and analyze interviews, examine supporting documents, and to report descriptive details. Analytic categories were used to examine the various facets of the organizational structures, delivery processes, financing and billing, and operations.

Results: Five themes revealing differences between two states emerged; historical development of SBOHPs, the structure of SBOHPs, staffing and professional relationships, finance and billing, and capacity of school-based oral health network.

Conclusion: Dental hygienists' supervision requirements play a critical role in school-aged children's access to oral health services and the capacity of SBOHPs. The variations in the degree of practice autonomy accorded to dental hygienists under the Missouri and Kansas dental practice acts resulted in different oral health delivery models. Greater autonomy for dental hygienists is essential for realizing the promise of dental public health.

Keywords: access to care, school based oral health programs, dental public health, dental hygiene workforce models, health policy.

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Introduction

The epidemic of childhood caries, a completely preventable disease, was highlighted in the 2000 United States (U.S.) Surgeon General's report, *Oral Health in America.*[1] In the nineteen years following this publication, the incidence of caries in children remains virtually unchanged. National Center for Health Statistics data suggests that children who are poor, live in low-income rural and urban areas, and come from racial and ethnic minority groups are disproportionately affected by this disease.[2] Low socioeconomic status, lack of dental insurance, low reimbursement from Medicaid, few providers in rural communities and even fewer who accept Medicaid all impede poor children's access to oral health care.[3-6] The impact on children is significant. Even in the absence of pain, children with poor oral health have three times as many school absences, lower self-esteem, and perform worse academically than those who have good oral health.[6-11]

The oral health goals *of Healthy People 2000* and *Healthy People 2010* have not been achieved. To promote progress, the U.S. Surgeon General asserted that oral health services need to be "accessible outside the parameters of a traditional dental practice".[12] *Healthy People 2020* specifically addressed oral health delivery systems with a new goal of "increasing the proportion of school-based health centers with an oral health component."[12] Similar to many other states, school-based oral health programs (SBOHP) have been established by Federally Qualified Health Centers (FQHC) in Missouri and Kansas with the goal of providing services to children who may otherwise lack access to care.[13] However, the structure of the SBOHPs in these two states differ.

Missouri passed a workforce statute in 2001 addressing the needs of low income children in public health settings.[14, 15]

Specifically, this statute allows registered dental hygienists (RDH) who have been in practice for at least three years, and employed in specific public health settings (such as FQHCs and public health departments), to provide fluoride, oral prophylaxis, and sealants to children identified as "eligible for medical assistance," without the supervision of a dentist.[14, 15] Currently, 81% of Missouri's RDH workforce have been in practice for the minimum requisite number of years to qualify.[16]

Kansas decreased RDH supervision mandates in 2003 by creating the Extended Care Permit (ECP).[17, 18] In addition to passing legislation designed, in part, to address the oral health needs of low-income children lacking access to traditional, private practice oral health services.[17] ECP RDHs can provide oral health services without the supervision of a dentist, provided they are "sponsored" by a dentist. Currently 5% of the RDHs licensed in Kansas hold ECP permits.[19] Tasks and procedures performed by ECP RDHs may be provided to "dentally underserved" children birth to age five, children in both public and non-public schools, kindergarten through grade 12, year-round; in addition to children participating in youth organization activities. A comparison of the RDH supervision requirements for Missouri and Kansas as they relate to this case study is shown in Table I.

Table I. Comparison of Missouri and Kansas workforce statutes addressing supervision requirements for dental hygienists

	Missouri	Kansas
	Statute 332.311.2.	Statute 65-1456
Requirements	Have been in practice for at least three years	Must have a sponsoring dentist, their own professional liability insurance, and 1,200 hours of practice in the past three years under the supervision of a dentist
Settings	Specific public health settings such as FQHCs and city or county public health departments	Children from birth to age five; children attending public and non-public schools, kindergarten through grade 12 regardless of the time of year, and children participating in youth organizations
Patient Qualifications	Must be "eligible for medical assistance"	Must be "dentally underserved"
Allowable Services	Fluoride, oral prophylaxis, and sealants	Fluoride, oral prophylaxis, sealants, and radiographs

A variety of researchers have investigated the outcomes and financial feasibility of SBOHPs.[20-23] Assessments of such programs utilizing dental therapists or dental hygienists suggest their success over models in which dentists provide care for children in private practice settings.[24, 25] However, minimal information is available regarding the organizational and policy-related issues associated with school-based oral health services. Two exceptions are the strategies described by Jackson et al. for creating a school-based mobile dental program;[26] and the case study description of Connecticut's school-based dental care system, run by FQHCs, as one of five promising programs for reducing access disparities for children.[27]

The purpose of this study was to begin exploring the effects of public policy related to RDH levels of supervision and policy uptake at the state level on the organization, delivery, and financing of SBOHPs, as the first step in the process of better understanding the role played by state workforce policy on the structure and efficiency of SBOHPs.

Methods

Multiple case studies were conducted at four FQHCs in two Midwestern states (Missouri and Kansas) with similar but distinctly different experiences with workforce reform. As preparatory to future descriptive and analytic research, the following research questions were posed: How are the SBOHPs organized and financed, and how are services delivered? How do the identified school-based oral health delivery systems differ? What accounted for the observed differences and similarities?

A case study strategy of inquiry was chosen to examine how SBOHPs organize, finance, and deliver services.[28] Multiple case studies were used as analytic conclusions resulting from multiple cases are more compelling than single-case studies, and because multiple cases provide opportunities to explore the impact of context on common conclusions.[28] Trustworthiness, using Lincoln and Guba's framework, and the integrity of data were considered throughout each phase of this project.[29] Rich descriptions were provided to illustrate the similarities and differences between each case.

The protocol for this study was reviewed by the Institutional Review Board (IRB) at the University of Missouri at Kansas City and determined to be exempt from IRB review. Informed consent was obtained for all participants.

Sample

In consultation with officials from Missouri and Kansas State Departments of Oral Health, a purposeful sample of four FQHCs with SBOHPs were selected for this study. Two cases were selected from each state to examine differences between processes. Semi-structured qualitative interviews with dentists, RDHs and administrators were conducted at each FQHC.

Data Collection

State-specific interview guides were developed. Although individual guides differed at the margins to reflect current dental care system characteristics of the two states, the interview guides were similar. To assure data trustworthiness and credibility, all respondents (n=12) within the cases were asked several identical questions. One-day visits were conducted at the primary location of each FQHC to interview key informants. Interviews were conducted by the same individual with experience in interviewing and policy analysis. The interviewer did not know any of the individuals who were interviewed. All interviews were recorded; recordings were transcribed verbatim and checked against the original recordings. Interviews lasted approximately 60 minutes. Supporting documents (memorandums of understanding, outreach promotional materials, and outreach facility agreements) were also collected. Additionally, researchers asked each site to complete an inventory of the outreach criteria used for selecting participating schools, the number of counties where their SBOHPs deliver care, the number and type of clinics where SBOHPs operate, the types of services delivered, and staffing for 2017 calendar year.

Data Analysis

Case studies of the four FQHCs were prepared based on the interviews, documents, field notes, and the inventory.[28] Studies were initially drafted using eleven *a priori* analytic categories to establish confirmability and aid in future analysis: 1) communities served; 2) historical development of SBOHPs; 3) structure and mission of SBOHPs 4) staffing and professional relationships; 5) facilities and equipment; 6) marketing and consent (communications between the program/school and parents); 7) service delivery process; 8) services offered; 9) information systems; 10) financing and billing; and 11) magnitude of school-based oral health network.

The analytic categories reflected various facets of the organizational structures, delivery processes, and financing and billing operations of the SBOHPs. The analysis began by considering each case as a separate study, preparing summaries identifying the themes, developmental influences, and unique environmental situations.[28] A table with the analytic categories was populated with data (i.e., narrative descriptions) from each case and then analyzed for cross-case patterns and themes, similarities and differences among all cases and between the two states, with the researchers achieving consensus about themes.

Results

Differences between the SBOHPs of the two states emerged in five of the *a priori* analytic categories and are shown in Table II.

Category 1: Historical development of school-based oral health programs

In each of the cases, the SBOHP began with the FQHC approaching the school, and with the school nurse playing a critical role in establishing the structure and organization of the SBOHP in order to meet the specific needs of their school.

The development of the SBOHPs was facilitated by state-specific forces. Health departments in both states established screening programs within the last 10 years, creating a demand for providers within the schools. The Missouri Department of Health and Senior Services established the Preventive Services Program (PSP) in 2006 which encouraged schools and communities to cooperate in the provision of dental screenings, fluoride varnish applications, oral health education, and referrals in school settings.[30] In Kansas, an innovative public-private partnership known as the Dental Hub Program (2009-2011) provided funding to FQHCs to develop outreach networks with community entities, such as schools, in unserved and underserved counties (hubs and spokes) to provide preventive services using RDHs with an Extended Care Permit (ECP) as the key providers.[31] The Dental Hub Program offered funding to purchase mobile equipment and supplies, and supported the hiring of new ECPs and the advancement of currently employed RDHs to ECP status.

Category 2: Structure of SBOHPs

The structure of the SBOHPs hinged largely on the interpretation of the states' dental practice act. Missouri's statute allowed dental hygienists to provide care without the dentist's exam only if the child was eligible for medical assistance. To treat all children in a school-based setting, the dentist had to examine the child and diagnose the need for preventive services (prophylaxis and sealants) prior to the RDH providing care. Dentists and RDHs worked side by side in permanent or mobile school-based clinics. RDHs working alone, were limited to providing screenings and applying fluoride varnish to all children, regardless of financial status. In Kansas where ECPs were accorded greater practice

Table II. Comparisons of school-based oral health programs in Missouri and Kansas in five a priori analytic categories

	Missouri	Kansas
Category 1: Historical development	Health departments established screening programs Missouri Department of Health and Senior Services established the Preventive Services Program	Health departments established screening programs A public-private partnership (Dental Hub Program) provided funding to develop outreach networks to provide preventive services using Extended Care Permit dental hygienists
Category 2: Structure of the school-based oral health program	Dentist must examine the child and diagnose the need for preventive services prior to dental hygienists providing care Dental hygienists can conduct screenings and apply fluoride varnish to all children regardless of financial status without a dentist's exam Dental hygienists can provide comprehensive preventive care without a dentist's exam only if the child is eligible for medical assistance	Extended Care Permit dental hygienists can provide comprehensive preventive services to children who lack access to care without a dentist's exam and diagnosis
Category 3: Staffing and professional relationships	Dentists, dental hygienists, and dental assistants staff programs	Extended Care Permit dental hygienists and dental assistants staff programs Sponsoring dentists provide retrospective record review and consult with extended care permit dental hygienists as needed
Category 4: Finance and billing	Sources of operating revenue include Medicaid, State Children's Health Insurance Program, private dental insurance, and self-pay on a sliding-fee schedule	Sources of operating revenue include Medicaid and State Children's Health Insurance Program
Category 5: Magnitude of oral health networks	Served 50 schools, screened 4,502 children, and provided preventive services to 2,751 children (2017 calendar year)	Served 172 schools, screened 35,700 children, and provided preventive services to 7,775 children (2017 calendar year)

autonomy, RDHs and dental assistants working under their direction provided all of the preventive services. Dentists did not accompany the outreach team on their visits to schools; no restorative procedures were performed in schools.

Even within this dichotomy, there were variations. In Missouri, the full range of general dental services were provided in permanent clinics located in schools and in mobile vans and semi-trailers allowing the SBOHP to provide comprehensive dental services. In Kansas, RDHs provided preventive services only in permanent clinics housed on school property and via mobile programs using portable equipment.

Category 3: Staffing and professional relationships

Kansas FQHCs employed more RDHs than those in Missouri. Kansas also used RDHs on an as needed basis to deliver care during the school year which helped with SBOHP sustainability. One Kansas FQHC reported having seven permanent SBOHPs on school properties, staffed exclusively by ECP RDHs. Staffing and locations of the FQHCs are shown in Table III.

Staffing differences between the Missouri and Kansas SBOHPs were a function of the professional relationships between RDHs and dentists. The Kansas dental practice act allows for ECP RDHs to deliver care without the direct supervision of a dentist in a variety of community settings, including schools, that "lack access to dental care." There were no financial restrictions and the scope of practice increased with the level of the permit. Sponsoring dentists provided retrospective record review of the care provided by ECPs; offered advice concerning unusual circumstances prior to a school visits (e.g., an uncommon medical history); and consulted with ECPs in the field to resolve problems. The

Table III. Description of FQHC locations and staffing for the 2017 calendar year

FQHC	Location	Dentist f/t*	Dentist p/t**	Dentist prn***	Dental Assistant f/t	Dental Assistant p/t	RDH f/t	RDH p/t	RDH prn	Office Manager	Care Coordinator
#1	**Missouri** Waverly, Concordia, & Buckner	3	0	0	5	0	3	0	0	3	0
#2	**Missouri** House Springs, Hillsboro, Arnold, & Festus, Missouri	5	3	1	16	1	7	3	0	5	3
#3	**Kansas** Wichita	5	0	0	14	0	14	1	7	1	1 Outreach Coordinator 1 Outreach Support Person
#4	**Kansas** Hutchinson	2	0	0	4	1	2	1	3	1	1

* f/t: full-time ** p/t: part-time ***prn: as needed

level of autonomy accorded to ECP RDHs allowed them to provide school-based preventive services without the need for a dentist to be on-site.

While the Missouri dental practice act allowed RDHs with at least three years' experience to provide preventive dental care to children who were "eligible for medical assistance" in community settings without the supervision of a dentist, the actual autonomy provided RDHs, in regards to SBOHPs, was slight. Two statutes for delivery of services by RDHs were relevant. If the RDH was following the statute set forth for care in "public health settings", then only children who were financially distressed or "eligible for medical assistance" could be treated without the examination of a dentist. Concerns about equal treatment of students made schools unwilling to separate only students who were financially distressed to receive preventive services from the RDH without the initial direction of the dentist. The RDHs had to provide care under another statute by which they were permitted to provide preventive care services only after the need for those services has been diagnosed by a dentist. Although fully capable of making such a diagnosis, as demonstrated by the other statute, Missouri RDHs were not allowed to diagnose the need for preventive services for children who did not require financial assistance. The implicit legal barriers could only be overcome in SBOHPs by fielding a team of dentists and RDHs working in traditional supervisory relationships. When this traditional team was in place, RDHs could provide prevention services but only to *all* children diagnosed with a need for the service.

Category 4: Finance and billing

In Missouri, FQHCs billed Medicaid and State Children's Health Insurance Program (SCHIP) as well as other private dental insurance and self-pay individuals on the sliding-fee schedule of the FQFC. Conversely, in Kansas, Medicaid and SCHIP were the only sources of operating revenue for the school-based oral health outreach programs. One Kansas FQHC opted to not bill private dental insurance or accept self-pay for any school-based oral health services because this FQHC did not want to be perceived as competing with community dentists. Children who had private dental insurance were still provided oral health services when they signed up to participate in the program, but, the care was not reimbursed. All of the cases reported that reimbursement for services alone was not sufficient and that they relied on federal and state grants and private gifts and was especially important during the formative years of their development.

Category 5: Magnitude of school-based oral health networks

Each FQHC's outreach criteria, type and number of clinics where SBOHPs deliver care, and number of children who were provided various oral health services are shown in Table IV.

All of the FQHCs targeted underserved communities within their catchment area. One clinic in Missouri also considers absenteeism for dental and medical related issues and water fluoridation. Kansas SBOHPs had a larger catchment area and were in nearly four times more counties. The number of schools and children served by each SBOHP varied widely between states. The two FQHCs in Missouri collectively served 50 schools, screened 4,502 children, and provided preventive services to 2,751 children. The two FQHCS in Kansas collectively served 172 schools, screened 35,700 children, and provided preventive services to 7,775 children. Restorative services were provided to 994 children in Missouri schools only.

Discussion

Results of this study suggest a clear distinction, between preventive and curative oral health services, due largely to state legislative policies and their implementation. In Kansas, preventive oral health services in the form of prophylaxis, fluoride applications and sealant placements were provided to a large number of school-aged children. In public health terms, this would be considered primary prevention. In Missouri, access to curative dental services were provided, in addition to primary preventive services, to a smaller number of school-aged children who were unable to access and receive services on their own. Such care reflects the way in which traditional dental services are delivered, albeit in less-than-traditional settings.

Table IV. Summary of FQHC fixed location(s), and number of children who were provided services in 2017.

FQHC	Location	Outreach Criteria	# of Counties Served	# Fixed School-based Satellite Clinics	# Schools Served using Mobile Vans	# Schools Served using Portable Equipment	# Children Screened	# Children Provided Preventive Services	# Children Provided Restorative Services
#1	**Missouri** Waverly, Concordia, & Buckner	Inside Catchment Area; Locations that have indicated need for dental services	4	1	5	0	795	368	223
#2	**Missouri** House Springs, Hillsboro, Arnold, & Festus, Missouri	High percentage of children who qualify for free or reduced lunch program; High absenteeism for dental and medical related issues; Non-fluoridated water	2	1	43**	43**	3,707	2,383	771
#3	**Kansas** Wichita	Title I schools – large free and reduced lunch population	18	7*	0	130	30,000	6,500	0
#4	**Kansas** Hutchinson	Inside Catchment Area; Locations that do not have access to dental care or a dentist; Occasionally provide preventive services in schools where a local dentist who does not accept Medicaid provides screenings	5	0	0	35	5,700	1,275	0

*preventive services only

**the same schools were served using both mobile vans equipped with dental operatories and portable equipment

One of the findings of this case study was the impact of state level infrastructure on improving access to oral health care, specifically how RDH scope of practice policy influenced the development of SBOHPs. Although other studies have focused on SBOHPs, few have fully explored the impact of workforce policy on service delivery. For example, the National Network for Oral Health Access (NNOHA) surveyed dental directors from 62 health centers across the nation to learn about characteristics and operations of SBOHPs.[13] The Maternal and Child Health Bureau (MCHB) conducted an evaluation of 12 comprehensive SBOHPs operating within existing school-based health centers that were funded by MCHB.[23] NNOHA and MCHB both reported the majority of school-based health centers in their respective studies utilized different delivery models for diagnostic and preventive services; however, neither study attempted to link RDH scope of practice to the differences.[13, 23] The NNOHA survey examined staffing; however, researchers did not examine staffing in relation to utilizing RDHs to the full extent of their license at school-based clinics.[13] RDHs are an integral part of SBOHPs in many states, especially those working in states that have expanded licensure policies allowing for the provision of preventive services (prophylaxis, sealants, and fluoride varnish application) without direct supervision by a dentist.[23, 32-34]

In 2016, the Center for Health Workforce Studies (CHWS) quantified the dental hygiene scope of practice for each state as defined by each state's dental practice act. Missouri and Kansas earned scores of 63 and 53 respectively.[35] Missouri scored slightly lower than Kansas in the supervision and tasks sub-categories, slightly higher than Kansas in the regulation category, and significantly higher than Kansas in the reimbursement category. These scores implied similarity between Missouri and Kansas in terms of allowing RDHs to practice to the full extent of their license. Additionally, the scores implied that Missouri allows RDHs to be directly reimbursed by Medicaid.

This case study examined these reimbursement policies in regards to their actual implementation. Findings revealed the CHWS scores were misleading. Very few of the 81% RDHs in Missouri who were eligible were taking advantage of Missouri Statute 332.311.2. This was in spite of the fact that no additional training was required, because schools were not considered to be a public health setting. Only RDHs employed by FQHCs were allowed to provide oral health services in schools without the supervision of a dentist.

While the Missouri RDHs examined in these cases met this qualification, they could only provide care to children who were "eligible for medical assistance." This requirement necessitates that schools divide students into two groups, which they were unwilling to do. Another misleading aspect of the Missouri statute is the RDH's ability to directly bill Medicaid. Even though the statute states that "Medicaid shall reimburse any eligible provider," Missouri Medicaid had not yet developed a method for direct reimbursement for RDHs. Conversely, the Kansas ECP RDH had a liberal range of settings to deliver care. However, the Kansas ECP RDHs cannot not directly bill Medicaid. In order to be reimbursed for services provided in Kansas, the ECP RDHs need a relationship with an FQHC or a dentist willing to bill Medicaid. Wing explored the effects of such regulation and concluded that direct reimbursement from Medicaid to dental hygienists increased utilization.[36] Direct reimbursement is an important policy tool that demonstrates great promise for increasing access to oral health services. Implementation of direct reimbursement should be examined on a state by state basis and best practice guidelines established.

Based on the four cases in two states, the RDHs ability to practice to the full extent of their license without the direct supervision of a dentist appeared to be a primary determinant of the efficiency of SBOHPs focused on screening and prevention. The independent outreach practices enabled by these new workforce policies allow RDHs to travel to more schools, and deliver care to more children than oral health outreach teams composed of RDHs and dentists. Consequently, it appeared to be an effective dental public health intervention targeted at an especially vulnerable segment of the population. Future studies should explore the relationship between RDH scope of practice and access to oral health services, outcomes, efficacy, cost and sustainability in SBOHPs across the country.

One of the inherent limitations of case study research is lack of generalizability. While findings from the present cases are not generalizable to other SBOHPs outside of Missouri and Kansas, they nevertheless enable the understanding of this phenomenon more fully and to suggest areas for further empirical exploration.

Conclusion

The cases examined revealed that SBOHPS are structured and organized around the individual state's dental practice act and are financed through billing Medicaid and securing grants. Differences between states were observed with respect to supervision of RDHs, delivery of restorative procedures in schools, the number of schools in the network, and the number of children seen. State workforce policy dictating RDH scope of practice plays a crucial role in access to oral health services and the capacity of SBOHPs. The degree of

RDH practice autonomy under the dental practice acts in Missouri and Kansas resulted in vastly different oral health delivery models. Greater RDH autonomy is essential for realizing the promise of dental public health.

Disclosure

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Research

Opinions on Dental Therapists: A comparison of dentists and dental hygienists in the Pacific Northwest

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Abstract

Purpose: As the United States continues to face increasing demands for oral health care, many states are examining alternative provider models as well as the role the dental hygienist (DH) can play in meeting access to care needs. The purpose of this study was to assess the opinions of dentists and DHs about incorporating a dental therapist (DT) into a regional dental group (RDG) located in the Pacific Northwest.

Methods: Cross-sectional, validated electronic surveys were sent to the dentists (n=220) and DHs (n=187) employed by a RDG. Survey items included open and close ended questions and Likert scale items. Descriptive statistics were used to analyze the data.

Results: Responses were received from 38% of the dentists (n= 84) and 46% of the DHs surveyed (n=86). Dentists and DHs differed significantly in their opinions of the need for a DT midlevel provider, the level of supervision needed, scope of practice, and appropriate tuition for DT education programs ($p<0.001$). Three-fourths of the DH respondents indicated that they were very or somewhat interested in becoming a DT. A majority of dentists (58%) and DHs (76%) were open to having a DT as part of their RDG ($p=0.017$).

Conclusion: Although dentists and DHs differed significantly in their opinions regarding the dental therapy midlevel provider, the majority of dentists and DHs surveyed were open to having a DT as part of their team within the RDG.

Keywords: access to care, dental hygiene workforce, dental therapists, midlevel providers, public health

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Introduction

Over 53 million people in the United States (U.S.) were identified in 2017 as residing in locations designated by the federal government as dental health professional shortage areas.[1] As the U.S. continues to face disparities related to access to oral health care, one of the main contributory factors is an insufficient number of dental providers.[1, 2] This void is particularly apparent for underserved populations of minorities and children.[1,3] Studies have shown pain and infection from untreated tooth decay is the chief complaint for dental related emergency room visits within the hospital system, leading many states to explore the incorporation of a dental therapist (DT) into the oral health workforce.[4]

Use of dental therapists, defined as midlevel oral healthcare providers, is being promoted as one of the ways to alleviate the nationwide access to oral care crisis and expand care to underserved populations.[1,5,6] In addition to the preventive clinical skills already possessed in most states by dental hygienists (DH), the scope of practice of a DT usually includes the ability to clinically diagnose oral conditions, perform restorative procedures including filling decayed teeth and simple extractions. The dental therapy trend is spreading throughout the U.S. and approximately a dozen state legislatures are either currently contemplating proposals to incorporate some form of a midlevel provider model or have recently passed legislation for this new provider category.[1] Initial reports from Alaska and Minnesota where DT education programs have been implemented and DTs are licensed to practice, demonstrate that safe and effective care is being delivered.[5, 7] States including Vermont, Maine, New

Mexico and Michigan have passed DT legislation and are in various stages of developing education programs. Each state has the ability to regulate the scope and level of practice to govern the adopted midlevel provider models.[6,8,9,10]

Initial perceptions among dental educators regarding the DT model have improved over time due to the observed benefits of DTs in patient care, exposure to new professionals, and information sharing among colleagues.[5] Evidence of safe and effective care provided by DTs has ignited an interest in a number of states, including Oregon.[5,7] The state of Oregon has been working for over twenty years to reach individuals with limited access to dental care by utilizing expanded practice dental hygienists (EPDH), a credential formerly known as the Limited Access Permit. EPDHs are RDHs who hold an expanded practice permit (EPP) to provide preventative dental hygiene services to populations with limited access to care without the supervision of a dentist. However, research by Bell et al. showed that EPDHs in Oregon may have a limited impact, due to an inability to practice to the full extent of their license.[11] While a variety of settings have been approved for EPDHs to provide care, the vast majority are working with either elderly individuals or children.[11] EPDHs in Oregon have identified limited knowledge regarding owning and operating a business, and difficulties in being reimbursed for services rendered as barriers to providing care.[12,13] A midlevel provider, such as a DT, may be better suited to help diminish these challenges and increase access to care.

Legislation was passed in Oregon allowing for dental pilot projects for alternative providers in 2011. The language states that the project must achieve at least one of the following: teach new skills to existing categories of dental personnel, develop new categories of dental personnel, accelerate the training of existing categories of dental personnel, or teach new oral health care roles to previously untrained persons.[14] As a result, two programs have been launched under the Oregon Heatlh Authority.[15,16] Workforce Pilot Project 100, approved in 2016, has an emphasis on developing a new level of dental provider and follows a model similar to the Alaska Dental Health Aide Therapist (DHAT). Short-term objectives of the pilot program are to increase the efficiency of the dental clinic and team, increase the capability of Native American tribal health programs to meet unmet needs, and the provider job and patient satisfaction. Long term goals include decreasing the rate of decay in pilot populations while increasing the treatment of decay, develop better understanding of oral health and improve oral health behaviors in the pilot communities.[16]

A second pilot project, "Training Dental Hygienists to Place Interim Therapeutic Restorations," focuses on teaching new skills to existing categories of dental personnel.[17] The purpose of Workforce Pilot Project 200 is to demonstrate the capability of expanded practice dental hygienists (EPDH) in placing interim therapeutic restorations (ITR), restorations intended to halt the progression of dental caries until the patient is able to receive treatment by a dentist.[17] The Oregon Health Authority hopes to see additional innovative pilot programs come forward.[16,17]

The American Dental Hygienists' Association (ADHA) supports the expansion of the scope of practice for DHs and for the promotion of DT programs in order to provide healthcare to populations with limited access.[18] Research conducted among DHs in Oregon has revealed strong support for a midlevel provider in the state and many DHs surveyed expressed a personal interest in becoming a DT.[19] Furthermore, respondents also indicated that if a midlevel provider model were to be developed in Oregon, the provider should be a DH first.[19] While the ADHA's supports a Master's degree level education for DTs, the majority of the respondents in the Oregon study indicated that a bachelor's degree would be sufficient education.[20,21] Post-graduate education can be viewed as a barrier for many associate degree educated DHs since they would have to first earn a bachelor's degree before becoming eligible to apply for a DT program at the master's degree level. It is noteworthy that the Workforce Pilot Project 100 does not require the participants to be DHs, nor does the project include the full scope of practice for the DT provider model being tested. [14]

With an abundance of rural communities in Oregon, along with the continued oral health need of the underserved populations, the addition of a DT midlevel provider could potentially close the care gap. While there is documented support for DTs by DHs in Oregon, the opinions of dentists remain unknown. The purpose of this study was to assess the opinions of dentists and DHs about incorporating a dental therapist (DT) into a regional dental group (RDG) located in the Pacific Northwestern states of Oregon, Washington and Idaho and the interest of the DHs employed by the RDG in becoming a DT.

Methods

This study was approved as exempt by the Pacific University, Forest Grove, Oregon Institutional Review Board. A sample population of dentists (n=220) and DHs (187) employed by a RDG in the states of Oregon, Washington and Idaho was selected for the study. Cross-sectional surveys were developed by revising a previously validated survey used with DHs in the state of Oregon.[19] New questions were added to the survey

and were reviewed by experts in the field to establish face validity and revisions were made. Separate surveys were created for the dentist and DH sample populations.

The 14-item survey developed for dentists contained open and closed-ended questions, including Likert-scale items. The following items were included: demographic questions, perceptions on the need for a DT, level of comfort in working with a DT, supervision and scope of practice of DT, education of a DT, proposed costs of a DT program, and compensation for DTs. Regarding the DT scope of practice question, the following description was provided: The scope of practice of a dental therapist varies, however the Commission on Dental Accreditation states that, at minimum, graduates of dental therapy programs must be able to perform pulpotomies, place crowns on primary teeth, extract primary teeth, along with preventive procedures within the scope of practice for a dental hygienist.

A 13-item survey was developed for DHs and included open and closed-ended questions, and Likert-scale items from the dentist survey. However, the DH survey included items regarding interest in becoming a DT and the desired delivery system for a DT education program.

Online survey software, (Qualtrics; Provo, UT) was used to distribute the survey via the Director of Operations of the RDG, during the winter of 2017. A reminder email was sent two weeks after the original recruitment email. Participation was voluntary and respondents' identities remained anonymous.

Responses were exported into SPSS (version 24, IBM) for data analysis. The only open-ended question related to projected income levels of a DT. It was determined by two investigators to convert responses into a projected yearly salary. Hourly wage figures were converted to a weekly salary by multiplying by 40 hours and further converted to a yearly salary by multiplying by 52 weeks. In cases where a salary range was given, the middle of the range was recorded. Each of the two investigators converted the answers individually and the answers were compared manually to assess for interrater reliability. Any discrepancies were due to oversight and differing interpretation. Oversights were corrected and differing interpretation was resolved through discussion. Frequency distributions were used to describe the findings. Chi-Square tests were used to investigate possible differences between the dentist and DH respondents. An independent t-test was conducted to compare opinions of appropriate salary ranges between dentists and DHs.

Results

Eighty-four dentists and 187 DHs employed by a RDG in the Pacific Northwest participated in the electronic survey for response rates of 38% and 46% respectively. Collectively, 60% of the respondents practiced in Oregon (n=103), 32% in Washington (n=55) and 6% in Idaho (n=11). There were statistically significant differences between dentists' and DHs' opinions in several areas. Only 38% of the responding dentists (n=32), as compared to 65% of the DHs (n=56), believed that there was a need for a dental therapist in their community ($p<0.001$). DHs were more likely than dentists to believe that DTs should be an integral part of the dental team as shown in Table I ($p<0.001$). The vast majority of DHs (90%, n=77) as compared to a little more than half of the dentists (56%, n=48), believed that a DT should already be a DH ($p<0.001$). Over three-fourths of DHs (76%, n= 65) were open to having a DT in their current work setting as compared to a little more than half of the dentists (56%, n=48).

Table I. Level of agreement that a dental therapist should be an integral part of the dental team (n=170)*

	Strongly Agree n (%)	Agree n (%)	Neither agree nor disagree n (%)	Disagree n (%)	Strongly Disagree n (%)
Dentists (n=84)	20 (24%)	23 (27%)	18 (21%)	11 (13%)	12 (14%)
Dental Hygienists (n=86)	46 (54%)	24 (28%)	14 (16%)	0 (0%)	2 (2%)

*percentages may not total 100% due to rounding

$p<.0001$

Levels of agreement of DHs regarding the DT scope of practice definition as compared to dentists are shown in Table II ($p<0.001$). Respondents demonstrated significant differences in perceptions regarding the appropriate level of supervision for a dental therapist, with 48% of dentists (n=39) indicating direct supervision and 57% of DHs (n=49) indicating either indirect or general supervision as shown in Table III ($p<0.001$). Most respondents felt that either a bachelor's degree or master's degree would be appropriate level of training for DTs provided they were already a DH ($p=.160$, Table IV).

Table II. Level of agreement with the proposed scope of practice for dental therapists (n=166)*

	Strongly Agree n (%)	Agree n (%)	Neither agree nor disagree n (%)	Disagree n (%)	Strongly Disagree n (%)
Dentists (n=80)	8 (10%)	28 (35%)	23 (29%)	13 (16%)	8 (10%)
Dental Hygienists (n=86)	31 (36%)	29 (34%)	22(26%)	2 (2%)	2 (2%)

*percentages may not total 100% due to rounding

p<.0001

Table III. Opinions regarding levels of supervision for dental therapists (n=168)*

	Direct supervision n (%)	Indirect Supervision n (%)	General supervision n (%)	General supervision through teledentistry n (%)	No supervision needed n (%)
Dentists (n=82)	39 (48%)	0 (0%)	25 (31%)	16 (20%)	2 (2%)
Dental Hygienists (n=86)	9 (11%)	25 (29%)	24 (28%)	18 (21%)	10 (12%)

*percentages may not total 100% due to rounding

p<.0001

Table IV. Opinions regarding the level of education required for dental hygienists to become a dental therapist (n=168)*

	Certificate n (%)	Associate's Degree n (%)	Bachelor's degree n (%)	Master's degree n (%)
Dentists (n=82)	14 (17%)	8 (10%)	31 (38%)	29 (35%)
Dental Hygienists (n=86)	16 (19%)	18 (21%)	31 (36%)	21 (24%)

*percentages may not total 100% due to rounding

P=.160

Opinions regarding the level of tuition and fees appropriate for a DT educational program varied significantly between dentists and DHs; dentists indicated significantly higher tuition and fees for DT programs ($p<0.001$, Table V). Seventy-five percent of responding dental hygienists indicated they were very interested (n=41) or somewhat interested (n=22) in expanding their scope of practice to become a dental therapist. When asked about the most feasible avenue to obtain the necessary education to become a dental therapist, 56% (n=50) indicated an online training program with clinical internship, followed by 25% (n=22) indicating a on-site night and weekend program and 18% (n=16) indicating a traditional, on-site program.

Respondents were asked to indicate an appropriate annual salary for a DT in an open-ended question. Dentists' opinions ($78,767) varied significantly from those of DH's regarding an average annual salary ($108,434) ($p<0.001$).

Dentists were asked if a DT were to be employed at the RDG, whether they would be willing to supervise and oversee their work. Sixty-three percent responded yes (n=53), 19% indicated they were neutral (n=16), and 18% indicated an unwillingness (n=15). Dentists indicating an unwillingness to supervise a DT, were asked to indicate what would increase their comfort level in overseeing a DT. Primary themes included appropriate training of the DT and demonstration of the DT's competency in regards to liability and supervision issues.

Discussion

Research indicates that with the future anticipated shortage of dental providers the need for a midlevel oral healthcare provider such as the DT is growing.[1,2,22] However results from this study indicate that only 38% of the dentists surveyed, as compared to 65% of the DHs, believe that a DT midlevel provider is needed as a part of the solution. Conversely, over half of the respondents in both groups agreed that a DT plays an integral part of the oral health care workforce. In addition, the majority of both dentists and DHs were open to having a DT in their current work setting. Consistent with previous studies,[19] opinions of DHs indicate approval and interest in dental therapy and

Table V. Opinions regarding tuition and fees individuals would be willing to pay for a dental therapy education program (n=141)*

	<$10,000 in tuition and fees n (%)	$10,000-20,000 in tuition and fees n (%)	$21,000-30,000 in tuition and fees n (%)	$31,000-40,000 in tuition and fees n (%)	$41,000-50,000 in tuition and fees n (%)	>$50,000 in tuition and fees n (%)
Dentists (n=78)	12 (15%)	14 (18%)	11 (14%)	8 (10%)	13 (17%)	20 (26%)
Dental Hygienists (n=63)	28 (44%)	24 (38%)	10 (16%)	0 (0%)	1 (2%)	0 (0%)

*percentages may not total 100% due to rounding

$p<.0001$

results from this study suggest a willingness to a strong interest from many DHs for becoming a DT.

Dentists expressed a greater concern regarding the level of supervision needed for a DT to practice and were more likely to support direct supervision as compared to DHs who supported indirect and general supervision. Dentists were also less supportive of the full scope of practice (filling decayed teeth and simple extractions) of a DT than DHs. This may be due to a lack of knowledge or appreciation towards the DHs clinical knowledge and abilities. Studies of dentists' opinion on the professional role and expanding the practice of the dental hygienist have shown that the higher a dentist rated the importance of DHs clinical contributions, the more often the DHs were allowed to perform diagnostic and additional procedures.[21]

However, a meta analysis of dentist and dental hygienists' opinions on scope of practice and independent practice of dental hygienists demonstrated no differences as a result of negative attitudes towards an expanded scope of practice for dental hygienists.[21] Without corroborating studies to provide additional evidence for DT, the authors believe that this difference may be due to the DHs' desire to practice to the full extent of their license and gain more autonomy in the profession. Conversely, it is possible that dentists may have reservations because of uncertainties regarding the quality of care a DT would be capable of providing due to differences in education and experience.

Over half of dentists in this sample stated they would feel comfortable supervising a DT. Dentists may be willing to oversee a DT to ensure that the care is safe and meets the standard of care independent of other opinions regarding dental therapy. Respondents who did not feel comfortable or reported hesitation about overseeing a DT stated reasons related to liability, supervision, and training demonstrating the need for more outcome assessment studies of currently practicing DTs.

Dentists and DHs agreed that the level of education for a DT should be either a bachelor's or master's degree; a slightly higher number of respondents believed a bachelor's degree was sufficient. Dentists' and DHs opinions regarding the need for a master's degree more closely aligned when the potential DT was not already an RDH. The Commission on Dental Accreditation (CODA) has developed accreditation standards for dental therapy education programs, however CODA is not prescriptive regarding the degree that should be awarded.[8] Individual states will continue to make their own determination of the appropriate level of a degree for a DT.

Parallels between DTs and nurse practitioner (NP) midlevel providers can potentially be utilized to help shape the growth of DT education.[23] The of NP model was established to advance the education and training of a RN as a response to demands for increased cost-effective access to healthcare.[23,24] Registered nurses (RNs) must achieve levels of education culminating in a Master's degree to become a NP; a similar pathway could be developed for DHs to matriculate to a DT. While NPs are able to perform limited invasive treatment procedures similar to the DT, they also focus on health promotion, disease prevention and expanding access to care.[23,24]

A majority of the DH respondents were interested in possibly becoming a DT. Oregon and Washington DHs are allowed to practice restorative procedures and these duties are heavily utilized within the RDG group in the study sample. While restorative permits are required for employment by the RDG, the permit is not a required for licensure in the state of Oregon. Transitioning to a DT may be viewed as an easier

process by DHs who already possess a restorative permit. In terms of delivery options for the DT education program, the majority of the DH respondents stated that an online program with a clinical internship would be preferable to meeting face-to-face in the evening and weekends or a traditional onsite program. These findings concur with another survey of Oregon dental hygienists.[19]

Comparisons of dentists' and DHs' opinions regarding the acceptable costs of a DT educational differed significantly. Results show that DHs believe that tuition should be lower with most selecting the range from less than $10,000 to $20,000 and nearly half of dentists believing it should be higher than $41,000. The price point indicated by DHs was also similar to survey responses suggesting that the program could be delivered online which could reduce some of the costs of face-to-face, on-site instruction. The higher tuition and fees suggested by responding dentists could potentially deter a prospective student from applying to an educational program, particularly if the potential salary is not significantly higher than that of a clinical DH.

Cost of the proposed education program is another factor that may influence interest of prospective DT students. Opinions of dentists on this topic may not be significant considering that they would not be impacted by the cost of education. However, if a DH model is developed, the opinions of DHs regarding the burden of tuition costs is worth considering by stakeholders designing DT programs or those implementing pilot programs. While the dentist respondents in this study considered higher tuition and fees to be appropriate for DT education they also felt that the salary of a DT should be significantly lower, by approximately $30,000, than the DH respondents. Dentists beliefs regarding DT salary levels may be attributed to their perspective of the scope of practice of a DT as compared to that of a dentist. It can be expected that a DT would earn more based on their increased level of responsibility and greater scope of practice.

Although there are currently two workforce pilot programs underway in Oregon, neither program fully encompasses the scope of practice of a DT. Based on the results of the current study, there may be adequate support from both dentists and DHs within this RDG for development of another pilot program utilizing DHs with a scope of practice paralleling that of a DT. Exactly what duties would be included in that scope of practice would need to be determined. A pilot program may be of particular interest for this RDG since two of the three states in their service area are exploring legislation for DT based midlevel providers.[1]

Generalization of the results from this study are limited as it was a regional survey conducted within a regional dental corporation. Opinions of dentists employed by a RDG are likely to be different as compared to self-employed, private practitioners. Additionally, dentists' opinions regarding delegating restorative functions in general may vary regionally.

Oregon and Washington have two of the most progressive practice acts for DHs which include restorative functions. National surveys would be beneficial and provide a more well-rounded understanding of the opinions of dentists and RDHs towards the midlevel DT provider model. Furthermore, outcomes assessments of the current pilot programs in Oregon can provide data demonstrating the effectiveness the alternative provider models in meeting the access to care challenges.

Conclusion

Dentists and DHs employed by a RDG in the Pacific Northwest were supportive of the concept of integrating a midlevel provider such as the DT into their practice settings. However, dentists and DHs differed significantly on a variety of aspects of the DT provider model including scope of practice and salary levels. Future studies, conducted at the national level, should survey dentists and DHs in other types of practice settings to more broadly assess acceptance and help inform the development of midlevel provider education programs.

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Research

Creating Awareness for the Social Determinants of Health: Dental hygiene and nursing student interprofessional service-learning experiences

Heather B. Allen, RDH, MSHCM, Tina P. Gunaldo, PhD, DPT, MHS, Elaine Schwartz, RDH, BSDH

Abstract

Purpose: The purpose of this study was to evaluate whether a service-learning interprofessional education (IPE) experience with dental hygiene students and undergraduate nursing students could reinforce learning related to Interprofessional Education Collaborative (IPEC) sub-competencies.

Methods: Dental hygiene students were provided an IPE experience document to guide group discussion and written reflection prior to a school-based service-learning activity with nursing students. Dental hygiene students were responsible for conducting oral exams and providing oral hygiene instruction while nursing students were responsible for taking blood pressure, calculating body mass index, and classifying risk for obesity. The dental hygiene students completed individual written reflection assignments following the activity and the narrative responses were independently analyzed for themes related to the IPEC sub-competencies and for learning beyond the targeted sub-competencies.

Results: Student reflection assignments confirmed that the learning outcomes were met. Themes from the written reflections indicated that students recognized social barriers related to health and the need for multiple professions to promote health. Responses also suggested the potential formation of negative bias.

Conclusion: Service-learning activities enhance IPE and learning outcomes on the topic of social determinants of health. Group discussion and individual reflection are essential components to consider when designing a service-learning IPE experience.

Keywords: interprofessional education, social determinants of health, dental hygienists, reflection

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Introduction

Community-based settings are ideal interprofessional learning environments for health professional students to share their knowledge in addition to providing opportunities to reflect on impacts extending beyond a single patient encounter. In community settings, students can appreciate how the environment and other professions, external and internal to the healthcare industry, can impact health. In a recent National Academy of Sciences report, educators and accreditors proposed a new vision for health education.[1] This vision emphasizes the need to broaden learning to include the overall health and well-being of individuals and populations as opposed to healthcare delivery from a single perspective.[1] Health professionals working together through an interprofessional approach have an opportunity to positively impact health outcomes.[2]

An interprofessional approach requires collaboration between individuals from different disciplines with the goals of improving quality of care and health outcomes. Formal interprofessional education (IPE) is a precursor to collaborative practice and is commonly used in health professional education programs to prepare students to work in teams. IPE is defined as "when students from two or more professions learn about, from and with each other."[3] The dental hygiene (DH) profession supports IPE through the Commission on Dental Accreditation (CODA) Standard 2-15 which states "graduates must be competent in communicating and

collaborating with other members of the health care team to support comprehensive patient care."[4,5]

Developing and implementing IPE experiences can present a number of challenges for DH programs and their faculty.[6] Commonly cited barriers to incorporating IPE include coordinating schedules among various programs, adding an additional class or activity into an already full curriculum, finding the time needed to develop meaningful experiences, and inexperienced faculty.[6,7] However, a recently conducted national survey of dental hygiene programs found that the majority of program directors indicated IPE was of personal importance as well as being important to the profession at large.[6] The majority of directors indicated that IPE was currently being integrated primarily into clinic-based activities, with a few programs indicating that IPE was being integrated through community-based or service-learning activities.[6]

Dating as far back as 1998, service-learning in health professions education has been recommended as an effective method of preparing students to work in a new healthcare delivery system.[8] Service-learning has been defined as "structured learning experiences with a balance of service and learning, combining community service with explicit learning objectives, and emphasizing opportunities for critical reflection about the service work and its relationship to the participants' professional education."[8]

Service-learning activities provide students with valuable interprofessional learning opportunities.[9-12] Creating IPE opportunities within service-learning projects provides a dual benefit of professional growth and collaboration. Previous research studies in interprofessional service-learning projects have reported positive outcomes, such as learning about other professions and respective roles, valuing communication within a team, and the positive impact multiple professions can have on teamwork.[9,13] Additionally, students and the community engage in a mutually beneficial relationship where both parties learn from each other in a collaborative manner.[14] Yoder established a framework for service-learning in dental education in 2006.[15] Research specific to DH students learning outcomes from participating in service-learning activities includes acquiring clinical competencies, and increased awareness of cultures and respective health practices.[12,16] While community engagement can contribute to the development of collaborative and skilled dental hygienists, it is also important to assess for student learning.[17]

The Interprofessional Education Collaborative (IPEC) panel has established four competency domains and thirty-nine respective sub-competencies for collaborative practice.[18] The four competencies include 1) Values and Ethics (VE), 2) Roles and Responsibilities (RR), 3) Teams and Teamwork (TT), and 4) Interprofessional Communication (CC).[18] The Louisiana State University Health Sciences Center-New Orleans (LSUHSC-NO) School of Dentistry uses the sub-competencies to guide student IPE learning. Previous literature describing service-learning IPE experiences has used quantitative assessment tools to measure student perceptions of IPE as well as student perceptions of their abilities to collaborate interprofessionally.[9,13] While open-ended questions have been used to describe student learning in general, there is a gap in the literature regarding specific IPE learning outcomes based upon IPEC sub-competencies. Additionally, there is a void in assessing the effectiveness of IPE learning using the Kirkpatrick Model, specifically level 2b (acquisition of knowledge and skills),[19] through the use of a post reflection assignment.[20]

A dental hygiene (DH) faculty member at LSUHSC-NO School of Dentistry was interested in integrating IPE experiences into the DH curriculum. For the past 8 years, DH and nursing students from LSUHSC-NO have participated in a multidisciplinary K-12 school-based screening program in conjunction with a local non-profit organization. Initially, the health screenings involved undergraduate nursing students exclusively. However, participants and school administrators quickly realized the need to provide dental screenings and oral hygiene education. The non-profit organization then established a connection with the DH program and oral health screenings were incorporated as a separate activity into the clinical rotation schedule. This community-based, service-learning activity presented an ideal opportunity for an IPE experience. In 2017, DH and nursing faculty members, with the guidance of the Center for Interprofessional Education and Collaborative Practice (CIPECP) director at the LSUHSC-NO strategically incorporated IPE into the existing service-learning activity and included a reflection activity.

Defining targeted IPE learning outcomes can assist faculty in program evaluation. Shrader, et al. recommended using the IPEC competency domains as a framework when developing IPE experiences.[21] However, research using IPEC competencies to guide and assess interprofessional service-learning is limited.[12,22-24] The purpose of the study was to evaluate if a service-learning IPE experience with dental hygiene students and nursing students could reinforce learning related to the following IPEC sub-competencies:

- Communicate roles and responsibilities clearly to the patient, family, and other health professionals (RR1).
- Explain the roles and responsibilities of other providers and how the team works together to provide care, promote health, and prevent disease (RR4).

- Describe how professionals in health and other fields can collaborate and integrate clinical care and public health interventions to optimize population health (RR10).

Methods

This qualitative study was approved by the LSUHSC-NO Institutional Review Board (IRB #9942). Senior DH students (n=31) from the LSUHSC-NO School of Dentistry had the opportunity to participate in a school-based health screening held in one of four participating New Orleans city schools with predominantly underserved student populations. Participants were divided into groups of six or seven and were assigned one of five dates for a four-hour health screening session at one of the schools. The DH students were provided with an IPE experience document that included the definition of IPE, student learning objectives, and a timeline of events. a few days prior to the service-learning activity. The document also included stimulus questions that would serve as a guide for group discussion and a written individual reflection assignment. The reflection assignment, completed within one week following the service-learning experience, was guided by the minimal model of reflective practice, "What? So what? and Now what?" developed by Rolfe, et al. shown in Table I.[25]

DH students were responsible for conducting oral examinations on children ranging from 7-14 years of age, including observation and documentation of untreated decay, treated decay, existing dental sealants, signs of oral trauma, and level of dental care needed, if appropriate. DH students also provided oral hygiene instruction to the children being screened. Nursing students were responsible for assessing blood pressure, calculating body mass index, and classifying risk for obesity.

Prior to the service learning activity, the DH and nursing students gathered as a group to share information about their professional roles related to health screens and the goals of each of their assessments. During the screening process, the DH and nursing students had the opportunity to observe and learn from each other, as time permitted. Immediately following the screening session, all students gathered again as a group for a debriefing session facilitated by a DH and nursing faculty member to discuss their experiences and findings while focusing on the IPE questions described in Table I.

Table I. Reflection questions following the service-learning activity

Question	IPEC sub-competency focus[18]
Q1. Discuss with the group, findings from the screenings conducted today. Were any of your findings unique in anyway?	RR1
Q2. How do you interpret the role of the opposite health professional student in promoting health and preventing disease as related to school-based health screenings?	RR4
Q3. How can dental hygienists and nurses work together to promote health (other than conducting screenings)?	RR4
Q4. What other health and/or non-health professionals (such as teachers or after-school staff) would you recommend join a school-based screening program and why?	RR4
Q5. What are some of the ways you think your community might benefit from health promotion in our schools?	RR10

The DH students were required to submit a written reflection assignment answering the questions from Table I, within one week following the service-learning activity. One DH faculty member de-identified the reflection assignments, and while another DH faculty member and the CIPECP director independently evaluated the reflections for themes representing the targeted IPEC sub-competencies. A single document including all the reflections was created and the reflections and coded statements were reviewed independently by the DH faculty member and the CIPECP director. Once the categorization of statements was agreed upon between the two evaluators, a second DH faculty member who was present during the screenings confirmed the themes. The DH students did not confirm the themes as the review process occurred post-graduation. Statements which were not categorized by IPEC sub-competencies RR1, RR4 or RR10 were organized into themes.

Results

Thirty-one senior DH students (n=31) participated in one of the five screening sessions at four local public schools, and completed a guided written reflection assignment. DH students appreciated the dedicated time used to share information about professional roles. Reflections regarding the role of a nursing student within school-based health screening (RR4) indicated that DH students learned that both professions are educated in their respective disciplines regarding preventive care, how to take blood pressure, how to assess for signs of physical abuse, and caries detection.

Within the service-learning experience, DH students educated nursing students on detecting intraoral signs of abuse (RR1). In addition, DH students commented on feeling appreciated, valued and respected by their nursing student cohorts, as integral members of the healthcare team.

DH students commented on the nursing student findings of elevated blood pressure and high levels of obesity in the young student population. DH students learned from nursing students how a child's body mass index is plotted on a chart in order to determine risk for obesity (RR4).

DH student reflections indicated a recognition of the need for multiple professions in order to promote overall health. Recommendations identified within the DH student reflections of the additional professionals needed for a screening team included the following: all health professionals (n=1), mental health services (n=1), nutritionist (n=7), parents (n=2), pharmacy (n=1), principal (n=1), school counselor (n=2), school staff (n=3), social worker (n=1), and teacher (n=5). Students highlighted the importance of including a nutritionist to provide proper nutrition education for the children as well as individuals who interact with the children on a daily basis (parents/caregivers and teachers) (RR10).

Through the written reflection assignments, DH students described potential cultural, social and financial barriers related to health. Participants indicated that the children being screened lacked knowledge and access to primary care including routine dental care. Reflections also indicated that parents/caregivers may be deemphasizing the importance of receiving dental care, and that children fear a visit to the dentist.

Several comments reflected the potential formation of negative bias. DH students commented on the difficulty children may have eating healthy foods based on what is served in the school cafeteria; children not being educated about health outside of what is presented in school; children not being active at home due to lack of parenting skills; and children being at risk for obesity related diseases because of lack of finances and/or unstable homes. One DH student commented, "There is a greater disparity among these communities and these children have a lack of knowledge and access to not only primary care, but also dental care. Possible challenges include lack of importance in dental care from parents or fear of going to dental visits."

Regarding BMI and the increased risk for chronic diseases, another DH student commented, "It was saddening to know that these children were on the path to having diabetes, high blood pressure, and other risk factors that are evident in disease. The nursing students and my classmates discussed the possible causes of this phenomenon could be related to troubles at home with the parents/guardians, especially financially. These young students may not be as fortunate as other school children to have the means to eating healthy foods. They also may not be as active at home due to lack of parenting skills." DH students indicated the perceived need for parents to be educated in primary care/prevention, and be held accountable to follow-up on health screening recommendations.

Two DH students provided specific examples of parents not scheduling a dental examination for their children. The students had made the assumption that the parents/caregivers were not educated about the importance of childhood dental care. However, the children indicated that their parents were not interested in scheduling the examination or seeking dental care since the baby or primary teeth will be lost and replaced by permanent teeth. In one of the cases the child had clinical evidence of decay accompanied by pain.

Discussion

This interprofessional service learning experience supports and contributes to the IPE literature by demonstrating student learning through their written reflections. Many IPE activities measure student learning outcomes quantitatively. However, student learning from an interprofessional activity varies due to the spontaneous nature of the experience.[26] The reflection aspect of a service-learning experience is essential[9] as it can provide faculty with a better understanding of learning extending beyond specific quantitative questions.

While research and project evaluation of service-learning experiences is growing, it remains limited in part due to a lack of analysis of outcomes with respect to improving the health and well-being of the community and its members. Additionally, most of the published work in service-learning is descriptive with an emphasis placed on the learning outcomes of a single profession.[1] In regards to IPEC competencies, similar to other service-based learning activities focused on underserved populations, DH students demonstrated learning in the IPEC RR, TT and CC domains.[9-11,27] Specifically, DH students demonstrated learning of all three targeted RR sub-competencies (RR1, RR4, and RR10). In addition, student comments regarding environmental and social factors affecting health, highlights learning in the VE domain. However, DH student negative assumptions regarding perceived support systems at home and at school need to be addressed to avoid possible bias, frustration or cynicism towards the underserved population.

Ryan, et al. reported improved student learning of the impact of socioeconomic status on health through a quantitative survey.[11] However, the extent of student learning was not

qualified. O'Brien et al. reported on medical student learning from service-learning projects through written reflections.[28] Following the service-learning project, medical students indicated they had a better understanding of the health challenges underserved communities face after participation in a community-based setting.[28] Student learning in community settings can also be coupled with lecture and discussions as it was in this study. Dedicated reflection time, through a written reflection assignment and/or oral discussion is important for both interprofessional and overall learning.[27,29] The written reflection assignment provided a deeper understanding of student learning beyond the quantitative measurements typically used to evaluate IPE experiences.

Service-learning has been described as "a structured learning experience which combines community service with preparation and reflection."[30] According to the National Academy of Sciences report, true service learning entails an ongoing synergistic effect between learning and service that involves active participation in thoughtfully organized experiences designed to meet the actual needs of the community.[1] It also includes structured time for reflection and integration of the service into basic science and clinical courses.[1] Faculty should utilize current research and education models beyond traditional lecturing to develop or modify service-learning IPE experiences to improve student learning outcomes. Future suggestions to improve the learning experience include enhancing the orientation for the IPE service-learning experiences to include discussions on the social determinants of health (SDH) and a description of the actual community being served as a means to avoid bias related to SDH.[31,32] Faculty should also include the topic of SDH in the debriefing session and encourage student discussion regarding interprofessional opportunities to diminish cultural/social/economic barriers to health.

The DH students in this study were not specifically asked to provide feedback regarding improvements to the service-learning experience. Wallace, et al. reported on a student request for an orientation prior to a service-learning experience involving older adults living in care facilities. The orientation would include visual imagery of the care facility environment and behaviors of older adults with cognitive deficits, as well as examples of how to communicate with older adults.[33] Detailed orientation sessions prior to service-learning experiences have the potential to increase student knowledge of the environment, provide students with an expectation of the type of service being provided and assist in emotionally preparing students for interactions with the community.

Limitations of this study include that it was conducted within a single institution during one academic year and was a single opportunity for DH students to engage in school screenings with nursing students. Also, the reflections regarding the IPE learning outcomes only came from the DH students. Recommendations for future research includes evaluation of the IPE service-learning activity from nursing students, as well as assessment of reflection assignments with the inclusion of an orientation prior to the service-learning experience. Additional research could also include longitudinal IPE service-learning experiences and evaluate student perceptions over time.

Conclusion

This project supports the Health Professions Schools in Service to the Nation Program recommendations while building upon the literature in student IPE learning through service-learning activities. Based upon the results, faculty should incorporate the topic of SDH into the orientation, debriefing and reflection components of a well-designed service-learning IPE experience. Given the spontaneous nature of IPE learning, faculty should consider integrating reflections as an opportunity to gain insight to student learning. In this study, narrative reflections supported learning of targeted IPEC sub-competencies, as well as highlighting a need for additional student education.

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Research

Obstructive Sleep Apnea Knowledge: Attitudes and screening practices of Minnesota dental hygienists

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Abstract

Purpose: Reported cases of obstructive sleep apnea (OSA) range between 4% to 9%, however between 70% to 90% of adults in the United States remain undiagnosed. The purpose of this study was to determine the current knowledge and attitudes of OSA among Minnesota dental hygienists and inventory OSA screening protocols currently used in dental practices.

Methods: The cross sectional study used an adapted Obstructive Sleep Apnea Knowledge and Attitude (OSAKA) survey instrument. Survey items included demographic variables, and measured attitudes, knowledge and perceived knowledge about OSA, routine screening procedures, and use of validated OSA screening protocols. Paper surveys were mailed to a random sample of 750 licensed Minnesota dental hygienists. Analyses included descriptive statistics (counts and frequencies), and analytic tests (one-way ANOVA, Pearson's correlation, and t-tests, Cronbach's alpha), as appropriate.

Results: Twenty-six percent of the returned surveys met inclusion criteria (n=197) and were used in the final analyses. Respondent age ranged from 19 to 70 years and mean years in practice experience was 19.9. The majority (93.9%) were in general practice and had completed an associate degree (59.6%). The mean (SD) self-rated OSA knowledge was 3.5 (3.3) on a scale of 0-10, attitude score was 3.2 (0.8) on a 5-point Likert scale, and knowledge score was 9.5 (range 0-17). No significant differences were found by age, degree type, or years in practice and OSA knowledge or attitudes. Routine practices included head and neck exams (89.3%), taking blood pressure (41.6%). Using a validated OSA screening protocol was reported by 9.6% of the respondents.

Conclusion: Dental hygienists perceive that assessing patients for OSA is important, however they have moderate knowledge of the disease. Results support incorporating OSA into dental hygiene practice through additions to the dental hygiene education curriculum and ongoing professional development courses with the goal of improving the screening and referral of patients presenting with OSA symptoms.

Keywords: obstructive sleep apnea, OSA screening, sleep disorders, dental hygiene education, professional role

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Introduction

Current estimates of obstructive sleep apnea (OSA) cases in the United States (U.S.) adult population range between 4% to 9%, however between 70% to 90% of adults remain undiagnosed.[1-2] Repetitive episodes of total or partial collapse of the upper airway during sleep characterizes OSA leading to sleep disruption and decreased oxygen levels or hypoxia.[3] Inflammation, oxidative stress and increased sympathetic activity precipitated by the sleep fragmentation and hypoxia are some of the mechanisms, that link OSA to several medical comorbidities affecting patients' oral and systemic health.[4] A strong association exists between OSA and cardiovascular diseases including hypertension, heart failure, arrhythmias, and stroke.[5,6] Some studies also implicate a potential association between OSA and periodontal disease.[5,7] Inflammatory cytokines such as TNF-α, IL-1β and acute phase C-reactive protein are increased in OSA patients[8, 9] and in patients with periodontitis.[10,11]

Several anatomical risk factors are associated with OSA including a large neck circumference, small size and a retruded position of the mandible (retrognathia), enlarged tongue, tonsillar hypertrophy, class II malocclusion and extension of

the soft palate behind the tongue.[3] Snoring, general fatigue, and excessive daytime sleepiness (EDS) are common symptoms of OSA. Because symptoms such as fatigue and EDS are also common to other chronic diseases, OSA is often not diagnosed as readily as its comorbidities such as diabetes or cardiovascular diseases.[3] Obesity is a major risk factor for OSA. It often leads to enlargement of the soft tissue in the upper airway and the tongue.[12,13] Ideal screening includes identifying the anatomical risk factors, clinical symptoms that patients experience and implementing validated screening tools followed by appropriate referral to a physician for further evaluation.[4]

Currently, there are several validated OSA screening tools available for health professionals such as the Epworth Sleepiness Scale, Berlin Questionnaire, and STOP Questionnaire.[14-16] Each evaluates a different aspect or risk factor of OSA. Perhaps the most widely used tool is the STOP-BANG questionnaire, which takes into account the patient's medical conditions and symptoms.[15] Mallampati scoring of oropharynx (length of soft palate) is an important part of assessment of the potential for soft tissue obstruction during intra-oral examination which has been shown to predict both the presence and severity of OSA.[17] Patients at risk for OSA are usually referred by their primary care providers although some otolaryngologists, cardiologists and neurologists specialize in sleep medicine. A definitive diagnosis is obtained by conducting polysomnography (i.e., sleep study) in consultation with a sleep medicine physician.[8]

Continuous positive airway pressure (CPAP) is the most effective treatment for moderate to severe OSA. The CPAP machine provides a continuous stream of air under high pressure that prevents the upper airway from collapsing.[3] The American Academy of Sleep Medicine recommends oral appliances (OA) for patients who are intolerant of CPAP (25% to 58%) or for those who prefer an alternate treatment option.[18] The OA advances the tongue and the mandible forward, increasing the upper airway diameter and reducing the upper airway collapse.[19-21]

Dental professionals have the potential to recognize the signs and symptoms of sleep apnea and refer patients for a medical consultation.[4] Dental hygienists spend the most time with patients and have the potential to provide an appropriate setting to conduct OSA screenings. While the potential for this practice has been previously proposed,[4] no published studies have reported the level of knowledge and attitudes about the importance of identifying OSA among dental hygienists. Practice modifications adopted by busy clinicians require both a positive attitude toward the need, and adequate knowledge base in the subject matter to implement and sustain a change.[22] The primary aim of this study was to assess the current OSA knowledge and attitudes of Minnesota dental hygienists and to identify the screening tools currently used to identify patients at high risk of OSA in dental practices. In addition, the study results can inform the need for continuing education on OSA, dental hygiene program curriculum changes, and implementing OSA screening protocols into dental hygiene clinical practice.

Methods

The study population consisted of a simple random sample of the 5,625 licensed dental hygienists in the state of Minnesota; those who were no longer in clinical practice or who obtained licensure within the last year were excluded from the study. An initial sample size of 750 participants was based on an average of an approximate 50% response rate, a sample size used in recent survey studies with dental hygienists and budgetary restrictions.[23-25] However, since this was a descriptive study, no minimum sample was required to meet statistical test criteria.

Data collection instrument

The Obstructive Sleep Apnea Knowledge and Attitude (OSAKA) questionnaire had been developed to measure OSA knowledge and attitudes among physicians; the instrument was modified for use in this study.[26] Following permission from the OSAKA designer, the items were adapted for administration to dental hygienists with minimal changes reflecting clinical practice settings (e.g., "cardiology" was changed to "dental hygiene"). The final version of the 40 item survey included 18 OSA knowledge items divided into four subcategories described as prevalence, diagnosis, risk factors, and treatment.[26] Response choices were true (scored as 1 point), and false or don't know (scored as 0 points) with a total possible score of 18 points. Five attitudinal items were subcategorized into two areas: importance of OSA as a disorder, and confidence in identifying and managing OSA patients.

Responses were selected from a 5-point Likert scale ranging from "not important or confident" to "extremely important or confident". Self-assessed knowledge of OSA consisted of one question ranked on a scale of 0 (no knowledge) to 10 (very knowledgeable). Additional questions assessed OSA curricular content in dental hygiene undergraduate programs, and completion of post-graduate OSA continuing education courses. Routine clinical screening practices assessed were the inclusion of an OSA item on medical history forms, performing extra- and intraoral examinations, and checking blood pressures (BP). An inventory of one or more currently used OSA protocols included the Mallampati Classification[27], Berlin questionnaire[14], STOP questionnaire, STOP-

BANG questionnaire[15], and the Epworth Sleepiness Scale.[16] Demographic variables included age, practice setting (general or specialty), and undergraduate degree type (bachelor or associate).

Content validity of the modified survey was evaluated by OSA experts associated with the University of Minnesota School of Dentistry and recommended changes were incorporated into a second version. The survey was then piloted among ten dental hygienists who met the inclusion criteria for study participation. Further changes were reviewed by the study team and incorporated into the final survey.

Procedures

The paper survey was mailed to 750 randomly selected dental hygienists and included a cover letter and stamped addressed return envelope. Subjects were asked to return the survey within two weeks of receipt. Each mailing list name and address was numbered with a corresponding code indicated on the survey allowing for a targeted second mailing to non-respondents two weeks after the initial mailing. The study was submitted to the University of Minnesota Institutional Review Board and deemed exempt.

Data analysis

Descriptive statistics including means and standard deviations for continuous measures; counts and percentages for categorical measures, were used to summarize item responses (SAS V9.3; SAS Institute Inc., Cary, NC). Internal consistency of the modified survey instrument attitude items was calculated to determine Cronbach's alpha. Pearson's correlation was used to test the correlation between self-assessed knowledge and total knowledge scores. Total knowledge scores and attitude scores were treated as dependent variables with one-way ANOVA for age categories, t-tests for degree type, and Pearson's correlation coefficient to determine an association with years in practice. The alpha level for all statistical tests was established at 0.05.

Results

Surveys were completed and returned by 230 respondents (n=230) included in the initial mailing of 750 (n=750) dental hygienists. Thirty-three surveys were excluded from analysis because respondents did not meet study inclusion criteria (i.e., they were no longer in clinical practice). The final sample consisted of 197 surveys (n=197) or 26% of the sample.

Respondents ranged in age from 19 to 70 years. Mean (SD) years in practice was 19.9 (12.0) and 93.9% practiced primarily in a general dentistry setting. The mean (SD) weekly hours practiced was 29.7 (8.3), and the majority of subjects (59.6%) earned an associate level degree upon completion of their dental hygiene program. Because a substantial number of respondents did not indicate their degree type (8.3%), results were reported with an additional category titled "non-specified." This variable was not included in additional analyses. Respondents' mean (SD) self-rated level of OSA knowledge was 3.5 (3.3) out of 5. Respondents' total knowledge mean score was 9.5 out of 18; itemized results are reported in Table I. Applying Pearson's product-moment coefficient of correlation, a moderate and statistically significant correlation (r=0.46, $p<0.001$) was found between the respondents' perceived self-assessed knowledge and their total knowledge scores.

Response frequencies to the five OSA attitudinal questions are shown in Table II. Subcategory mean scores (SD) for the "importance of OSA" was 3.7 (0.8) out of 5 and "confidence of identifying OSA risk factors" was slightly lower at 2.8 (1.0) out of 5. The mean (SD) for all items was 3.2 (0.8).

Because the instrument used to collect data was altered for use in this study, both the internal validity and correlation between items was tested replicating the same procedures conducted by Schotland, et al.[26] as part of initial survey development. Cronbach's alpha was established at 0.81 indicating a good level of internal consistency. Correlations between each item ranged from none to high, with several results yielding statistically significant associations (Table III).

Results of the inferential statistical analyses comparing the dependent variables of total knowledge scores and attitude to age, degree type and years in practice are displayed in Table IV. No statistically significant differences were found.

The majority of respondents reported that they routinely conducted extra- and intraoral examinations (89.3%), but fewer than half (41.6%) regularly checked patients' blood pressure. Less than half reported inclusion of an OSA item on their practice's medical history form (39.6%). Only ten (9.6%) of the respondents used an established OSA screening tool with half reporting use of the STOP-BANG tool, either exclusively or in addition to, another method.

Discussion

Previous studies have established the potential for dental hygienists to screen patients for OSA risk factors in clinical practice settings. However, there is a gap in the literature regarding the actual OSA knowledge, attitudes and screening practices of dental hygienists. As no dental hygiene comparatives were available, results of physicians completing the OSAKA knowledge and attitudes items were reviewed. Comparisons of studies assessing the OSA knowledge of cardiologists, internists and family practitioners showed that

Table I. Dental hygienists' responses to OSA knowledge items

	Correct responses are shaded		
	True n (%)	**False n/(%)**	**Don't know n/(%)**
Prevalence:			
The estimated prevalence of obstructive sleep apnea among adults is between 2-10%.	29 (15)	67 (35)	101(50)
Diagnosis:			
An overnight sleep study is the gold standard for diagnosing obstructive sleep apnea.	165 (84)	10 (5)	21 (11)
Less than 5 apneas (cessation of breathing during sleep) or hypopneas (limited breathing during sleep) per hour is normal in adults.	38 (20)	45 (23)	112 (57)
The majority of patients with obstructive sleep apnea snore.	142 (74)	19 (9)	36 (17)
A craniofacial and oropharyngeal examination is useful in the assessment of patients with suspected obstructive sleep apnea.	132 (68)	6 (3)	57 (29)
Risk Factors:			
Women with obstructive sleep apnea may present with fatigue alone.	95 (48)	29 (14)	73 (37)
Obstructive sleep apnea is more common in women than men.	10 (5)	98 (51)	88 (44)
Obstructive sleep apnea is associated with hypertension.	98 (51)	18 (9)	80 (40)
The loss of upper airway muscle tone during sleep contributes to obstructive sleep apnea.	117 (61)	8 (4)	71 (36)
The most common cause of obstructive sleep apnea in children is the presence of large tonsils and adenoids.	149 (77)	3 (2)	43 (22)
Alcohol at bedtime improves obstructive sleep apnea.	5 (3)	162 (83)	29 (14)
Untreated obstructive sleep apnea is associated with a higher incidence of automobile crashes.	117 (60)	10 (5)	68 (34)
In men, a collar size 17 inches or greater is associated with obstructive sleep apnea.	92 (47)	15 (8)	88 (45)
Cardiac arrhythmias may be associated with untreated obstructive sleep apnea.	139 (71)	1 (1)	56 (28)
Treatment:			
Uvulopalatophryngoplasty (a surgical procedure to remove and/or remodel tissues of the throat) is curative for the majority of patients with obstructive sleep apnea.	20 (9)	83 (43)	94 (47)
CPAP (continuous positive airway pressure) therapy may cause nasal congestions.	52 (36)	38 (19)	106 (54)
Laser-assisted uvuloplasty is an appropriate treatment for severe obstructive sleep apnea	41 (21)	20 (11)	134 (68)
CPAP is the first line therapy for severe obstructive sleep apnea.	124 (64)	11 (6)	61 (31)

these health care providers consistently scored higher than dental hygienists (76%, 79% and 78%, respectively, vs. 54%).[26, 28] Mixed comparisons were found between this study and others when comparing OSA knowledge with clinician age, practice type or specialty, and years in practice. This study, similar to a report of cardiologists, found no differences in OSA knowledge or attitudes by age, years in practice or practice type. However, Schotland et al.[26] found a statistically significant inverse relationship among internists and family practitioners by age; lower knowledge scores and less confidence in diagnosing OSA were associated with increased age. These differences may be due to practice specialization with cardiologists and dental hygienists being less likely to routinely screen for OSA as compared to primary care family practitioners and internists.

Attitudinal comparisons found that fewer dental hygienists than cardiologists reported OSA as either a "very important" or "extremely important" clinical disorder (59% vs. 78%, respectively).[28] Fewer than one-fourth, (24%, of dental hygienists) compared to over two-thirds, (68% of physicians), were confident in their ability to identify patients with OSA.[28] Twenty-four percent of dental hygienists compared to 18% of cardiologists were "very confident" or "extremely confident" in their ability to manage (dental or general) concerns of OSA patients. Twenty-seven percent of dental hygienists were "very confident" or "extremely confident" in their ability to manage dental concerns related to OSA on CPAP therapy compared to 10% of cardiologists' general ability to manage these patients.

It should be noted that the last two attitudinal survey questions for dental hygienists specific to patient management and CPAP therapy, were modified to indicate dental concerns as opposed to general patient management in the original OSAKA survey for physicians. Results of correlation analyses between attitudes toward OSA and

Table II. Dental hygienists' attitudes about the importance of and confidence in treating dental concerns of patients with OSA

	Not important or confident	Somewhat important or confident	Important or confident	Very important or confident	Extremely important or confident	
	n (%)					Mean(SD)
Importance of OSA						**3.7 (0.8)**
As a clinical Disorder, OSA is:	1 (0.5)	15 (7.7)	62 (32.7)	75 (38.3)	41 (20.9)	
Identifying patients with possible OSA is:	0 (0.0)	15 (7.7)	71 (36.4)	64 (32.8)	45 (23.1)	
Confidence with OSA						**2.8 (1.0)**
Identifying patients at risk of OSA	33 (17.3)	40 (20.9)	73 (38.2)	32 (16.8)	13 (6.8)	
Ability to manage patients with dental concerns related to OSA	29 (15.1)	37 (19.3)	81 (42.2)	32 (16.7)	13 (6.8)	
Ability to manage dental concerns of patients on CPAP therapy	36 (18.9)	36 (18.9)	68 (35.6)	41 (21.5)	10 (5.2)	
Total of all items						**3.2 (0.8)**

Table III. Results of Pearson's correlation tests between attitude items and total knowledge scores.

	1	2	3	4	5
OSA clinical (1)	1	-	-	-	-
ID pts (2)	0.75**	1	-	-	-
ID at risk (3)	0.38**	0.43**	1	-	-
Manage OSA (4)	0.23*	0.30**	0.78**	1	-
Manage therapy (5)	0.28**	0.31**	0.68**	0.82**	1
Knowledge score	0.11	0.14	0.17*	0.25**	0.26**

* $p < 0.05$, ** $p<0.001$

knowledge scores were similar for both dental hygienists (r=0.23; p=0.001) and cardiologists (r=0.29; p=0.004).[28] It is of interest that both clinician groups with attitudes identifying OSA as important, also had higher OSA knowledge scores.

Fewer than half of all respondents routinely collect clinical information critical to diagnosing OSA. Approximately one-third of dental hygienists reported that the medical history forms used in their practices include questions specific to OSA or its symptoms. Furthermore, only 41.6% responded that blood pressure screenings were performed during routine dental hygiene care appointments. This result was surprising as clinical practice guidelines recommend blood pressure screenings at all dental hygiene care appointments.[29] It is well established that many OSA patients also exhibit high blood pressure,[30-34] and current evidence suggests improved blood pressures with OSA treatment.[34]

A majority of respondents (89.3%) indicated that they completed or assisted in examinations that evaluate extra- and intra-oral structures during routine dental hygiene appointments. While the current emphasis of this procedure is on oropharyngeal cancer detection, educating dental hygienists on anatomical variations indicative of OSA could seamlessly include a practical addition to this routine assessment.

The use of established OSA screening protocols or other tools used in dental practices was very low in this study population (9.6%). The small number of respondents (n=10) makes it difficult to determine the utility of available instruments, and further inquiry is needed to determine an appropriate tool for use in the dental setting.

Study limitations include a low response rate despite two mailings including prepaid envelopes. Contributing factors may include lack of an incentive to complete the survey, limited familiarity or interest in the subject matter, or lack of time. Therefore, results may not be representative of dental hygienists as a whole. However, the significance of this study is that the dental hygienist respondents consider OSA to be an important disorder; although their confidence in identifying and managing dental concerns of OSA patients is lower than attitudes regarding its importance. Further, dental hygienists' perception of their OSA knowledge coincides with their actual OSA knowledge. As it is well established that attitudes preclude the acquisition of knowledge and subsequent behavioral change,[22] results from this study support increasing educational opportunities on OSA for dental hygiene students and practicing clinicians.

Table IV. Inferential test results comparing OSA knowledge scores and attitudes to age, degree type and years in practice.

		Total Knowledge	*p*-value	Attitude: Importance diagnosing	*p*-value	Attitude: Confidence identifying	*p*-value	Total Attitude Score	*p*-value
Age*	**n (%)**	**Mean (SD)**		**Mean (SD)**		**Mean (SD)**		**Mean (SD)**	
19-35	50 (25.5)	8.7 (42)		3.7 (0.8)		2.8 (1.0)		3.2 (0.8)	
36-45	43 (21.9)	9.8 (4.0)		3.7 (0.8)		2.8 (1.0)		3.2 (0.7)	
46-55	50 (25.5)	9.0 (3.9)		3.7 (0.9)		2.6 (1.2)		3.0 (0.9)	
56-70	53 (27.0)	10.5 (3.6)		3.7 (0.8)		2.8 (1.0)		3.2 (0.8)	
			0.1		0.99		0.61		0.77
Degree**									
AA	115 (59.6)	9.1 (4.0)		3.6 (0.9)		2.8 (1.1)		3.1 (0.8)	
BS	62 (32.1)	9.7 (4.0)		3.9 (0.8)		2.7 (1.0)		3.2 (0.8)	
Other	16 (8.3)	11.5 (2.8)		3.5 (0.5)		2.7 (0.8)		3.0 (0.6)	
			0.32		0.07		0.93		0.41
Years in Practice***									
1-10	53 (27.0)	9.0 (3.9)		3.8 (0.8)		2.7 (1.1)		3.2 (0.8)	
11-20	61 (31.1)	9.1 (4.3)		3.6 (0.9)		2.9 (1.1)		3.2 (0.9)	
21-30	36 (18.4)	9.7 (4.1)		3.7 (0.8)		2.6 (1.1)		3.2 (0.8)	
31-40	38 (19.4)	10.5 (3.0)		3.8 (0.8)		2.8 (1.1)		2.9 (0.7)	
41+	8 (4.1)	9.0 (4.0)		3.3 (0.6)		2.6 (0.9)			
			r= 0.12, p=0.99		r= -0.001, p=0.86		r= -0.006, p=0.42		r= -0.004, p=0.59

* One-way ANOVA

**t-test (associate and bachelor categories only)

***Pearson's correlation coefficient

A majority of the 70 to 90% of Americans with OSA remain undiagnosed indicating the need for new screening and referral strategies.[4] As the health care paradigm shifts towards interprofessional practice, the potential role of dental hygienists to screen for OSA is timely. Standardized OSA screening can be integrated seamlessly into clinical practice as dental hygienists often conduct routine medical history reviews, head and neck examinations, intraoral examinations and blood pressure screenings. The time spent to administer a brief questionnaire, elicit a conversation regarding OSA symptoms, and provide a dentist's referral for assessment by a physician is reasonable, especially when considering the potential benefits to patients. Dental hygienists are likely to have more time for the initial screening of patients with the dentist confirming positive responses. Preparing clinicians will require incorporating OSA into dental hygiene curricula, and offering continuing education courses for practicing professionals. The long-term goal of this line of research is to improve the recognition of OSA signs and symptoms along with referrals to physicians for further evaluation and management.

Conclusion

The attitudes of Minnesota dental hygienists regarding the importance of OSA as a chronic disorder are higher than their knowledge of OSA. Currently, dental hygienists are underutilized for performing OSA screening in the dental practice setting. Results from this study support the practical aspects of incorporating OSA into the knowledge-base of dental hygiene practice to improve the screening and referral of patients presenting with OSA symptoms.

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Research

Social Media Use Behaviors and State Dental Licensing Boards

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Abstract

Purpose: The importance of upholding and maintaining professionalism is even greater in a digital world particularly for health care providers entrusted to care for patients and maintain privacy laws. Studies suggest that specific consequences of violation of professionalism and other ethical standards have not been well established. The purpose of this study is to identify how online social media behaviors influence the licensure and enforcement practices of dental professionals.

Methods: A non-experimental descriptive electronic survey research design was utilized for this study. A total of 52 surveys consisting of questions relating to social media and the licensure of and practice act enforcement of dental professionals were sent to the executive directors of the dental boards in the United States.

Results: Of the surveys that were sent (n=52), 18 responses were received for a 35% response rate. Overall, respondents indicated a lack of social media usage surveillance initiated by state dental boards. Incidents of online unprofessional behavior came to the attention of the board a variety of ways and with a range of consequences. Overall, there was a level of concern reagarding online activities by licensees that may be in violation of laws, rules and regulations of the state or the dental board exists. However, no state dental licensing boards are currently in the process of creating a social media policy.

Conclusion: Dental boards are aware of potential online unprofessional behaviors and have implemented various consequences. Dental boards should consider developing policies to address potential online unprofessional behavior to protect the public that they serve.

Keywords: social media policy, professionalism, ethics, patient privacy, licensing boards

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Introduction

Social media has become an integral part of today's society. Social networking began to take stride in 2002 and by 2006 social media sites such as LinkedIn, MySpace and Facebook began to flourish.[1] Facebook remains the leading global social network with more than 1.9 billion active users.[2] With the rise of mobile devices and "fourth screens" such as smartphones and tablets, applications such as SnapChat and Instagram have entered the mainstream of social networking. Each social media platform has specific characteristics that engage users. Fifty-two percent of adults now use two or more social media sites, a significant increase from 2013, when it stood at 42% of Internet users.[3] As social media use has increased, the rationale in how it is actually used has also evolved.[4] Facebook and Twitter users are increasingly using those outlets to obtain news information.[5] The growth of social media has allowed not only personal interactions but informational and professional interactions to occur in this media.

Not only does the general public use social media for communicating with a wide range of contacts, social media provides healthcare professionals with tools to share information, discuss policy and practice issues, and educate and communicate with patients and the public a large. It has been reported that while over 90% of physicians use some form of social media for personal activities, only 65% use these sites for professional purposes.[6] While social media has numerous benefits of expanding networks and access to information, healthcare providers encounter a number of risks when interfacing on social media. These risks include poor quality of information, damage to professional image, potential for breaches of patient privacy, violation of patient and healthcare professional boundary, and

licensing and legal issues.[6] Social media platforms allow the public, including patients and their families, to search out health care providers and students and examine their digital profiles. This open access has the potential to be detrimental to the professional image of the practitioner, the medical institution and the profession in general.[7]

Zijilstra-Shaw et al indicate that social media professionalism is a needed competency in both undergraduate and postgraduate studies, in order to act effectively and ethically.[8] An assessment of surgical residency program directors found that surgical residents are more likely to be dismissed from a program for unprofessionalism rather than cognitive failure.[7] In a study of dental and dental hygiene students at one college of dentistry, fourteen instances of unprofessional content were found within the student social media profiles.[9] Dental hygiene students were more likely to have a Facebook account as compared to their dental student cohorts. Sixty-one percent had an identifiable profile, with only 4% being entirely public.[9]

It is vital that health care students and professionals understand that online information, even those accounts with restricted access, is not always private. Milton outlined the ethical obligations for nurses related to social media and indicates that violating these ethical and legal principles may open the door to litigation and distrust of the profession.[10] Health care providers should maintain their legal and ethical obligations to patients and the public in any media, including social media.

Because of reported violations and the potential of litigations, social media policies have begun to make their appearance in employee handbooks nationwide. A survey by Proskauer found that 90% of businesses use social media in some aspect.[11] As social media increases, there has been a greater need to expand the social media policies for companies and organizations. Social media policies in businesses have increased from 60% to 80%, with more than half of businesses updating their policies with precautions being taken to reduce misuse of confidential information, misrepresenting the views of the business, inappropriate non-business use, and harassment.[11] Institutions of higher education are finding the need to implement social media policies as well. A study of U.S. dental schools revealed 35% of dental schools had social media policies and among the respondents, all had an official social media page. As a result of the study findings, dental educators and administrators were encouraged to raise awareness of social media professionalism within their schools, through education and curricular integration.[12]

In addition to the obligation to protect patients' privacy and trust, health care providers should be aware that actions on social media can negatively affect their own credentialing and licensure. State medical boards have imposed disciplinary action related to social media behavior, including restricting, suspending or revoking licenses.[6] An example of this type of social media violation included an emergency medicine physician who was fined after making comments on Facebook regarding a patient. Although a name was not released, pertinent information leading to the patient's identity was enough for the Rhode Island State Medical Board make a judgement on the practitioner's unprofessional conduct.[13]

Studies of social media use by medical students and physicians have highlighted areas of unprofessional content. Previous research has shown that 60% of U.S. medical school deans had concerns regarding students posting unprofessional content.[14] Greysen et al studied online professionalism investigations by state medical boards. Surveys including ten hypothetical vignettes were sent to the medical boards to see what type of scenario would prompt an investigation. Among the highest consensus for investigation were scenarios depicting misinformation on physician practice websites, misleading claims of treatment outcomes, misrepresentation of board certification, patient confidentiality, and inappropriate communication with patients.[15]

Unprofessional conduct violations and guilty verdicts are made public and are part of the individual's permanent licensure record. In the event that a license is restored to good standing, the disciplinary action may have lingering effects, such as restrictions from certain provider groups. Small outlined that nurses may have difficulty finding employment if they are excluded from a Medicaid provider list. Disciplinary action on a license can prevent a registered nurse from working for employers receiving Medicaid reimbursements. Furthermore, obtaining licensure in another state or in another health care profession could be limited if there are disciplinary actions on the permanent licensure record.[16]

Guidelines for professional social media behavior and the legal and ethical obligations health care providers have to their patients have been discussed in the literature.[15] Medical boards have sanctioned medical professionals due to unprofessional behavior online.[15] Currently there is a gap in the literature examining how state dental boards license and enforce their individual dental practice acts relative to social media behaviors. The purpose of this study is to identify how online social media behaviors influence the licensure and enforcement of dental professionals.

Methods

A survey research design was used to evaluate the use of social media, licensure and enforcement practice in dentistry. This study was determined exempt by the Institutional Review Board at The Ohio State University. Email addresses were collected from the American Association of Dental Boards website in conjunction with the individual state dental board websites for the 52 licensing bodies. Permission was granted to use a modified version of the survey, "Online Professionalism Investigations by State Medical Boards: First, Do No Harm," developed by Greyson et al.[15] The electronic survey, administered by Qualtrics (Provo, UT), was sent via email to the 52 executive directors of each state dental board and a dental hygiene board. The 19-item survey instrument included multiple choice and open-ended questions related to licensure and enforcement policies regarding the use of social media by dental professionals. An initial email was sent to all 52 dental board directors with follow-up emails were sent at two, four and six weeks. Follow-up phone calls were made at week five and eight. One final email was sent to all non-respondents at week ten. Agreement to participate was established with the completion of the survey. Descriptive statistics were used to analyze the results.

Results

Eighteen responses were collected from state dental licensing board directors (n=52) for a 34.6% response rate. Respondents were primarily executive directors, located in a wide geographic range in the United States (U.S.). A majority of the respondents reported that they were not using social media as a communication tool for their licensing board. One respondent indicated use of Twitter by the state dental board while two others indicated using the board's website for communication with their licentiates. Demographics and social media usage by state dental boards are summarized in Table 1.

When asked whether online unprofessional behavior of licentiates had reported to the board, the most frequent behavior reported was online misrepresentation of credentials, clinical competencies or outcomes (n=10). The next most frequent behaviors reported were in regards to inappropriate communication or contact with patients online (n=3). Incidents of online unprofessional behavior came to the attention of the board in various ways, including reporting by another dentist (n=8, 44%) and discoveries during ongoing investigations of another complaint (n=5, 28%). Various actions on incidents of online unprofessional behavior were reported including informal warnings, consent orders and continuing education in ethics and professionalism (Table II). In addition to dentists, similar incidents of online unprofessional behavior were reported among other professionals licensed by the board. Dental hygienists (n=3, 38%) and expanded functions dental auxiliaries (n=3, 38%) were most frequently reported. However, reported incidents also included certified dental assistants, dental radiographers and dental therapists/ mid-level providers.

Table I. State dental licensing board demographics

Respondent's primary role	**n (%)**
Executive	14 (78%)
Licensing	1 (6%)
Investigations	1 (6%)
Other	2 (11%)
Region	
Northeast	6 (33%)
South	4 (22%)
West	7 (39%)
Midwest	1 (6%)
Licensed dentists in jurisdiction	
≤ 1,000	2 (11%)
1,000-1,999	4 (22%)
2,000-2,999	3 (17%)
3,000-3,999	2 (11%)
4,000-4,999	0(0%)
≥ 5,000	7 (39%)
Public non-dental members of the board	
None	3 (17%)
One	7 (39%)
Two	6 (33%)
Several public non-dental members that comprise 25% of the board	2 (11%)
Social media communication with licensees, patients or other parties	
Yes	1 (6%)
No	17 (95%)
Social media tools used by the board	
Twitter	1 (6%)
Other: Board website	2 (11%)
None	15 (83%)

Each licensing board was asked regarding their level of agree-ment with several statements related to social media and dental licensure and enforcement. Many respondents reported that they are uncertain about first amendment rights that may supersede board actions related to professionalism and privacy violations made

Table II. Reporting and disciplinary actions for dentists

How did incidents of online unprofessional behavior come to the attention of the board?	n (%)
Reported by another dentist	8 (44%)
No incidents reported	6 (33%)
Discovered during ongoing investigation of another complaint	5 (28%)
Reported by patient, patient family member or other member of the public	4 (22%)
Reported by other non-dentist clinical provider	2 (11%)
Reported by non-clinical staff	1 (6%)
Reported by clinician in training	0(0%)
Uncertain	3(17%)
Which of the following actions were taken by the board and/or its agents in response to incidents of online unprofessionalism?	
No actions taken	8 (44%)
Informal warning (verbal or written communication)	8 (44%)
Issuing of consent order	3 (17%)
Formal disciplinary meeting	1 (6%)
Other (consent agreement)	1 (6%)
Uncertain	4 (22%)
What outcomes have occurred as a result of the actions taken by the board?	
Letter of reprimand	4 (31%)
Ethics and professionalism refresher course/ continuing education	3 (23%)
Other	3 (23%)
Assigned specific educational or community service requirements	1 (8%)
Monetary fine	1 (8%)
Limitation or restriction of license	1 (8%)
Temporary suspension of license	1 (8%)
Revocation of license	1 (8%)
Uncertain	5 (38%)

Table III. State dental board current impressions of online unprofessional behaviors

Indicate the board's level of agreement with the following statement: "Concerns about violating first amendment rights would prohibit my board from taking action against dentists responsible for online unprofessional behavior." (n=17)	n (%)
Strongly Disagree	1 (6%)
Disagree	5 (29%)
Agree	3 (18%)
Strongly Agree	0
Uncertain	8 (47%)
Indicate your impression of the board's overall level of concern about online activities by licensees that may be in violation of laws, rules and regulations of the state or the dental board. (n=16)	
Not concerned	1 (6%)
Somewhat concerned	5 (31%)
Moderately concerned	5 (31%)
Concerned	3 (19%)
Very concerned	2 (13%)
Are the state's laws, rules and regulations broad enough to cover issues of Internet use and online behavior? (n=18)	
Yes	7 (39%)
No or Uncertain	11 (61%)
Does the board have policy specifically addressing issues of Internet use and online unprofessional behavior? (n=18)	
Yes	0
No	15 (83%)
Uncertain	3 (17%)
Is the board currently developing a specific policy to address issues of Internet use and online unprofessional behavior?	
Yes	0
No	18 (100%)
Given existing laws, rules and policies for the board's jurisdiction, do you feel the board is able to effectively deal with issues of internet uses and online unprofessional behavior?	
Yes	9 (50%)
No	1 (6%)
Uncertain	8 (44%)

through social media (n=8, 47%) and whether the board could effectively deal with issues related to social media use and online unprofessional behavior (n=8, 47%). The majority of dental licensing boards do not have policies to specifically addresses social media, Internet use or online unprofessional behavior (n=15, 83%) (Table III).

Discussion

While social media use is increasing, its impact and effects on licensed dental professionals are still being explored. This study represents baseline data in the area social media and state dental licensing boards. It is evident that there are concerns regarding unprofessional online behavior of licensed dental professionals as well as the strength of the current laws and regulations of the individual board to properly address these issues. In general, this study produced similar results to those of the state medical boards.[15] Both types of licensing boards reported uncertainty or did not have policies in place for Internet use by their licentiates; did not utilize social media to communicate with their licentiates or the public; and demonstrated concerns regarding violations of professionalism online.

The high level of consensus regarding cause for investigation by state medical boards matched the most frequently reported behaviors identified by the dental boards. Rationale for board investigations included online violations of patient confidentiality, online misrepresentations, and inappropriate communication or contact with patients.[15] Specific consequences for these actions were not discussed in the state medical board study. However, there may be other legal consequences for violations of online professionalism including suspension or termination of employment based on an employer's policy. It noteworthy that dental boards used social media to communicate with the public and their licentiates less frequently than medical boards.[15]

Beyond potential violations and consequences initiated by the licensing board, it is the responsibility of dental providers to follow their professional code of ethics both online and offline. Codes of Professional Responsibility and Ethics should be updated to acknowledge social media within the core principles. Greysen et al identify that patients could bring suit for privacy violations under the Health Insurance Portability and Accountability Act and the health care provider may be prosecuted by the Department of Health and Human Services.[15] Most social media sites have terms and conditions a user must accept prior to joining. Generally, this agreement states that social media sites own the data, though the content author may retain some rights.[17]

In a second study by Greyson, it was found that teachers and lawyers have been disciplined and or fired for online behaviors.[18] Dental professionals must be aware that their online content may be seen by all, regardless of their privacy levels, and potential ramifications for this content can vary based on the extent. Attitudes towards social media usage for dental office business have also been explored. One study showed that while 73% of patients did not expect their dental practice to have a social media account, 36% had searched for their dentist's reviews via Facebook.[19] While these findings are not directly related to licensure, they serve as a reminder to be conscientious of public social media postings.

Despite the concern with online unprofessionalism and current laws, rules, and regulations to address these issues, none of the respondents reported that they were creating social media policy at the time of this study. With the increasing use of social media, dental boards should consider policy in order to protect employees, employers, patients, and the public. Rationales for the apparent lack of social media use policies by state dental boards, may be an area for future research.

From results of this study, it is evident that legal issues are easily identifiable and punishable, whereas ethical issues may be more difficult to adjudicate. Other ethical ramifications may be more open to the interpretation of the board without a social media policy in place. An additional reason licensing boards may not have a social media policy may be due to uncertainty regarding the intercession of first amendment rights with online unprofessional behavior. Results from this study indicate that 47% of dental boards have uncertainty about this area and should further examine how social media postings may relate to the role of the dental board in licensure and enforcement. Elevating the awareness of state licensing boards on the increased levels of social media use of the general population could promote future adoption of utilizing social media outlets to connect with professionals and the public. In a study of social media usage by students in U.S. dental schools, students stated that online media is their primary source of information.[20] Having state dental boards utilize social media sites could bridge the gap between professional and unprofessional behaviors. Dental boards could act as an example and resource of proper online professionalism for licensees to follow.

Future recommendations include creation of state dental board social media policy. Focus should be made on being professional, being respectful, maintaining confidentiality and privacy, respecting third party content, allowing for subject matter experts respond and add value, knowing that the Internet is permanent, and separating personal views.[21]

Policies created should reflect the well-being of all parties involved and clearly define what constitutes a violation of such policies. Additionally, state dental boards could require an ethics and professionalism continuing education course for each renewal period. Currently, only six states require an ethics and professionalism course for dental hygiene license renewal. Other states could allow ethics and professionalism courses to fulfill licensure renewal requirements but do not mandate a specific ethics course.[22] If states choose to adopt this suggestion, courses should be evaluated to reflect current and up-to-date information including content related to professionalism on digital media. This uniformity would allow professionals holding multiple state licenses to follow the same guidelines regarding social media since this platform has no boundaries.

This study had several limitations. By sending the survey exclusively to the state dental board executive directors, respondents may not have had access to adequate information to answer the proposed questions. This is most likely validated by the number of uncertain responses to the survey questions. One state dental board executive director commented that many of the questions related to violations were handled by a compliance unit and therefore the information was not readily available. Recognizing this limitation would allow for future research to include enforcement officers or compliance units with more direct involvement in online unprofessional conduct complaints. A similar finding was also indicated in the study of state medical boards where one respondent specified that all complaints must be investigated and referred to a compliance unit as necessary.[15] Another limitation was that the survey did not include any potential scenarios or hypothetical vignettes, unlike the study of state medical boards. Vignettes showing hypothetical pictures or comments posted on social media sites could be used in future studies for participants to demonstrate concern for investigation.

Since the original research was completed, there have not been any significant findings in the area of state dental licensing boards and social media. With limited data from dental board studies and online unprofessionalism, comparisons to other health care providers are scarce. As more research continues, studies can further compare oral health care related boards to identify similarities and differences among online unprofessionalism. Finally, this survey had a response rate of 35%, limiting its generalization.

Conclusion

State dental licensing boards are aware of potential online unprofessional behaviors and have implemented various consequences. While this study shows that very few state dental boards communicate via social media with licentiates or the public, dental professionals have warned or penalized for online behaviors which violate dental practice acts or policies. Although no social media policy currently exists for state dental licensing boards, ongoing continuing education programs should include professionalism on digital platforms. Dental professions should maintain the highest ethical standards for themselves, the public and the profession in all their activities online.

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