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- Public Opinions Regarding Advanced Dental Hygiene Practitioners in a High-Need State
- Perceptions of California Dental Hygienists Regarding Mandatory Continued Competence Requirements as a Condition of License Renewal
- Oral Health Care Providers' Knowledge and Attitudes About Intimate Partner Violence
- Senior Dental Students' Knowledge and Attitudes Toward Dental Hygienists' Contributions to Comprehensive Patient Care
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- Implications for Improving Oral Health Care Among Female Prisoners in Georgia's Correctional System

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The *Journal of Dental Hygiene* is the refereed, scientific publication of the American Dental Hygienists' Association. It promotes the publication of original research related to the profession, the education, and the practice of dental hygiene. The Journal 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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The Impact of Leadership and Research on Decision Making: Forming Collaborations and Shared Partnerships



Ann Eshenaur Spolarich, RDH, PhD

There is an old saying that “two heads are better than one.” Certainly, there are many opportunities for health care providers to participate in collaborative work efforts, including for conducting original research.¹ The decision to participate on a collaborative research team is often based on practical considerations (eg lack of access to a specific patient population, health science librarians, or biostatisticians) or simply because it makes sense to bring together individuals who have different areas of expertise and/or backgrounds in health care with shared interests. Interprofessional collaborative teams are becoming much more commonplace in academic and health care settings to examine clinical problems from multiple perspectives.²

In research, there is an underlying assumption that collaboration produces greater outcomes. However, studies have shown that even small differences in work effort by one or more individuals on a team lead to large differences in the degree of effectiveness. Team leaders must be able to define work expectations, as well as encourage and monitor the efforts of all participants to ensure that efficiency does not suffer and that project outcomes are successful.¹

Researchers have to make choices when offered opportunities to collaborate. Joining a collaborative team has implications for each individual on the team, who must weigh the risks and benefits before making the decision to participate. Most choices revolve around credit allocation, such as who will be the project leader or the lead author on subsequent publications. These decisions should be made prior to the initiation of the project to prevent future disagreements and adverse working relationships after the project is under way. For many scientists, giving away the chance for sole ownership or lead authorship on a project may be a major trade-off made in exchange for greater efficiency and a faster rate of completion.^{2,3}

For early investigators, making the choice to collaborate also poses an ethical dilemma: will the opportunity for learning new skills and mentorship gained by working with established scientists enhance scholarly productivity, or will serving as a junior member of a team of established scientists limit

the degree of recognition received in proportion to the amount of work effort invested? Early investigators have to carefully weigh these considerations and the impact their choices have on their career advancement. Indeed, there are times when collaboration may hinder an individual’s planned path for advancement, especially if a supervisor demands the individual’s participation for the good of the organization. Ultimately, the individual has to determine the rate of return of the time and effort devoted to achieving the team’s goals and the value of the collaborative experience.

The literature that examines values in science is limited, as most of the work focuses on individual scientists’ decision-making instead of within the framework of collaboration. It is accepted that a shared social value for the attainment of new knowledge exists among individual scientists. However, other factors may influence the value placed upon the knowledge gained from a collaborative project, such as the culture of the environment in which the project takes place, and social and moral values of the individuals who comprise the project team.⁴ Investigators should remember that the goal of collaboration is to obtain results as opposed to merely participating on collaborative teams.⁵

Collaboration is more common in the natural sciences, and has become the social norm among scientists in these fields. This behavior is in part due to the necessity to join forces to successfully compete for funding for basic science research.⁶ The culture of research at the bench is very different from that of the social sciences. Basic scientists are trained within a team context from the very beginning of their education, moving from research apprenticeships and internships through graduate school and post-doctoral work, working underneath the auspices of the established investigator who serves as the Principal Investigator on the project (PI). It is the PI who sets the goals for the project, and the team works together to achieve these goals. Along the way, student team members are given opportunities to build their own skills, by giving poster presentations and coauthoring papers related to the project. However, skill development among these student investigators is highly dependent upon the time and talents that

the established investigator devotes to mentorship.

Most researchers in dental hygiene are trained in the social sciences, where collaboration is much less frequent and, when available, tends to occur on a much smaller scale within the context of educational training. The mentor/mentee relationship still exists, but is much less structured as compared to what students experience within the basic sciences. Also, collaboration is more likely to occur with other dental hygienists, and the size of the team is also likely to be smaller. Early career dental hygienists, especially graduate dental hygiene students, may be given opportunities to collaborate with other professionals within the university setting or within the health care setting in which they are employed (eg hospital); however, it is more difficult for these novice investigators to find teams that they can readily join who have shared interests. Further, dental hygiene researchers who are early in their careers often lack an available mentor at their work setting who has enough experience to guide them with their scholarly pursuits. There is a tremendous need to foster leadership development in our field with grant writing, study design, project management, and authorship.

Collaboration is critical for growing the knowledge base that supports dental hygiene education and practice. Working together enables researchers to maximize the utilization of limited resources, capitalizes on existing skill sets of experienced investigators, and allows for expansion of both the scope and depth of proposed projects. Collaborative efforts also may allow for enhanced efficiency in addressing prioritized topics identified through published research agendas.^{7,8} Recently, members of the National Center for Dental Hygiene Research and Practice (NCDHRP), the American Dental Hygienists' Association (ADHA) Council on Research, the Canadian Dental Hygienists' Association (CDHA) Research Advisory Committee, and leadership from the ADHA, the CDHA, and the International Federation of Dental Hygienists (IFDH) came together to discuss strategies to advance dental hygiene science and to identify shared priorities.⁹ Discussions continue as to how best to work together on projects to improve the health of the communities that we serve.

Dental hygiene educators and leaders within the profession must partner with the dental hygiene research community to disseminate knowledge gained through research. Knowledge changes very quickly, but translation and adoption of new knowledge are slow. Tremendous progress has been made with the acquisition of new knowledge gained through original research, as evidenced by the expansion of the number of issues of the *Journal of Dental Hygiene*, and the increase in the number of journals devoted to dental hygiene.¹⁰ However, getting dental hygienists to read journal articles is still a major challenge.

Socialization to reading research papers must begin with dental hygiene students, with an emphasis placed on how that knowledge supports their decision-making. More effort is needed on the part of the leadership within the research community to encourage knowledge translation so that the adoption of this knowledge can be measured through changes in education and practice.

The NCDHRP was originally established to create and train interprofessional collaborative research teams. The mission of the NCDHRP is to promote the health of the public by fostering the development, implementation, and dissemination of oral health research; establishing an infrastructure to support dental hygiene research; and strengthening the scientific foundation for the discipline of dental hygiene. Three of the goals of the organization support the concept of collaboration:

1. Create and facilitate opportunities that promote leadership and scholarship;
2. Foster research efforts that address the objectives of oral health research agendas; and
3. Promote the translation of research evidence so that it is meaningful and useful in dental hygiene education and practice.

The NCDHRP regularly hosts conferences to bring members of the global dental hygiene scientific community together to explore commonalities in research interests, learn from each other, and to foster future collaborations.⁹ An underlying goal of these conferences is to build collegial relationships among oral health researchers and representatives from academia, health care organizations, government, and industry. The intent of these conferences is to provide both the networking and intellectual support needed to systematically and purposely advance progress made toward addressing identified research priorities.⁹

The number of dental hygienists who self-identify as researchers continues to grow, which is imperative if we are to firmly establish a strong research infrastructure for the profession. Creating a critical mass of trained researchers is essential to this effort.¹¹ However, simply increasing the number of individuals engaged in dental hygiene research is not enough. Ongoing efforts are needed to further enhance the culture of research by keeping research efforts in front of the members of our dental hygiene professional organizations, by sharing research activities with leaders of dental hygiene organizations, by encouraging dental hygiene theory development, and by engaging key stakeholders in knowledge translation and adoption. Participation on interprofessional collaborative teams will also help to ex-

pand the reach of dental hygiene research projects through promotion of oral health within initiatives aimed toward improving general health.

Successful collaboration in dental hygiene allows investigators to:

- explore unique problems,
- examine problems from different perspectives,
- encourage risk-taking and critical thinking,
- challenge existing paradigm concepts,
- build “think-tank” and forecasting skills,
- capitalize on the expertise of others,
- gain access to critical resources,

- share workloads and job responsibilities,
- successfully compete for funding,
- develop new skill sets,
- work more efficiently and effectively, and
- disseminate knowledge to the broad scientific community.

Henry Ford once said, “Coming together is a beginning; keeping together is progress; working together is success.”¹²

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CRITICAL ISSUES IN DENTAL CARE

Public Opinions Regarding Advanced Dental Hygiene Practitioners in a High-Need State

Sarah E. Walsh, PhD, CHES; Jennifer Chubinski, PhD; Toby Sallee, MA; Eric W. Rademacher, PhD

Abstract

Purpose: The new Advanced Dental Hygiene Practitioner (ADHP) profession is expected to increase access to oral health care for the general population, particularly in rural and underserved areas. In order for this strategy to be successful, the public must feel comfortable with the care provided by ADHPs and seek out their services, yet consumer receptivity has been overlooked in the literature. The current study explores comfort with ADHPs for one high-need state: Kentucky.

Methods: Consumer receptivity to the ADHP was assessed using a large, random sample telephone survey. As a point of comparison, respondents were first asked about their comfort with care provided by two other advanced practice clinicians already licensed in the state: advanced practice registered nurses (APRN) and physician assistants (PA).

Results: After hearing a brief description of the profession, nearly 3 in 4 Kentucky adults said they would be somewhat (35.4%) or very (38.2%) comfortable seeing an ADHP for routine dental care. The total proportion of Kentucky adults who were comfortable seeking care from an ADHP (73.6%) was slightly less than the proportion indicating comfort seeing an APRN (79.7%) or PA (81.3%).

Conclusion: Overall, this study demonstrates that adults are receptive to new models of care delivery and report high levels of comfort with ADHPs. Consumer concerns are unlikely to be a barrier to expanded licensure for dental hygienists in high-need areas like Kentucky.

Keywords: advanced dental hygiene practitioner, public opinion poll, patient acceptance of health care, patient preference

This study supports the NDHRA priority area, **Health Services Research:** Investigate how alternative models of dental hygiene care delivery can reduce health care inequalities.

INTRODUCTION

In 2008, the American Dental Hygienists' Association approved a list of competencies for a new type of oral health professional: the Advanced Dental Hygiene Practitioner (ADHP).¹ The proposed master's degree curriculum for ADHPs would require 37 graduate credits including 16 credit hours of advanced practice clinical courses. Upon completion of this training, ADHPs will be qualified to provide primary oral health care, including certain preventive, diagnostic, therapeutic, and restorative services. ADHPs will establish partnerships with dentists to coordinate services outside their scope of practice and ensure continuity of care for their patients. A small handful of states have embraced the ADHP model and launched training programs,² but widespread implementation is lacking.

In the years since these competencies were approved, research has been conducted on ADHPs and other models of advanced practice oral health pro-

viders. Perhaps most critically, we have seen that advanced practice oral health providers can reduce the rate of untreated dental disease in a population.³ Researchers have also investigated the impact of advanced practice oral health providers on the existing oral health workforce. It has been suggested that these new professional models have the potential to be a "disruptive innovation" in dentistry, fundamentally changing the market for oral health care services,⁴ and may permit dentists to take on an expanded scope of practice.⁵ More pragmatically, studies show the addition of new oral health providers will have a minimal adverse impact on earnings for dentists in private practice.^{6,7} When used effectively, dental teams involving advanced practice clinicians increase revenues by serving more patients more efficiently.⁸ Practicing dental hygienists⁹ and dental hygiene program directors¹⁰ support the ADHP model.

Driscoll and colleagues explored the demand for

Table I: Respondent Receptivity to Routine Care From an ADHP: Percent and (Count)

	Count	Percent Very Comfortable	Percent Somewhat Comfortable	Total Percent Comfortable
All Kentucky Adults	1669	38.2% (638)	35.4% (591)	73.6% (1229)
Sex				
Male	800	37.1% (297)	37.2% (298)	74.3% (595)
Female	869	39.2% (341)	33.8% (294)	73.0% (634)
Race				
African American	115	42.9% (49)	37.6% (43)	80.5% (93)
White	1475	38.3% (565)	35.4% (522)	73.7% (1087)
Age				
18-29 years	366	40.9% (150)	35.7% (131)	76.6% (280)
30-45 years	531	42.7% (227)	37.0% (196)	79.7% (423)
46-64 years	479	37.6% (180)	34.0% (163)	71.6% (343)
65 and older	264	29.2% (77)	36.3% (96)	65.5% (173)
Education				
Less than high school	407	32.0% (130)	34.6% (141)	66.6% (271)
High school graduate	567	41.0% (232)	36.4% (206)	77.4% (439)
Some college	421	39.4% (166)	37.1% (156)	76.5% (322)
College graduate	272	40.0% (109)	31.9% (87)	71.9% (196)
Federal Poverty Level Status				
< 100%	438	33.7% (148)	36.5% (160)	70.2% (307)
100-200%	284	38.4% (109)	38.1% (108)	76.5% (217)
> 200%	629	43.2% (272)	34.0% (214)	77.2% (486)
Insurance Status				
Health Insurance	1277	38.4% (490)	34.4% (439)	72.8% (930)
Uninsured/Don't Know	390	37.3% (145)	39.2% (153)	76.5% (298)
Self-rated Health Status				
Excellent/Very Good	696	39.7% (276)	36.6% (255)	76.3% (531)
Good	456	37.8% (172)	35.3% (161)	73.1% (333)
Fair/Poor	515	36.5% (188)	33.9% (175)	70.4% (363)

Notes: Counts and percentages are weighted: see text for details. For all findings except race and insurance status, the chi-square statistic is significant ($p < 0.05$).

ADHPs. For example, they noted that the United States has significant unmet oral health care needs that could benefit from the addition of ADHPs or other providers.¹¹ Further, they found that there is demand for advanced study among dental hygienists themselves.¹² These facets of demand—unmet health care needs and willing providers—are critical for the ADHP model to be successful in the United States, but this is not a complete picture.

It is hoped that the ADHP will increase access to oral health care for the general population, particularly in rural and underserved areas.¹³ The ADHP model appears to be suited to medical settings,¹⁴ which may expand access beyond traditional oral health settings. Additionally, advanced practice oral

health professionals are likely to expand access for low-income children enrolled in Medicaid or Children's Health Insurance Program (CHIP).¹⁵ In order for this strategy to be successful, the public must feel comfortable with the care provided by ADHPs and seek out their services. Despite the wealth of studies devoted to ADHPs, consumer receptivity has been a critical yet overlooked dimension. As dental hygienists pursue advanced credentialing and advocates work toward changing licensure regulations,¹⁶ it is imperative to assess public opinion about the profession. Because the ADHP profession cannot succeed absent willing patients, the current study is an effort to answer this question for one high-need state: Kentucky.

Table II: Respondent Receptivity to Routine Care From Various Advanced Practice Clinicians: Percent and (Count)

Profession	Percent Very Comfortable	Percent Somewhat Comfortable	Total Percent Comfortable
ADHP	38.2% (638)	35.4% (591)	73.6% (1229)
APRN	50.4% (844)	29.3% (490)	79.7% (1334)
PA	42.4% (711)	38.9% (652)	81.3% (1363)

Note: Counts and percentages are weighted: see text for details.

Kentucky provides a useful model for national opinions about the ADHP profession for several reasons. First, many Kentucky residents across the age spectrum have poor oral health. One third of elementary school students (33.1%) were found to have untreated caries.¹⁷ More than half of Kentucky adults have had at least one permanent tooth extracted.¹⁸ Approximately 1 in 4 adults over age 65 (24.8%) have had all of their natural teeth extracted, and just 4 states have higher rates of edentulous seniors.¹⁸ Second, Kentuckians lack access to oral health care. In 2012, just 60.3% of Kentucky adults had visited the dentist in the past year.¹⁸ More than half lacked dental insurance of any kind,¹⁹ a critical factor in utilization of oral health services.²⁰ The dental workforce in Kentucky is concentrated in urban and affluent areas, leaving many regions of the state with insufficient dentist-to-population ratios.²¹ In these ways, Kentucky typifies the types of oral health needs that the ADHP profession was created to address. Despite these challenges, the capacity to train oral health professionals is one of Kentucky's strengths. Kentucky is home to 2 dental schools and several dental hygiene programs, including 2 four-year university programs. While there are no ADHP training programs at present, the state clearly has the potential to launch them in the future.

For these reasons, this study assessed consumer receptivity to the ADHP in Kentucky, using a large, random sample telephone survey. As a point of comparison, respondents were also asked about their comfort with care provided by two other advanced practice clinicians already licensed in the state: advanced practice register nurses (APRN) and physician assistants (PA).

METHODS AND MATERIALS

The Kentucky Health Issues Poll (KHIP) is an annual, public opinion survey sponsored jointly by the Foundation for a Healthy Kentucky and Interact for Health and administered by the Institute for Policy Research at the University of Cincinnati. The broader purpose of KHIP is to produce timely information on a variety of health and health policy issues affecting Kentucky.²² For the purposes of this study, a series

of questions on advanced practice clinicians was included on the 2012 KHIP.

Face validity for KHIP questions was evaluated by the research team, and the completed instrument was pilot tested with randomly selected adult residents of the Commonwealth by telephone in advance of fielding the KHIP. These pretests are designed to test survey length, administration challenges related to the mode of the interview (cell or landline), administration challenges experienced by interviewers, and challenges experienced by respondents (for example, not understanding question wording or inability to answer questions) during the course of the interview. Depending on pretest outcome, initial KHIP instruments may be altered and retested prior to fielding of the survey. The specific phrasing included in this manuscript reflects the final instrument design. Following review and approval by the University of Cincinnati Institutional Review Board, a random sample of 1,680 adults from throughout Kentucky was interviewed by telephone for the 2012 KHIP. KHIP was administered by trained interviewers using a computer-assisted telephone interviewing (CATI) system. To increase representation among the growing number of Kentuckians living in wireless-only households with no landline telephone,²³ a portion of the interviews were conducted with cell phone users. Specifically, 1,360 landline interviews and 320 cell phone interviews were conducted between September 20 and October 14, 2012. Sample responses were also weighted based on American Community Survey estimates for gender, race, age, educational attainment, and region of Kentucky. As a result, KHIP responses are considered representative of the noninstitutionalized adult population in Kentucky.

Several questions about receptivity toward ADHPs were included in the 2012 KHIP survey instrument. Prior to the questions, the interviewers read a brief description of ADHPs as "a new type of dental hygienist who has a specific license and has completed additional education, typically such that he or she can provide diagnostic, preventive and therapeutic oral health services, such as filling ordinary cavities." Respondents were then asked to rate how comfort-

Table III: Respondent Receptivity to Routine Care From Various Advanced Practice Clinicians by Personal Experience: Percent and (Count)

	Count	Percent Very Comfortable	Percent Somewhat Comfortable	Total Percent Comfortable
APRN				
Care in Past Year	827	62.5% (517)	24.2% (200)	86.7% (717)
No Care in Past Year	830	39.4% (327)	34.9% (290)	74.3% (617)
PA				
Care in Past Year	673	53.2% (358)	34.8% (234)	87.8% (591)
No Care in Past Year	995	35.5% (353)	42.0% (417)	77.5% (771)

Notes: Counts and percentages are weighted: see text for details. For all findings, the chi-square statistic is significant ($p < 0.05$).

able they would be seeing an ADHP for routine dental care (very comfortable, somewhat comfortable, neither comfortable nor uncomfortable, somewhat uncomfortable, very uncomfortable). Before they were asked about ADHPs, respondents were first asked about their comfort with APRNs and PAs. These followed the same format as the questions about ADHPs: the interviewer would read a description of the profession and then ask about comfort seeking routine care. Respondents were also asked if they had received care from an APRN or PA in the past 12 months.

Upon completion of data collection, descriptive and inferential statistics were produced using SAS. The final KHIP data files are also available for review or analysis through the OASIS Data Archive system.²⁴

RESULTS

After hearing a brief description of the profession, nearly 3 in 4 Kentucky adults said they would be somewhat (35.4%) or very (38.2%) comfortable seeing an ADHP for routine dental care (Table 1). One in six said they would be somewhat (7.7%) or very (8.5%) uncomfortable seeing an ADHP. An additional 6.6% said they would be neither comfortable nor uncomfortable seeing an ADHP, and 3.6% did not have an opinion. Although there was some variation in responses among different subsets of participants, the majorities of all demographic groups reported they would be comfortable seeing an ADHP.

The total proportion of Kentucky adults who were comfortable seeking care from an ADHP (73.6%) was less than the proportion indicating comfort seeing an APRN (79.7%) or PA (81.3%) (Table II). For the two established professions, comfort with the advanced practice clinician was higher if the respondent had personal experience with that profession (respondent had received care from this type of professional within the past 12 months) (Table III). For both APRNs [$\chi^2(4, n=1657) = 94.06, p < 0.001$] and PAs [$\chi^2(4, n=1668) = 60.61, p < 0.001$], the rela-

tionship between personal experience and comfort was significant.

DISCUSSION

For all demographic subgroups studied, the majority of Kentucky adults would be somewhat or very comfortable seeing an ADHP for routine dental care. As the availability of ADHPs increases, tailored outreach efforts may be needed to increase comfort with the profession, particularly among those with reduced access to oral health care. Further research is needed to identify best practices for marketing the ADHP profession.

Reported comfort with ADHPs may have been limited by the respondents' understanding of the profession. The study format necessitated that questions be brief, and the description of the ADHP profession that was read did not capture the full scope of practice that has been proposed for ADHPs. The questions about APRNs and PAs were deliberately asked first to allow respondents to draw parallels between ADHPs and these professions (previous research suggests that the majority of U.S. adults are familiar with APRNs and PAs).²⁵ Despite these efforts, respondent understanding is a potential limitation of the study.

A number of prior studies have looked at consumer receptivity to APRNs and PAs. When presented with a hypothetical care-seeking scenario, most people are willing to see an APRN or PA if it would mean a shorter wait time relative to seeing a physician.²⁵⁻²⁸ Respondents with prior experience with APRNs and PAs were more likely to seek care from an APRN or PA in the future when presented with a time-tradeoff scenario.²⁵ Although the current study did not investigate this time tradeoff, the levels of self-rated comfort found align with the existing literature. Further research is needed to determine if potential decreased wait times would motivate care-seeking behaviors in a similar way in oral health settings, but this study shows that underlying consumer

comfort exists even without such incentives.

While Kentuckians reported less comfort with ADHPs than with other advanced practice clinicians, this may be related to a lack of direct experience with ADHPs. It is possible that individuals who have received health care from an APRN or PA in the past would be more comfortable seeking care from that profession in the future. Alternatively, it is possible that individuals who are inherently comfortable with a profession are more likely to seek care from that profession. A point-in-time survey like KHIP cannot determine the directionality of the relationship between comfort and personal experience. Although the predictive validity of self-reported comfort with ADHPs and care-seeking behavior is unknown, the association between comfort and care seeking for other advanced practice professions suggests that once ADHPs are licensed to practice, they will find willing patients in Kentucky. In addition to this ambiguity regarding temporal relationships, this study has several limitations typical of a telephone survey, including the potential for nonresponse bias. Further, the sample was limited to Kentucky adults and may not be generalizable to other regions of the country.

Perceived comfort is just one of many factors that are likely to influence care-seeking behavior for consumers, but expanding the scope of practice for dental hygienists has been met with high levels of patient satisfaction in the past: a Minnesota study found that 98% of patients were satisfied or very satisfied with the care they received at a restorative functions dental hygiene clinic.²⁹ It is reasonable to expect similar levels of satisfaction with the new ADHP profession as well.

CONCLUSION

In order for the ADHP model to be successful, the public must feel comfortable with the care provided by ADHPs and seek out their services. This study addressed the lack of available information on consumer receptivity using a representative sample of adults in Kentucky, a high-need state. Overall, this study demonstrates that adults are receptive to new models of care delivery and report high levels of comfort with ADHPs. Consumer concerns are unlikely to be a barrier to expanded licensure for dental hygienists in high-need areas like Kentucky.

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Perceptions of California Dental Hygienists Regarding Mandatory Continued Competence Requirements as a Condition of License Renewal

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Abstract

Purpose: To determine the perceptions of California dental hygienists (DHs) regarding mandatory continued competence requirements (MCCRs) as a condition for license renewal.

Methods: A quantitative cross-sectional survey was distributed through email by the California Dental Hygienists' Association (CDHA). The CDHA agreed to send a link to the survey and informed consent information to DHs whose email addresses were in the CDHA database. The online survey consisted of 19 items. All survey responses were analyzed using frequency distributions for categorical variables and means for continuous variables. Chi-square tests assessed associations between variables and differences between groups. The Wilcoxon signed rank test assessed relationships between perceptions and support of MCCRs for license renewal.

Results: Almost all (93%) believed that they have remained competent to deliver care since licensure. Over half agreed that continued competence should be verified throughout ones' professional career (53%). Most (81%) agreed that continued competence is important for patient safety and well-being. Less than half (47%) supported MCCRs as a condition of license renewal; however, 51% of those who agreed that competence is important for patient safety and well-being and 67% of those who agreed with verification of competence were in support of MCCRs.

Conclusion: While California DHs agreed that continued competence is important for patient safety and well-being and verification of competence is important, less than half supported MCCRs. Prior to instituting mandate for license renewal in California, continued competence and methods to ensure continued competence throughout ones' career should be defined.

Keywords: continuing education; dental and dental hygiene workforce models; education concepts and theory; evidence based practice; survey research

This study supports the following NDHRA priority areas:

Health Services Research: Evaluate strategies dental hygienists use to effectively influence decision-makers involved in health care legislation and develop valid and reliable measures of quality dental hygiene care.

Professional Education and Development: Validate measures that assess continued clinical competency.

INTRODUCTION

Dental hygienists enter the profession with a commitment to lifelong learning in order to maintain competence in an evolving health care system. This commitment is a key component of the American Dental Hygienists' Association's (ADHA) Standards of Dental Hygiene Practice¹ and the American Dental Education Association's (ADEA) Core Competencies for Entry into the Dental Hygiene Profession.² In addition, the core competencies proposed in the ADHA's Advanced Dental Hygiene Practitioner (ADHP) Model include self-assessment and the commitment to lifelong learning for professional development.

Each state licensing board has the legal authority to ensure that dental hygienists within their jurisdiction maintain these competencies and meet established criteria for dental hygiene education, licensure, and license renewal.³

Moreover, the 1998 PEW Foundation Report recommended that states in the United States require that their "regulated health care practitioners demonstrate their competence in the knowledge, judgment, technical skills and interpersonal skills relevant to their jobs throughout their careers."⁴ Currently,

Table I. Demographic Data

Item	% (n)
ADHA/CDHA Member	76 (620)
Gender	
Male	3 (27)
Female	97 (786)
Race	
White	75 (595)
American Indian/Alaskan Native	1 (6)
African American	1 (6)
Asian	9 (71)
Hispanic	11 (84)
Hawaiian/Pacific Islander	2 (16)
Middle Eastern	2 (14)
Other	3 (20)
Age	
20–29	12 (99)
30–39	22 (178)
40–49	19 (159)
50–59	27 (225)
60–69	16 (133)
70+	3 (26)
First Year Licensed to Practice	
1950–1979	19 (154)
1980–1989	18 (149)
1990–1999	16 (136)
2000–2009	23 (191)
2010–2014	24 (199)
Highest Degree Earned	
AA/AS	43 (357)
BA/BS	44 (363)
MA/MBA/MS	13 (103)
EdD/PhD	0 (3)
Practice Description	
Part-time clinical practice	49 (404)
Full-time clinical practice	40 (328)
Part-time administrative or indirect patient care	3 (23)
Full-time administrative or indirect patient care	1 (8)
Part-time teaching faculty	8 (67)
Full-time teaching faculty	4 (37)
Retired	3 (25)
Other	8 (68)

however, continued competence of dental hygienists, as well as that of other health care professionals throughout the country, is being addressed indirectly and primarily through mandatory continuing education for licensure renewal.⁵ Within the dental hygiene

profession, the ADHA recommends that dental hygienists be actively involved in the development and administration of continuing competence mechanisms as a critical aspect of self-regulation.⁶

Table II. Definition of Continued Competence (n=1,015)

Definition	Response % (n)
The ability to deliver evidence-based, safe and effective treatment throughout ones' professional career.	87 (884)
Meeting continuing education requirements throughout ones' professional career.	11 (108)
Practicing on a regular a basis throughout ones' professional career.	2 (23)

Table III. Statements Regarding Continuing Competence

	Strongly Disagree/ Disagree % (n)	Neither Agree or Disagree % (n)	Agree/Strongly Agree % (n)	Total Responses
Continued competence of a dental hygienist is important to the safety and well-being of patients/clients.	13 (120)	6 (61)	81 (769)	950
Continued competence increases with the number of years in practice.	18 (173)	32 (301)	50 (47)	946
In my opinion, since initial licensure I have remained competent to deliver dental hygiene care.	6 (53)	1 (11)	93 (882)	946
In my opinion, continued competence should be verified throughout ones' professional career.	22 (207)	26 (242)	53 (496)	945
The current continuing education requirement is adequate to assure continued competence to practice dental hygiene for the length of my professional career.	18 (171)	15 (142)	66 (633)	946

Percentages may not add up to 100% due to rounding; measured on a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree"; the 2 categories at the bottom and top of the scale were combined respectively to form two new categories of "Strongly Disagree/Disagree" and "Agree/Strongly Agree."

Because, to date, neither dentistry nor dental hygiene have formally defined continued competence, the authors have adapted nursing's definition as a baseline for the purpose of discussing continued competence in dental hygiene. The term "continued competence" has been defined by nursing as "The application of the knowledge and inter-personal, decision-making and psychomotor skills expected for the nurse's practice role, within the context of public health, welfare and safety" and as "The extent to which professionals can handle the various situations that arise in their area of practice."⁷

In 2014, during the legislative sunset process, the Dental Hygiene Committee of California (DHCC), the California dental hygiene licensing body, recommended mandating continued competence as a condition for license renewal to assure the public that dental hygienists practice safely throughout their professional careers.⁸ The way in which mandatory continued competence would be evaluated for license renewal is currently unclear. Since this evaluation could involve additional requirements beyond current mandatory continuing education, it is criti-

cal to gain feedback about this issue from California dental hygienists (DHs) who will be directly affected by proposed changes.

To address this information gap, the following research questions were asked:

- How do California DHs define continued competence?
- What are the perceptions of California DHs regarding continued competence?
- Do California DHs believe that continued competence is important for patient safety and do they support evaluation as a condition for license renewal?

To answer these questions, the purpose of this study was to determine the perceptions of California DHs regarding mandatory continued competence requirements (MCCRs) as a condition for license renewal, using a web-based survey.

Table IV. Comparison of Continued Competence Being Important in Patient Safety and Well-being and Support of MCCR (n=818)*

Continued competence of a dental hygienist is important to the safety and well-being of patients/clients.			
	Support MCCR % (n)	Would Not Support MCCR % (n)	Total Responses % (n)
Strongly Disagree/Disagree	37 (36)	63 (62)	12 (98)
Neither Disagree or Agree	15 (8)	85 (44)	6 (52)
Agree/Strongly Agree	51 (342)	49 (326)	82 (668)
Totals % (n)	47 (386)	53 (432)	100 (818)

*Chi square test, P-value = <0.001

METHODS

Study Design. This cross-sectional, web-based quantitative study was approved by the University of California San Francisco Human Research Protection Program (Institutional Review Board).

Recruitment, Informed Consent, and Survey Administration. The California Dental Hygienists' Association (CDHA) was contacted to explain the study and to help facilitate recruitment of all California registered DH's with email addresses in the CDHA database. CDHA administrators agreed to forward the link to the survey instrument, which included the informed consent document, to all California members and nonmember DH's with email addresses in their database (N=6,605). Email reminders were sent out 2 times approximately 2 weeks apart.

The Survey. The survey included 19 items: a multiple-choice item to assess how California DHs defined continued competence; four 5-point Likert scale items (ranging from "Strongly Agree" to "Strongly Disagree") to assess beliefs regarding competence as they relate to patient safety, years in practice, perceptions about their own competence, and the need to verify competence throughout ones' professional career; a 5-point Likert scale item (ranging from "Strongly Agree" to "Strongly Disagree") to determine if the current requirement for mandatory continuing education is adequate to assure continued competence; and one item (yes/no response options) to assess awareness of the DHCC's intent to pursue continued competence measures as a condition of licensure.

In addition, the survey included 7 demographic items (first year of dental hygiene licensure; first year of dental hygiene licensure in California; highest degree earned; practice description; age; race/ethnicity, and gender); an item to assess current sources of continuing education measured by percentages equaling 100%; and an item to determine

membership status in ADHA/CDHA.

Prior to finalizing survey items, feedback was requested and received from the DHCC and CDHA leadership regarding the content of the survey items. The survey instrument was revised twice based on this input. Subsequently, a formal pilot study was then conducted with a sample of 11 dental hygienists enrolled in a graduate MS-DH program, 3 dental hygiene members of the DHCC, and 5 CDHA leaders to assess clarity, feasibility, and acceptability of the survey instrument. The survey instrument was then revised and finalized based on the results of the pilot test.

Web-based data collection methodology was chosen because research has shown that participants prefer computer-based surveys to traditional paper-and-pencil surveys, feel more comfortable with issues around confidentiality (eg privacy and anonymity),^{9,10} particularly for sensitive items, and tend to be more honest with their answers when using this methodology.¹¹ In addition, web-based administration of surveys improves data quality by reducing data entry error.^{12,13} Qualtrics (www.qualtrics.com) was used as the web-hosting organization.¹⁴

Data Analysis. All survey responses were analyzed using frequency distributions for categorical variables and means for variables measured on a continuous scale. Frequencies for each item were calculated, including a multiple-choice item with 3 response options for defining continued competence. In analyzing 5-point Likert scale items ranging from "Strongly Disagree" to "Strongly Agree," the bottom 2 categories and the top two categories were combined respectively to form two new categories of "Strongly Disagree/Disagree" and "Agree/Strongly Agree."

Chi-square tests were performed to assess associations between those selecting "The ability to deliver evidence-based, safe and effective treatment

throughout ones' professional career" as their definition of continued competence and their support of mandatory continued competence evaluation as a condition for license renewal.

In addition, chi-square tests were performed to explore differences between CDHA members and nonmembers; differences based on how respondents define continued competence; and differences based on such factors as perceptions about patient safety, their own professional competence, and the need to verify competence throughout ones' professional career; and years in practice. A Wilcoxon signed rank test was utilized to assess relationships between perceptions regarding competence verification and support of MCCR as a condition of license renewal.

Finally, in analyzing the results for awareness of the DHCC's intentions regarding implementation of measures to assure continued competence, a chi-square test was utilized to determine if differences between ADHA/CDHA members and nonmembers were significant.

RESULTS

Of 6,605 research survey notifications sent out, 384 bounced back due to invalid e-mail addresses, for a total of 6,221 valid surveys sent. Of these valid surveys sent, 1,212 were returned for a 19.5% response rate. Most of the respondents were ADHA members, female, White, between the ages of 40-59 years, received their dental hygiene license between the years 2000-2014, had either an associate degree or a bachelor's degree, and worked part-time in clinical practice (Table I).

Defining Continued Competence. Most respondents defined continued competence as "The ability to deliver evidence-based, safe and effective treatment throughout ones' professional career" (Table II).

Perceptions Regarding Continued Competence. As measured on a 5-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree," most agreed that continued competence is important for patient safety and well-being, with half indicating that competence increases with years of practice. Nearly all respondents believed that they have remained competent to provide care since initial licensure. Over half agreed that continued competence should be verified throughout ones' professional career and that the current requirement of 25 hours of continuing education every 2 years for license renewal was adequate to assure continued competence (Table III).

Patient Safety and Support of Mandatory Continued Competence Requirements. An over-

whelming majority of participants agreed that continued competence is important for patient safety and well-being with more than half of those supporting MCCR as a condition of license renewal. Belief that continued competence was important for patient safety was associated with support of MCCR, although differences were primarily due to much greater neutrality among those who did not support MCCR (85% compared to 15%), and more disagreement about continued competence and patient safety (63% among those not supporting MCCR compared to 37% among those who supported MCCR). (Chi-square test, P-value = <0.001) (Table IV).

Slightly less than half of all respondents were in favor of MCCR as a condition of license renewal. There was a significant association of those agreeing/strongly agreeing that competence should be verified throughout ones' career and support of mandatory continuing competence as a condition for license renewal (67%) (Wilcoxon signed rank test P-value = <0.001) (Table V).

ADHA members were significantly more supportive of MCCR than nonmembers (chi-square test, P-value = <0.001/Table VI). There was no difference in support of MCCR based on years in practice (chi-square test, P-value = 0.07/data not shown).

Prior to taking the survey, 26% of the total respondents were aware of the DHCC's intent to pursue mandatory continued competence as a condition for license renewal with a significant difference be-

Table V. Comparison of Verification of Continued Competence Attitudes and Support of MCCR (n=815)

In my opinion, continued competence should be verified throughout ones' professional career.			
	Support MCCR % (n)	Would not support MCCR % (n)	P-value
Strongly Disagree/Disagree	12 (22)	88 (159)	
Neither Disagree or Agree	36 (74)	85 (44)	
Agree/Strongly Agree	67 (289)*	33 (142)	<0.001*
Totals % (n)	47 (385)	53 (430)	

*Wilcoxon signed-rank test, nonparametric test of trend

Table VI. Comparison of Support of MCCRs as a Condition for License Renewal and ADHA Membership (n=804)*

	Member % (n)	Nonmember % (n)	Total Responses % (n)
Support MCCR (includes all support options)	50 (300)	39 (78)	47 (378)
Would not support MCCR	50 (306)	61 (120)	53 (426)
Total Members/ Nonmembers	75 (606)	25 (198)	100 (804)

*Chi square test, P-value = <0.001

tween ADHA members (29%) being aware of this intent compared with nonmembers (14%) (chi-square test, P-value = <0.001/data not shown).

DISCUSSION

To date, there is no formal definition of continued competence within the professions of dentistry and dental hygiene. This study shows that the majority of California DHs (87%) define continued competence as the ability to deliver evidence-based, safe and effective treatment throughout ones' professional career. The need to define continued competence was addressed by the 2014 ADHA House of Delegates when they referred a proposed resolution that defined continued competence to the Council on Education with a request to report back to the 2015 House of Delegates.¹⁵ The 2015 House of Delegates will reconsider this resolution based upon the recommendation from the Council.¹⁶ Within the health care professions a variety of definitions exist and include the concept of ongoing continued competence being essential to delivering safe and effective care.⁴

The DHCC has yet to define continued competence. While the ADHA is moving in this direction, its most recent proposed definition does not include reference to providing competent care throughout ones' professional career or on an ongoing basis. The California Dental Association defines competence in its Code of Ethics, which stipulates that maintenance of competence includes continual self-assessment and commitment to lifelong learning and that competence is a just expectation of the patient.¹⁷ The Minnesota Board of Dentistry also defines continued competence as an ongoing, dynamic process of learning.¹⁸

The lack of research or formal definition of continued competence within dental hygiene as a whole presents a challenge for the profession. When considering mandates for continued competence verification, it is important to gain an understanding of the profession's perceptions regarding competence verification. It is interesting to note that in this study, an overwhelming majority (93%) believed that they have remained competent to deliver care since licensure, and yet only half indicated that they believed competence increases with years in practice (50%). This discrepancy mirrors other reports, including that of the DHCC 2013/14 Sunset Review Report,⁸ that raised the question of competence from initial licensure and that of competence throughout ones' professional career.^{19,20}

Over half of our respondents agreed continued competence should be verified throughout ones' professional career (53%), and that the current requirement of 25 hours of continuing education every 2 years for license renewal was adequate to assure continued competence (66%). In addition to the DHCC, support for verification of continued competence has been echoed by the American Association of Dental Boards²¹ and the American Association of Retired Persons.²² These groups also question the concept of mandatory continuing education as an effective method to assure competence. Additionally, the California Board of Podiatric Medicine has enacted regulations to ensure continued competence that includes a variety of mechanisms to verify continued competence in addition to 50 hours of continuing education every 2 years.²³ Finally, within the profession, the College of Registered Dental Hygienists of Alberta (Canada) have required demonstration of continued competence for the renewal of practice permits, which includes continuing education hours, documentation of practice hours and reporting requirements.²⁴

On the other hand, the American Dental Association includes continuing education as a method for achieving professional competence and the public's protection²⁵ and further states that keeping knowledge and skills current is a primary obligation under their duty to refrain from harming patients.²⁶

Evidence from this study shows that the vast majority (81%) of California DHs believed that continued competence is important to patient safety and well-being and that more than half of those (51%) significantly supported MCCRs as a condition for license renewal. This finding is consistent with reports in the literature that acknowledge the relationship between competence and patient safety and confirm the ongoing debate among practitioners and organized dentistry regarding the need and/or support for MCCRs as a condition of license renewal.^{21,27}

While less than half of all respondents supported mandatory continuing competence requirements as a condition for license renewal, 67% of those who "agreed" or "strongly agreed" that competence should be verified throughout ones' career supported the concept of mandatory requirements as a condition for license renewal. These findings suggest that these respondents would support the efforts of the DHCC and its position regarding patient safety and competence; and that verification/evaluation of continued competence should be a part of license renewal.

Interestingly, findings demonstrated that a higher percentage of ADHA members support MCCRs than nonmembers (50% vs. 39%). A possible explanation for this difference could be a better understanding by ADHA members regarding the necessary steps to gain expansion of the scope of practice and the need to ensure patient safety and well-being.

Finally, study data showed that only a minority of respondents was aware of the DHCC's intent to pursue mandatory continuing competence as a condition of license renewal with a significantly higher percentage of ADHA members being aware over nonmembers. The DHCC stipulates it is the responsibility of the licentiate to keep up to date on changes and the authors propose that members are more likely to keep up-to-date on DHCC actions through their professional organization.

Limitations of this study include a low response rate (19.5%). Additionally, the CDHA database (6,605) does not include all DHs licensed to practice in California (~19,000). These limitations prevent the generalizability of the results to all California DHs. The study results could also be affected by response bias, in that those who participated in the study may have had a greater interest in the topic than those who did not participate. Finally, despite a rigorous pilot testing process, the complexity and potential lack of understanding of continued competence and possible verification requirements might have led to misinterpretation of some of the survey items.

CONCLUSION

Over half of the DHs in this study agreed that continued competence should be verified throughout ones' professional career; however, less than half supported MCCRs as a condition for license renewal. Nevertheless, the majority believed continued competence is important for patient safety and well-being, which suggests support of MCCRs in the future. Findings from this study provide support for the DHCC to formally define continued competence, as well as methods to ensure continued competence of California DHs throughout their careers.

Continued Competence Definition Update. After this research was conducted and submitted for publication, the 2015 American Dental Hygienists' Association House of Delegates formally defined continued competence as "the ongoing application of knowledge, judgment, attitudes, and abilities in a manner consistent with evidence-based standards of the profession."²⁸ This represents the first formal definition of continued competence for dental hygienists in the United States and is consistent with the definition found in this study.

Kristy Menage Bernie, MS, RDH, RYT is an assistant clinical professor; Elizabeth T. Couch, MS, RDH is an assistant clinical professor; and Margaret Walsh, MS, MA, EdD, RDH was a professor in the Department of Preventive and Restorative Dental Sciences at the University of California, San Francisco.

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Dr. Margaret (Peggy) Walsh passed away while this article was in press. Dr. Walsh was a renowned leader, educator, and researcher in the areas of dental hygiene education, oral disease prevention, and tobacco cessation. Her contributions as a scholar, colleague, mentor and friend will continue to inspire the evolution and advancement of our profession and the dental hygiene discipline as a whole.

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Oral Health Care Providers' Knowledge and Attitudes About Intimate Partner Violence

Chris Marie Harris, RDH, MS; Linda Boyd, RDH, RD, EdD; Lori Rainchuso, RDH, DHSc; Andrew T. Rothman, MS, EIT

Abstract

Introduction: Given its high prevalence, intimate partner violence (IPV) is an important public health issue. Oral health care providers (OHCPs) often encounter victims of intimate partner abuse in dental settings, but there is a lack of existing literature regarding OHCPs' attitudes toward and knowledge of IPV.

Purpose: This study assessed OHCPs' knowledge and perception of preparedness in assessment and management for IPV.

Methods: Using a validated survey tool called PREMIS, this study assessed a convenience sample of OHCPs' knowledge and attitudes about the identification, assessment, and management of IPV.

Results: The survey results obtained from 117 OHCPs indicated 92% had had some form of IPV education, but 45% felt they did not have sufficient training to assist individuals who were victims of IPV. Other areas in which the respondents felt ill-prepared included identifying victims of IPV (61.5%) and appropriate referrals to social services (64%). Only 7 to 9% screen new patients or those with abuse indicators on the history or exam.

Conclusion: This study explored OHCPs' attitudes and knowledge of IPV and provided insight into IPV screening practices and management in dental care settings. Because injuries to the head, neck, and face are very common in IPV, OHCPs have the opportunity to play a key role in managing "the silent epidemic" of domestic violence by routinely including screening of new and returning patients and having a referral resources available.

Keywords: continuing education, risk assessment, special needs patients, women's health issues

This study supports the NDHRA priority area, **Clinical Dental Hygiene Care:** Investigate the links between oral and systemic health.

INTRODUCTION

Intimate Partner Violence (IPV) has long been a part of human history, but it was not until the 1960s that there was recognition in the United States of its prevalence, impact, and outcomes.^{1,2} IPV is defined by the World Health Organization (WHO) as physical, sexual, or psychological harm by an intimate partner.³

A WHO systematic review examined data from 79 countries and found the global lifetime prevalence of IPV among women who had ever had an intimate partner was 30%.⁴ In the United States, the Centers for Disease Control and Prevention's (CDC) National Intimate Partner and Sexual Violence Survey (NISVS) found approximately 31% of women experience a lifetime prevalence of physical violence by an intimate partner, and more than 20 people per minute become victims of IPV.⁵ Women are not the only victims of IPV: the lifetime occurrence for men is 27.5%.⁵ Based on the global and national prevalence, IPV is undeniably a serious and pervasive pub-

lic health issue for both men and women.^{4,5}

Health Effects of IPV

The health effects of IPV include sexually transmitted disease, HIV infection, miscarriage, low birthweight and premature babies, mental illness, substance use, nonfatal physical injuries, and fatal injuries (homicide).⁶ In terms of mental illness, depression, generalized anxiety disorders, and post-traumatic stress disorder (PTSD) are significant comorbidities that may affect 50% of women who experience IPV.^{4,7-10} Evidence is more limited about the association of IPV and eating disorders, but it appears 60% of women and 34% of men with eating disorders have a history of experiencing IPV.¹¹

Nonfatal physical injuries associated with IPV include injury to the head, neck, and face.^{12,13} One of the most common IPV injuries is to the head and neck region and ranges from 50 to 77% with most

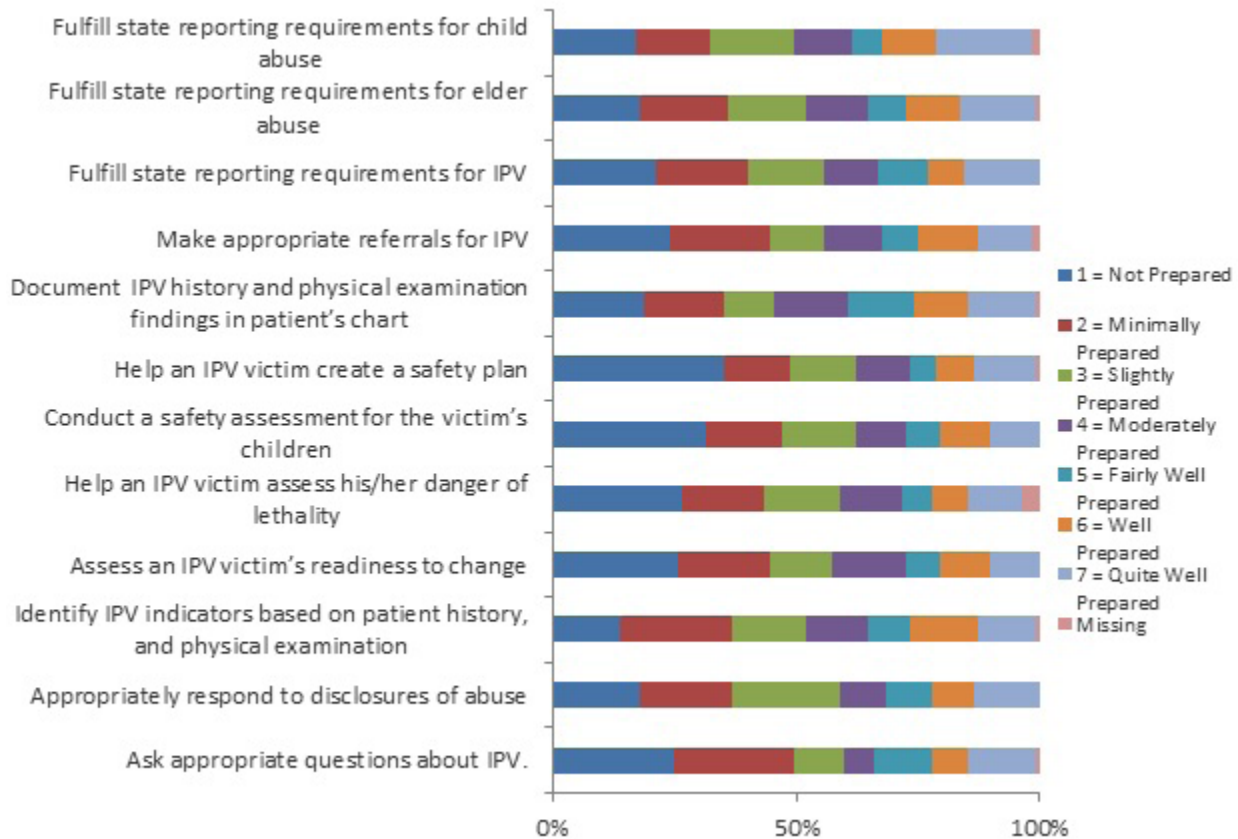
Table I: Demographics of Study Participants & Previous IPV Training

	Previous IPV Training				
	Total Survey Population (n=117)	Attended a lecture or talk (n=68)	Attended skill's based training or workshop (n=17)	Dental/ Nursing/ Other - Classroom training (n=17)	Dental/ Nursing/ Other - School training (n=6)
Gender					
Female, n (%)	93 (79%)	50 (74%)	13 (76%)	16 (94%)	5 (83%)
Male, n (%)	23 (20%)	17 (25%)	4 (24%)	1 (6%)	1 (17%)
Transgender, n (%)	1 (1%)	1 (1%)	0 (0%)	0 (0%)	0 (0%)
Age in years					
18-24, n (%)	5 (4%)	2 (3%)	1 (6%)	1 (6%)	0 (0%)
25-34, n (%)	23 (20%)	15 (22%)	3 (18%)	4 (24%)	2 (33%)
35-44, n (%)	25 (21%)	13 (19%)	4 (24%)	3 (18%)	2 (33%)
45-54, n (%)	33 (28%)	17 (25%)	4 (24%)	6 (35%)	2 (33%)
55-64, n (%)	25 (21%)	18 (26%)	4 (24%)	1 (6%)	0 (0%)
65-74, n (%)	5 (4%)	2 (3%)	1 (6%)	2 (12%)	0 (0%)
≥75, n (%)	1 (1%)	1 (1%)	0 (0%)	0 (0%)	0 (0%)
Education					
Associate degree, n (%)	40 (34%)	22 (32%)	6 (35%)	7 (41%)	2 (33%)
Bachelor degree, n (%)	42 (36%)	23 (34%)	6 (35%)	6 (35%)	4 (67%)
Graduate degree, n (%)	35 (30%)	23 (34%)	5 (29%)	4 (24%)	0 (0%)
Primary Field of Dental Practice					
General, n (%)	81 (69%)	46 (68%)	11 (65%)	10 (59%)	5 (83%)
Public Health, n (%)	16 (14%)	10 (15%)	5 (29%)	3 (18%)	1 (17%)
Pediatric, n (%)	4 (3%)	1 (1%)	0 (0%)	1 (6%)	0 (0%)
Orthodontist, n (%)	3 (3%)	3 (4%)	0 (0%)	0 (0%)	0 (0%)
Periodontist, n (%)	2 (2%)	1 (1%)	0 (0%)	1 (6%)	0 (0%)
Missing, n (%)	11 (9%)	7 (10%)	1 (6%)	2 (12%)	0 (0%)
Employment Status					
Employed - full time, n (%)	86 (74%)	50 (74%)	13 (76%)	11 (65%)	4 (67%)
Employed - part time, n (%)	29 (25%)	17 (25%)	4 (24%)	5 (29%)	2 (33%)
Not employed - looking for work, n (%)	2 (2%)	1 (1%)	0 (0%)	1 (6%)	0 (0%)
Census Region					
Northeast, n (%)	56 (48%)	30 (44%)	6 (35%)	9 (53%)	3 (50%)
South, n (%)	27 (23%)	17 (25%)	6 (35%)	5 (29%)	2 (33%)
Midwest, n (%)	8 (7%)	5 (7%)	0 (0%)	1 (6%)	1 (17%)
West, n (%)	26 (22%)	16 (24%)	5 (29%)	2 (12%)	0 (0%)
Years practicing dental hygiene or dentistry, mean (SD)	19 (11.68)	19.73 (11.83)	18.28 (9.61)	16.53 (12.33)	14.69 (5.89)
Total hours of previous IPV training, mean (SD)	6.66 (12.32)	6.45 (8.39)	11.13 (11.92)	10.07 (15.44)	12.17 (18.69)

injuries being in the upper third of the maxillofacial region.^{12,13} Soft tissue injuries such as abrasions, lacerations, and bruising are seen in approximately 88% of reported cases related to IPV.¹³ Recognition of nonfatal injuries as an aid in identifying IPV victims is essential to prevent homelessness and possible fatal injury (homicide).¹³⁻¹⁵

Research has shown many women leave their homes due to violence, and therefore IPV becomes a contributing factor to the beginning of homelessness among women.¹⁴ Women who experienced IPV in the last year had almost 4 times the odds of housing instability as those who did not experience IPV.¹⁵ However, for women who stay in an abusive relationship,

Figure 1. Perceived Preparation (How prepared are you to perform the following?)



there is a risk of escalation of the violence resulting in fatal injury.¹² Homicide by an intimate partner is a significant issue and impacts women 6 times more often than men, with a global prevalence of 38% for all women who have experienced IPV.^{4,6}

IPV remains a major public health problem that has a significant social impact at the individual, family, and community level, and health care providers are central to screening and identifying individuals experiencing intimate partner violence.^{4,16} The American Medical Association and American Dental Association encourage health care providers to recognize, treat, and respond to IPV.¹⁷⁻¹⁸ Additionally, the American Dental Hygienists' Association (ADHA) Standards for Clinical Dental Hygiene Practice include risk assessment for domestic violence.¹⁹

Health Care Providers Knowledge, Attitudes, and Management of IPV

In many cases, health care providers do not recognize IPV.²⁰⁻²³ Routine assessment for IPV by medical and dental professionals remains low,²⁰⁻²³ yet the health care system is a necessary part of identification and management of IPV victims.¹⁶

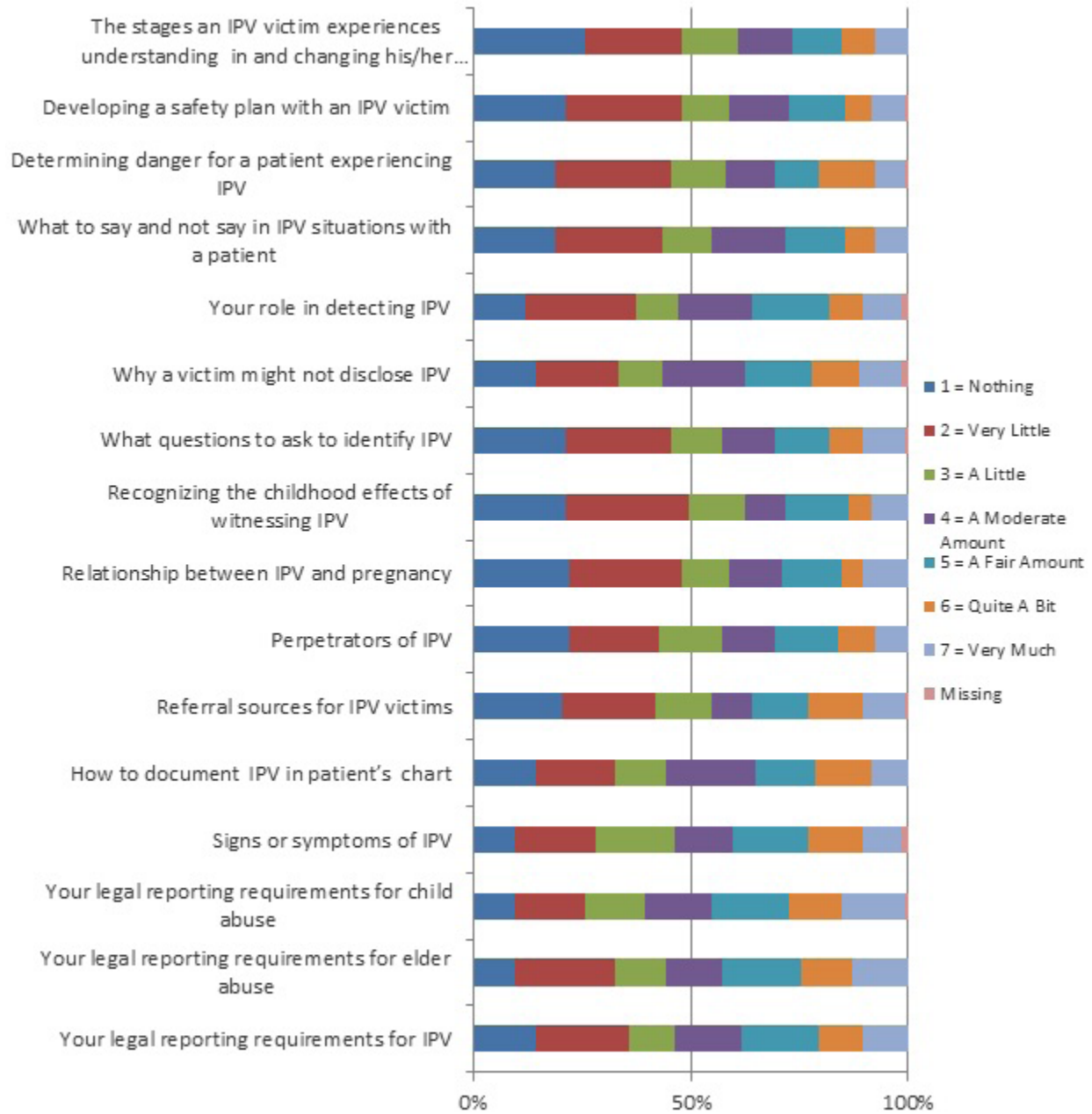
OHCPs have a unique opportunity to identify and refer victims of IPV to support services because of

the high prevalence of injury to the head, neck, and face.^{12,13,24} Despite the important role OHCPs play in helping IPV victims, 50 to 87% never screen for IPV.^{23,25,26} In the presence of head, neck, or facial injuries, 19 to 35% report not screening, and less than 50% refer patients to social services when IPV is suspected.^{23,25} The percentage of providers screening and referring for services is remarkably a low number considering the national and global IPV prevalence rate.^{4,5} However, 69% of IPV victims who saw an OHCP with signs of abuse reported that they would have liked the dental provider to ask about the injuries.²⁷ It is time for dental providers to get past their embarrassment and discomfort about addressing IPV head on.

The barriers OHCPs face in screening IPV victims have been identified as lack of training, concern about offending patient, embarrassment about bringing up the topic, patient accompanied by partner or children, and concern about legal issues.²³⁻²⁶ Encouragingly, however, a recent survey found providers who received domestic violence education were more likely to have screened their patients ($p \leq 0.0001$) and more likely to take action when IPV was suspected ($p = 0.0006$).²³

IPV research with OHCPs has consisted primarily of survey research with convenience sample sizes rang-

Figure 2. Perceived Knowledge (How much do you feel you know about the following?)



ing from 359 to 536 (response rates 68.5 to 90%), and one study using a random sample (n=321) with a 56% response rate.²⁵ Mascarenhas et al. conducted survey research that included dental hygienists.²³ A major limitation to the survey research in OHCPs to date is use of instruments for which internal validity and reliability were not clearly described and no Cronbach α or internal consistency was reported.^{23,25,26}

Dental hygienists, who typically spend the most one-on-one time with a patient, are in an ideal position to address this issue and ensure victims of IPV get the help and support they need. This study seeks to explore dental hygienists' knowledge, attitudes, and readiness to manage IPV utilizing a survey instrument with good internal validity, reliability, and

stable psychometric properties.²⁸ The findings will assist in planning future education related to IPV.

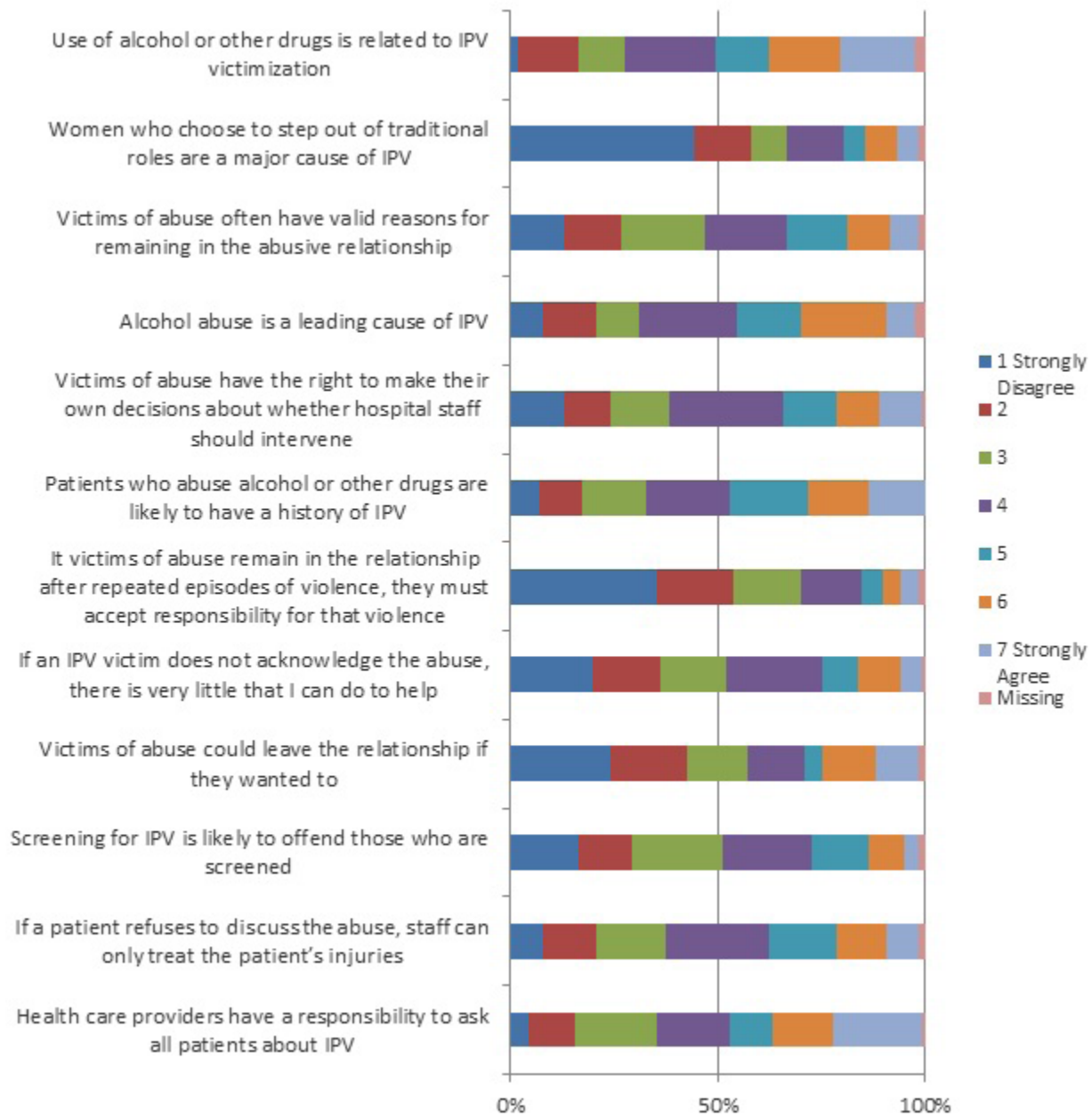
METHODS AND MATERIALS

This cross-sectional, descriptive survey research was conducted using a web-based instrument with a convenience sample of dental hygienists. The study received approval from the university's institutional review board (IRB) (protocol #IRB060914H).

Description of Setting

Participants were recruited at the ADHA annual session in June 2014. The principal investigator used a table in the Exhibit Hall for the purposes of con-

Figure 3. Understanding Victims Experiencing Abuse



ducting this survey. The ADHA conference was selected to recruit a national sample of participants.

Research Participants

Inclusion criteria were currently practicing dental hygienists and dentists. Exclusion criteria consisted of individuals attending the conference who were not dental hygienists or dentists. Participants recruited were provided with a postcard with the URL for the web-based survey. All participants gave implied consent by completing the online survey.

Instrument

Permission was obtained, and the Physician Readiness to Manage Intimate Partner Violence (PREMIS)

tool was modified to meet the purpose of this study. Modifications were limited to the respondent profiles to make them more applicable to dental providers. The survey questions consisted of 37 questions grouped into five major sections: (1) respondent profiles (11 items); (2) background (education or training) in IPV, perceived knowledge, and perceived preparation to manage IPV (4 items with multiple parts); (3) actual knowledge of IPV (8 items); (4) IPV opinions concerning attitudes and beliefs (1 item with multiple parts); and (5) practice issues dealing with behaviors and office practice policies (13 items).

Construct Validity. The original PREMIS instrument was developed in conjunction with expert reviewers.²⁸ Construct validity is based on the ability of a tool to measure what it claims to measure. The

Table II: Clinicians' Actual Knowledge

	% answering correctly (n=117)
Warning signs that a patient may have been abused by his/her partner:	
Chronic unexplained pain	67 (57%)
Anxiety	70 (60%)
Substance abuse	67 (57%)
Frequent injuries	95 (81%)
Depression	79 (68%)
An IPV victim may not be able to leave a violent relationship because:	
Fear of retribution	91 (78%)
Financial dependence on the perpetrator	97 (83%)
Religious beliefs	71 (61%)
Children's needs	85 (73%)
Love for one's partner	79 (68%)
Isolation	71 (61%)
Most appropriate ways to ask about IPV:	
"Are you a victim of intimate partner violence?" (is not appropriate)	23 (20%)
"Has your partner ever hurt or threatened you?" (is appropriate)	74 (63%)
"Have you ever been afraid of your partner?" (is appropriate)	79 (68%)
"Has your partner ever hit or hurt you?" (is appropriate)	53 (45%)
The following are generally true:	
There are common, non-injury presentations of abused patients	61 (52%)
There are behavioral patterns in couples that may indicate IPV	86 (74%)
Specific areas of the body are most often targeted in IPV cases	77 (66%)
There are common injury patterns associated with IPV	72 (62%)
Injuries in different stages of recovery may indicate abuse	74 (63%)

construct validity for PREMIS was based on the ability to measure attitudes, knowledge, and attitudes that contribute to health care providers responding effectively to victims of IPV. A final measure of construct validity for PREMIS was the extent to which knowledge, attitudes, and training predicted self-reported behaviors.²⁸

Reliability. The PREMIS tool demonstrated good internal consistency among the items with a Cronbach's $\alpha > 0.963$.²⁸ The tool has good stability in psychometric properties and a good correlation with the measured office practices of IPV.²⁸ In addition, the correlation among the survey items relate to the OHCPs' opinions about the adequacy of previous training, attitudes and knowledge of IPV.²⁸ The survey instrument also helps determine awareness of IPV.²⁸

Statistical Analysis

All data obtained was entered into Microsoft Excel spreadsheets and imported into STATA 11.2 soft-

ware for statistical/data analysis. Descriptive statistics was used for the respondent profiles and survey questions.

RESULTS

One hundred thirty-three participants met the study inclusion criteria and were given and submitted the survey. To account for large amounts of unanswered questions by participants, responses for participants who left one or more of the 5 major sections in the survey instrument entirely unanswered were excluded from the analysis. Following this exclusion for missing data, a total of 117 participants were included in the analysis. The participants were primarily 25 to 64 years of age, and predominately female (79%) with 20% male and 1% transgender (Table I). The most common specialties in the primary field of dental practice included general dentistry (69%), periodontal practice (2%), public health (14%), pediatric (3%), and orthodontics (3%). The respondents had a mean of 19 years in practice.

Table II (cont.): Clinicians' Actual Knowledge

Stages of Change:	
Begins making plans for leaving the abusive partner is "preparation"	58 (50%)
Denies there's a problem is "pre-contemplation"	86 (74%)
Begins thinking the abuse is not their own fault is "contemplation"	60 (51%)
Continues changing behaviors is "maintenance"	32 (27%)
Obtains order(s) for protection is "action"	70 (60%)
The following statements are false:	
Alcohol consumption is greatest single predictor of the likelihood of domestic violence	48 (41%)
Reasons for concern about domestic violence should not be included in a woman's medical record if he/she does not disclose the violence	71 (61%)
Being supportive of the person's choice to remain in a violent relationship would condone the abuse	49 (42%)
Strangulation injuries are rare in cases of domestic violence	70 (60%)
Allowing partners or friends to be present during the consultation of a person who had experienced domestic violence ensures their safety	69 (59%)
The following statements are true:	
There are good reasons for not leaving an abusive relationship	54 (46%)
Persons who have experienced domestic violence are able to make appropriate choices about how to handle their situation	14 (12%)
Clinicians should not pressure IPV patients to acknowledge that they are living in an abusive relationship	61 (52%)
Persons who have experienced domestic violence are at greater risk of injury when they leave the relationship	55 (47%)
Even if the child is not in immediate danger, clinicians have a duty of care to consider an instance of a child witnessing domestic violence in terms of child protection	85 (73%)

Previous Intimate Partner Violence Training

Of those participants who provided information on their previous IPV training, 58% attended some form of lecture or talk about IPV training, 14.5% attended a skill-based training or workshop, 14.5% attended other classroom training, 5% attended school-clinical setting training, and 8% received no previous training. The mean number of training hours was ≤6.66 hours (Table I).

Perceived Preparation for Managing Intimate Partner Violence

In the questions related to Perceived Preparation, 50 to 63% of participants felt slightly, minimally, or not prepared except in relation to documenting IPV history or physical examination findings in the patient chart (45%) (Figure 1). The items with the highest percentages of participants feeling slightly, minimally, or not prepared were creating a safety plan and conducting a safety assessment (62.4%). Fifty-nine percent felt slightly, minimally, or not prepared to respond to a disclosure of abuse. For the second question related to Perceived Knowledge 44 to 62% reporting knowing a little, very little, or nothing about each of the items with the exception of legal requirements for reporting child abuse (39%) (Figure 2). Approx-

mately 14 to 27% of respondents reported knowing quite a bit or very much about the items. The items participants felt most knowledgeable about were the legal reporting requirements for IPV (20.5%), child (26.5%), and elder abuse (24.7%); how to document IPV in a patient's chart (21.4%); determining danger for a patient experiencing IPV (19.7%); why a victim might not disclose IPV (20.5%); and signs and symptoms of IPV (21.4%).

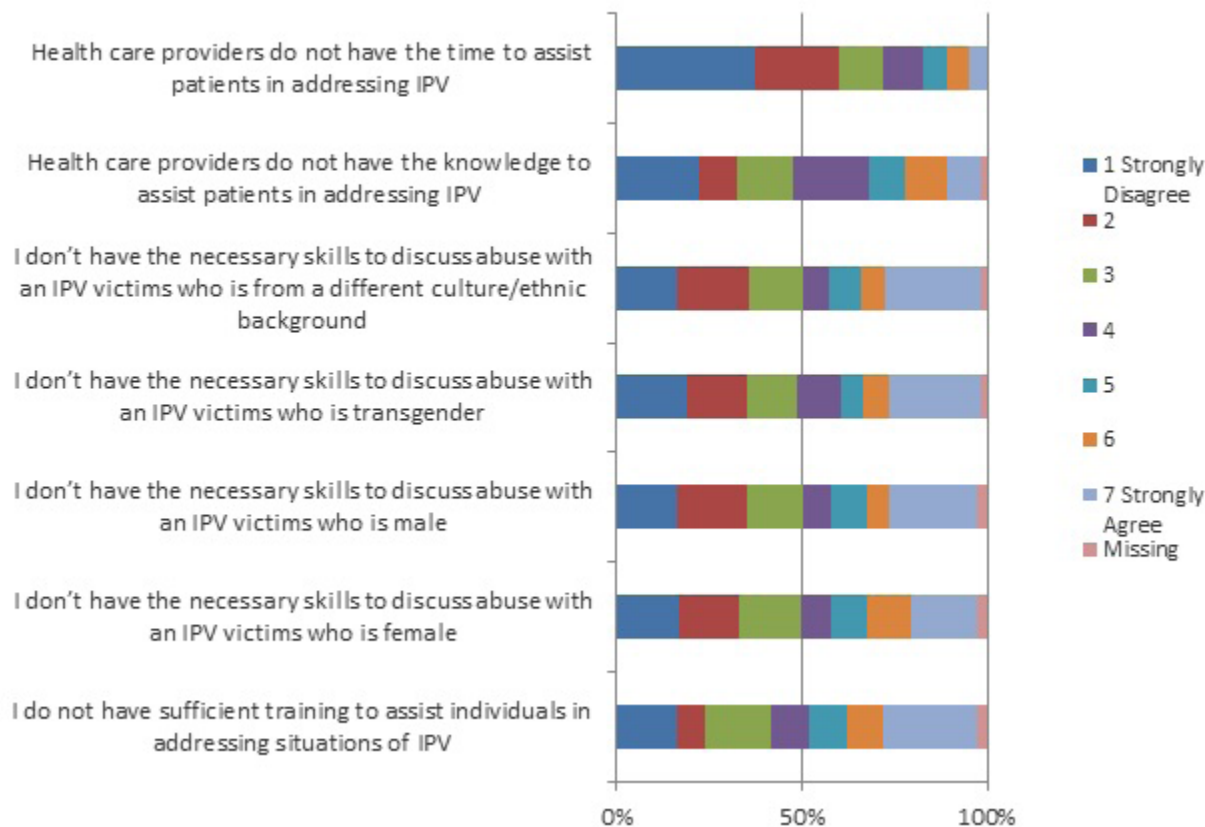
Actual Knowledge of Intimate Partner Violence

The Actual Knowledge was scored based on correct responses. Fifty to 83% of respondents answered correctly for a majority of items (Table II). The items the respondents answered correctly least often included persons who have experienced domestic violence are able to make appropriate choices about how to handle their situation (12%) and the most appropriate way to ask about IPV: are you a victim of intimate partner violence? (20%).

Opinions

The opinion scale represented the OHCP's attitudes and beliefs about IPV.

Figure 4. Self-Preparation



Understanding Victims Experiencing Abuse. Results showed participants had a fairly good understanding of IPV victims with the exception of relationship of drug and alcohol abuse to IPV (30.8 to 32.5%) (Figure 3).

Self-Preparation. Fifty percent or more of respondents somewhat disagreed, disagreed, or strongly disagreed that health care providers didn't have the skills and knowledge to address IPV with all items except the last one (Figure 4). More than 45% somewhat agreed, agreed, or strongly agreed with the statement: I do not have sufficient training to assist individuals in addressing situations of IPV.

Self-Efficacy. Respondents were evenly divided in their response to the items related to self-efficacy (Figure 5). The items that respondents more strongly disagreed, disagreed, or somewhat disagreed with included the following: I am too busy to participate on a multidisciplinary team that manages IPV cases (70.9%); I ask all new patients about abuse in their relationships (76%); I am capable of identifying IPV without asking my patient about it (57.3%); and I can recognize victims of IPV by the way they behave (62.4%).

Workplace Issues. Approximately 50% of respondents strongly disagreed, disagreed, or somewhat disagreed with all but 2 items related to work-

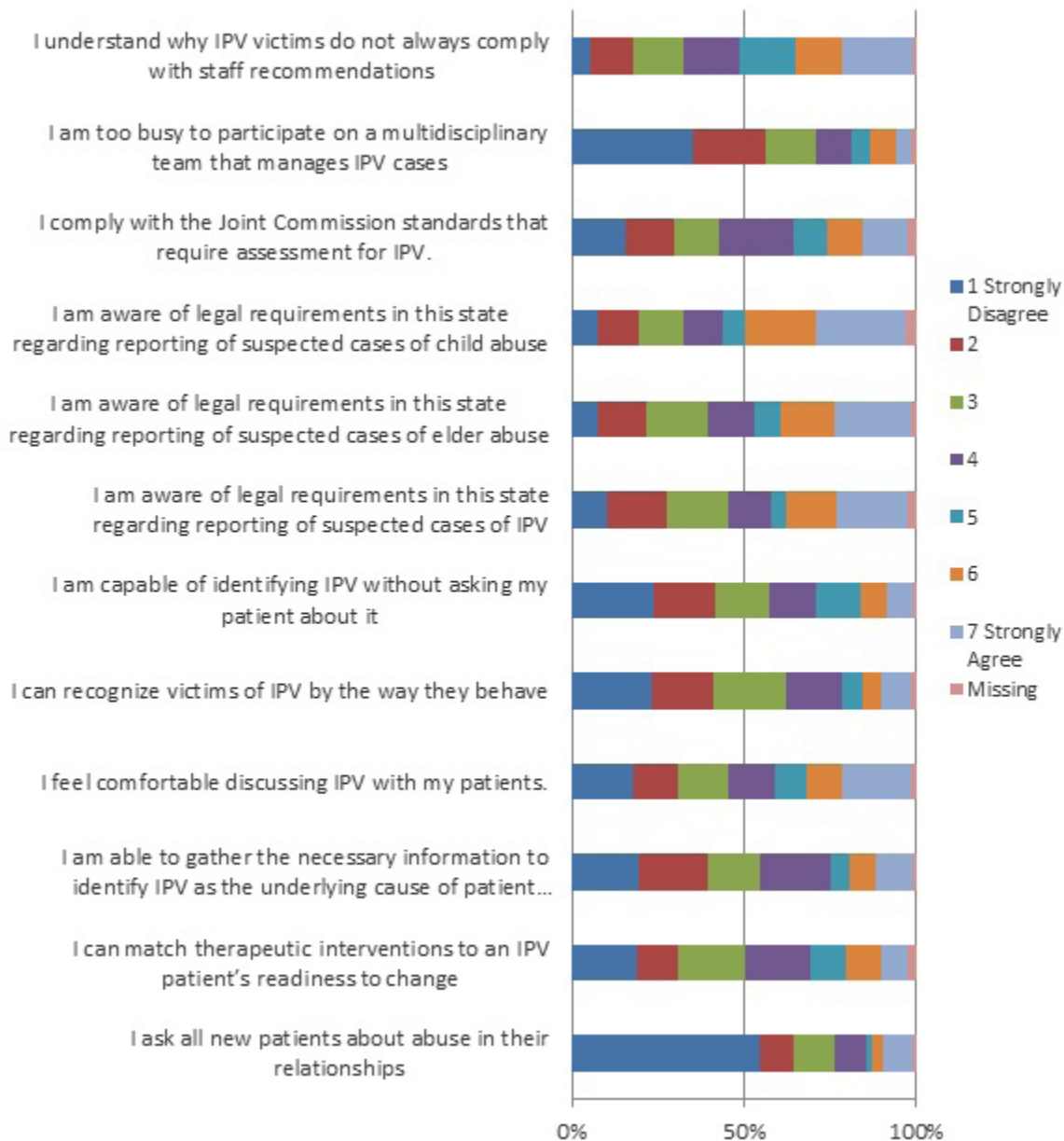
place issues (Figure 6). The responses were evenly divided between agreed and disagreed with the statement: my practice setting allows me adequate time to respond to victim of IPV. Fifty percent disagreed with the item: I can make appropriate referrals to services within the community for IPV victims, and another 64% disagreed with the statement: I have contacted services within the community to establish referrals for IPV victims.

Practice Issues

Clinical Management. A majority of respondents (89%) reported not identifying IPV in the last 6 months, but only 7% screen all new patients, and 9% screen patients when abuse indicators on history or exam are noted (Table III). When IPV had been identified, 14% reported referring the patient to a local domestic violence/IPV hotline, and 21% provided information to the patient.

General Practice Resources. Nineteen percent of practices reported having a protocol for dealing with adult IPV, 46% reported no protocol, and another 18% were unsure or felt it is not applicable to their patient population. See Table IV for the results of resources available for victims of IPV in practice settings.

Figure 5. Self-Efficacy



DISCUSSION

In this study, 92% of participants reported attending some form of IPV education or training as compared to Love et al., who found over 70% of dentists had not received any education related to domestic violence.²⁵ In this study, the average IPV education or training was just over 6.5 hours for participants, which is twice as much as that reported by Ramsey et al. among primary health care providers in the UK.²⁹ Other literature has reported on whether health care providers have had training, but most did not gather information on the number of hours OHCPs had received regarding IPV education or training.^{23,25,26,30}

IPV Knowledge. In this study, 50 to 83% of respondents had correct responses, and the survey identified areas for improvement to help identify individuals who are at risk or victims of IPV. This is lower than seen in studies with other health care providers, which is of concern given that 60 to 77% of IPV injuries are to the head and neck area and OHCPs acknowledge a role in reducing the prevalence of IPV.^{23,25,26,31,32}

Preparation. The areas where OHCPs feel most prepared to manage IPV was documenting it in patient charts and requirements for legal reporting, which is consistent with research found in other health care professions.^{23,25,30}

Table III: Practice Issues: Clinical Management

	(n=117)
How many new IPV diagnoses have you made in the last 6 months	
None	81 (69%)
1-5	21 (18%)
6-10	6 (5%)
11-20	5 (4%)
≥21	1 (1%)
Not in Clinical Practice	3 (3%)
What patient groups are screened for IPV?	
All new patients	8 (7%)
All new female patients	4 (3%)
All patients with abuse indicators on history or exam	11 (9%)
All female patients at the time of their annual exam	0 (0%)
All pregnant patients at specific times of their pregnancy	1 (1%)
All patients periodically	10 (9%)
Certain patient categories:	0 (0%)
Teenagers	0 (0%)
Young adult women (under 30 years old)	0 (0%)
Elderly women (over 65 years old)	2 (2%)
Single or divorced women	1 (1%)
Married women	0 (0%)
Women with alcohol or other substance abuse issues	1 (1%)
Single mothers	1 (1%)
Black or Hispanic Women	1 (1%)
Immigrant women	1 (1%)
Homosexual men	0 (0%)

Opinion, Attitudes, and Beliefs about IPV. Lack of training was reported as a barrier by 45% of respondents in this study, which is lower than seen in other studies. Love et al. reported 61% of dentists would like more IPV training, and similarly Mascarenhas et al. reported 82%, which may be related to the high percentage of respondents in this study who had previous IPV training or education.^{23,25} Workplace issues noted in this study were consistent with other research and included: lack of time, lack of training to screen for or identify IPV, and ability to make appropriate referral to community services for IPV.^{23,25,26,29,30}

Clinical Management. The literature on screening for IPV has shown 50 to 87% never screen for IPV, which is consistent with the findings in this study where 93% do not screen new patients.^{23,25,26,29} In the presence of head, neck, or facial injuries, 19 to 40% report not screening in the literature, while this study found only 9% screened in the presence of abuse indicators.^{23,25,26,30} IPV research has found less than 50% of health care providers and OHCPs refer patients to social services when IPV is suspected,

and this study found 28% refer to IPV hotlines, battered women's shelters, and other local and national domestic violence resources.^{23,25,30} The percentage of providers screening and referring for services is a low number considering the national prevalence of IPV.^{4,5} However, 69% of victims of IPV reported that they would have liked the dental provider to ask about the visible injuries.²⁷

Implications for Research and Practice

This study highlights the areas of inadequate OHCP knowledge and preparation for responding to the needs of women and men experiencing IPV. In particular, enhancing OHCPs knowledge of IPV along with protocols for screening and referral to domestic violence services could make a significant impact on this major public health issue.²³ Preliminary research was done by Hsieh et al. in 2006 using an interactive multimedia tutorial on domestic violence with a focus on Asking, Validating, Documenting, and Referring (AVDR), but little follow up or implementation of this model has occurred in the dental professions.^{26,31}

Table III (cont.): Practice Issues: Clinical Management

Lesbian women	0 (0%)
Depressed/suicidal women	6 (5%)
Pregnancy women	0 (0%)
Mothers of all my pediatric patients	0 (0%)
Mothers of pediatric patients who show signs of witnessing IPV	0 (0%)
Mothers of children with confirmed or suspected child abuse	3 (3%)
Do not currently screen	49 (42%)
N/A	14 (12%)
When IPV has been identified, what actions have you taken over the past 6 months	
Provided information	24 (21%)
Counseled patient about options she/he may have	16 (14%)
Conducted a safety assessment for the patient	14 (12%)
Conducted a safety assessment for the victim's children	13 (11%)
Helped the patient develop a personal safety plan	6 (5%)
Referred the patient to individual therapy	11 (9%)
Referred the patient to alcohol/substance abuse counseling	6 (5%)
Referred the patient to local domestic violence/IPV hotline	16 (14%)
Referred the patient to Child Protective Services	9 (8%)
Referred the patient to national domestic violence / IPV hotlines	6 (5%)
Referred the patient to religious leaders/organizations	3 (3%)
Referred the patient to LGBT	4 (3%)
Referred the patient to battered women's program/shelter group	10 (9%)
Referred the patient to police, sheriff, or other local law enforcement	9 (8%)
Referred the patient to housing, education, job or financial assistance	5 (4%)
Have not identified IPV in past 6 months	88 (75%)

Strengths and Limitations

The strengths of this cross-sectional survey included the use of a validated questionnaire to explore the knowledge, attitudes, and practices of OHCPs in relationship to intimate partner violence with a national sample of OHCPs. However, a limitation of this study is the lack of correlation with actual IPV clinical practices since self-reporting may introduce bias. Another limitation was the use of a convenience sample, which limits generalizability even though the survey did include a national sample of OHCPs. A further limitation of the study was the length of the modified PREMIS tool that specified it would take about 15 minutes to complete; however, respondents reported that it actually took 30 minutes to complete the survey. This may have caused the missing or incomplete answering of items found within the survey.

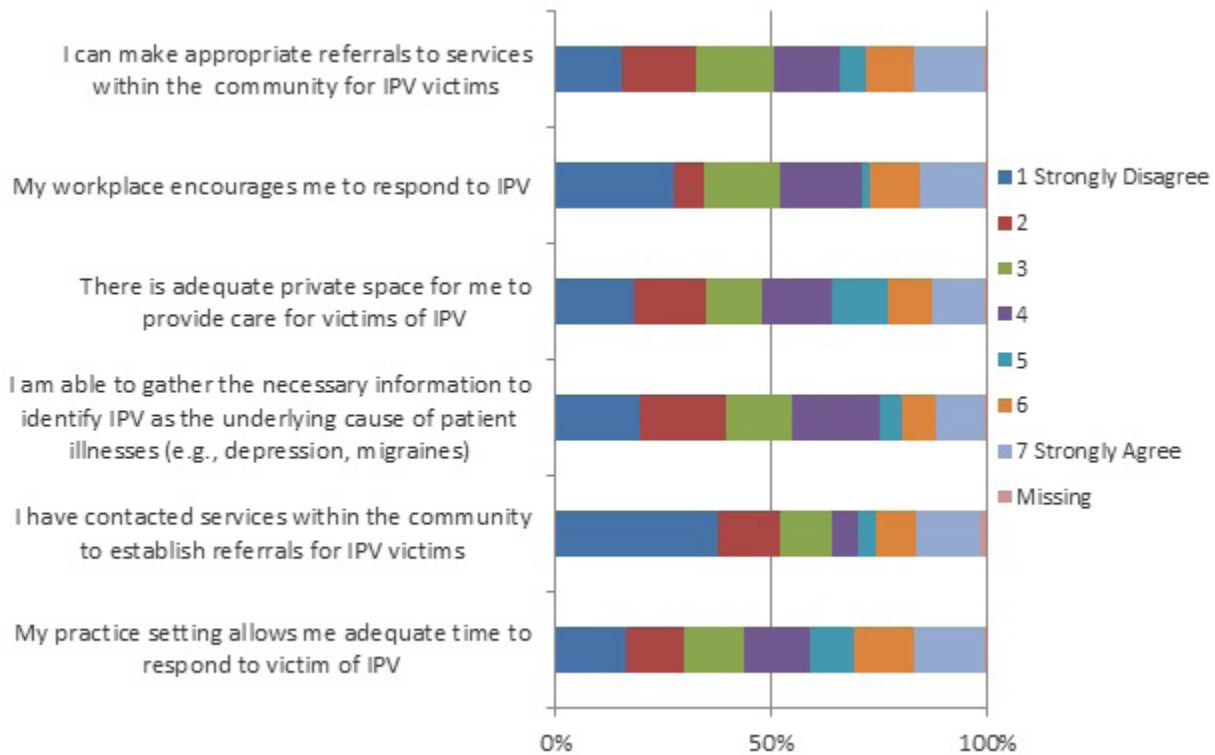
CONCLUSION

This study explored OHCPs' attitudes and knowledge of IPV, and provided insight into IPV screening practices and management in dental care settings. A

much higher percentage of participants in this study reported some education or training in IPV than in previous IPV literature; however, nearly half still felt they were inadequately prepared to assist victims of IPV.^{25,30} Knowledge about identifying victims of IPV needs improvement as well as a defined office screening protocol for IPV. The other major barrier that must be addressed includes resource and referral information to provide to individuals who are identified as victims of IPV. OHCPs who do not let embarrassment or discomfort be a barrier in professionally addressing the issue have the opportunity to play a pivotal role in managing the "silent epidemic" of IPV.

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Figure 6. Workplace Issues



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Table IV: Practice Issues: General Practice Resources

	% answering correctly (n=117)
Is there a protocol for dealing with adult IPV at your Practice/Clinic?	
Yes, and widely used	22 (19%)
Yes, and used to some extent	14 (12%)
Yes, but not used	5 (4%)
No	54 (46%)
Unsure	14 (12%)
Not applicable to my patient population	3 (3%)
Not currently in practice	4 (3%)
Missing	1 (1%)
Is there a camera available at your work site photographing IPV victims' injuries?	
Yes	68 (58%)
No	27 (23%)
Unsure	16 (14%)
Not applicable to my patient population	1 (1%)
Not currently in practice	3 (3%)
Missing	2 (2%)
Do you provide abused patients with IPV patient education or resource materials?	
Yes, almost always	24 (21%)
Yes, when it is safe for the patient	17 (15%)
Yes, but only upon request	19 (16%)
No, due to inadequate referral resources in the community	17 (15%)
No, because, I do not feel these materials are useful	6 (5%)
Not applicable to my patient population	29 (25%)
Missing	5 (4%)
Do you have adequate adult IPV referral resources for patients at your work site?	
Yes	43 (37%)
No	52 (44%)
Unsure	15 (13%)
Not currently in practice	4 (3%)
Not applicable to my patient population	3 (3%)

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Senior Dental Students' Knowledge and Attitudes Toward Dental Hygienists' Contributions to Comprehensive Patient Care

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Abstract

Purpose: To assess senior dental students' knowledge and attitudes toward dental hygienists' contributions to comprehensive patient care and to compare the responses of students from two dental schools, one with a dental hygiene (DH) program, and one without a DH program.

Methods: Senior dental students from one school with DH (n=363) and one without DH (n=111) were requested to complete a 15-item survey assessing knowledge of clinical duties of licensed dental hygienists, attitudes regarding outcomes of collaborating with hygienists, and demographic characteristics. Responses were collated, and frequencies of responses for each item were analyzed by Qualtrics software program. The chi-square test was used to compare responses of the two groups of dental students.

Results: The response rate was 27%. More respondents from the school with DH than those from the school without DH significantly agreed to these statements: "collaborating with DH students in school, has given, or would have given me, a better understanding of the value a dental hygienist brings to my future dental practice" (p=0.02) and "having a DH program at a dental school leads to patients receiving more comprehensive preventive care" (p=0.01). The likelihood of employing a dental hygienist was not significantly different between the two groups of students. The perceived high financial cost was the most frequent reason not to employ a hygienist.

Conclusion: Collaboration of dental and DH students in entry-level education results in dental students' greater understanding and support of the dental hygienists' contributions to comprehensive patient care.

Keywords: clinical management; dental and dental hygiene workforce models; dental hygiene education/curriculum; health promotion; interdisciplinary collaboration; professional development/team building

INTRODUCTION

Most dental hygiene programs are independent of schools of dentistry, suggesting that interprofessional collaboration between dentists and dental hygienists is challenged among graduates.¹ There are 65 accredited dental schools in the United States; 27 have affiliated dental hygiene (DH) programs, and less than ten have dental hygiene programs integrated within the school's clinical program. A 2009 Swedish clinical teaching study reported that health professionals educated together obtain greater knowledge of other professions' skills, communication, and teamwork philosophy.² The practice model, described by Stolberg and colleagues, suggests that a strong, developed working relationship between a dentist and a dental hygienist strengthens productivity, individual work satisfaction, and continuity of care.¹ According to the 2006 American Dental Education Association Commission on Change and Innovation in Dental Education, the vision of the dental

health care team is clouded by the reality that students in separate health professions have minimal interaction with one another.³ Initiating teamwork between DH and dental students during their undergraduate education was reported to increase dental students' knowledge about dental hygienists' competence.⁴ Furthermore, improved patient outcomes were observed when students of medicine, nursing, occupational therapy, and physical therapy were trained together in a clinical setting as an interprofessional team.⁵ Educating dental and DH students together, which occurs more commonly outside of the United States, has resulted in successful working relationships in private practice.⁴⁻⁶

Currently, there is minimal research regarding knowledge and attitudes of U.S. dental students related to dental hygienists' contributions to optimal patient care in dental practice, particularly the influ-

ence of integrated entry-level education. The purpose of this quantitative, cross-sectional study was to assess senior dental students' knowledge and attitudes toward dental hygienists' contributions to optimal comprehensive patient care and to compare the responses of students from two dental schools, one with a DH program and one without a DH program.

MATERIALS AND METHODS

The University of California, San Francisco (UCSF) Institutional Review Board approved this cross-sectional study. The study population consisted of 474 senior dental students from two U.S. dental schools, one with a DH program (363 students) and one without (111 students). At both dental schools there were two-year International Dentist Programs. The second-year international program students participated in the clinical activities with the traditional fourth-year dental students. Thus, responses from both groups of dental students were combined. The schools were from different states, but the legal DH duties were the same, with the exception that nerve block injections were not allowed in the state of the school with a DH program.

The dental and DH students at the school with a DH program had two major sources of professional interaction. First, both groups of students participated in a class, in which they presented thorough courses of treatments for assigned patients with complex and extensive health histories. The students worked in groups of five, one from each of the following classes: DH, D1, D2, D3, and D4, with the DH student being responsible for oral hygiene instruction, nonsurgical periodontal treatment, and maintenance. Secondly, both groups shared the same clinic space, which facilitated collaboration of patient treatment. The dental students would refer their assigned patients to the DH student for DH care. If the DH student saw a patient who needed a procedure performed by a dental student, first, he/she would refer the patient to the dental student for the treatment.

The survey was developed and implemented utilizing Qualtrics⁷ survey software program. The survey instrument consisted of 15 items in the following domains: 1) Knowledge, including the routinely performed duties of a licensed dental hygienist (five multiple-choice questions); 2) Attitudes, including outcomes of collaborating with a dental hygienist and interest in hiring a dental hygienist in one's future dental practice (five Likert-like questions); and 3) Demographic characteristics (five multiple-choice questions). The survey was pilot tested by five dental students, separate from the study sample, to ensure feasibility of the survey instrument and clarity of the items. The pilot survey was evaluated and the final instrument revised accordingly. The survey was administered to senior dental students from the school

without DH during a designated class session. The researcher provided the potential subjects with a TinyURL link via Qualtrics software program, which allowed them to access the web-based survey without collecting personal identifiers. Informed consent was obtained on the first page of the survey, and survey submission was monitored through Qualtrics. At the school with DH, potential subjects were recruited in informal settings throughout the school premises. They were requested to complete a written copy of the survey, which included the informed consent on the first page of the survey. The researcher entered the resulting data into the study database without knowledge of any personal identifiers.

Results were expressed as frequencies of responses for each item on the survey. The chi-square test was used to compare responses of the two groups, and a p-value of ≤ 0.05 was used to indicate statistically significant differences between the two groups.

RESULTS

The survey was completed by 95 senior dental students, which included students from the International Dentist Programs; 44 from a school without DH, and 51 from a school with DH. While the total enrollment of senior dental students of the two schools was 474, all students were not available the day of the survey administration due to externships and rotations outside the school premises. Thus, the number of potential subjects was 354, and the study's response rate was 27%.

For both schools most of the respondents were in the 4-year DDS program and were between the ages of 25-29 (Table I). The primary ethnic differences reported were a greater percentage of Asian respondents in the school without DH, and a higher percentage that selected "other" in the school with DH.

The responses of the two groups of dental students differed significantly on two major study outcomes (Table II). Participants from the school with DH indicated greater agreement with the statement, "collaborating with DH students in school, has given, or would have given me, a better understanding of the value a dental hygienist brings to my future dental practice" ($p=0.02$). Likewise, a significant difference ($p=0.01$) was found to the statement, "having a DH program at a dental school leads to patients receiving more comprehensive preventive care"

The extent of reported collaboration with DH students is indicated in Table III. Respondents were allowed to select multiple responses to the phrase, "Working in collaboration with DH students results in . . ." Ninety percent of the respondents from the school with DH selected the response: "Providing optimal comprehensive patient care," compared with

Table I. Demographic Characteristics of Respondents From Schools With and Without Dental Hygiene (DH) Programs

Characteristic	School Without DH Program n=44	School With DH Program n=51	p-value
	n (%)	n (%)	
Age			0.60
Under 24 yrs old	1 (2)	0 (0)	
25-29 yrs old	35 (80)	38 (75)	
30-34 yrs old	7 (16)	11 (22)	
35 yrs or older	1 (2)	2 (4)	
Gender			0.42
Male	20 (45)	19 (37)	
Female	24 (55)	32 (63)	
Ethnicity			<0.001*
White/Caucasian	16 (37)	14 (27)	
Native American/ Alaska native	1 (2)	0 (0)	
African American	1 (2)	3 (6)	
Asian/Asian American	18 (42)	13 (25)	
Hispanic/Latino American	5 (12)	3 (6)	
Pacific Islander	0 (0)	0 (0)	
Other	2 (5)	18 (35)	
Type of Program			
4-year DDS	37 (84)	43 (84)	
2-year International	7 (16)	8 (16)	

*Significant difference between the respondents from the two schools

72% of those from the school without DH. Alternatively, a greater percentage from the school without DH than the school with DH selected "Developing a relationship of trust and respect between two professions" and "Increasing awareness of each profession's responsibilities in the dental office."

Table IV demonstrates the respondents' knowledge of the routine and nonroutine performed duties of a licensed dental hygienist. Most students in both groups knew that dental hygienists do dental cleanings, fluoride treatment application, and cannot write prescriptions. However, approximately half of

the respondents from the school without DH did not know that the hygienist could perform the following: application of pit and fissure sealants, delivery of nitrous oxide-oxygen sedation, intra/extra-oral examination of soft tissue, and nonsurgical treatment of periodontal disease; whereas more than 78% of respondents from the school with DH were familiar with these DH duties. This difference was statistically significant ($p < 0.001$).

The responses from the two groups did not significantly differ to the statement, "How likely are you to employ a dental hygienist in your future clinical prac-

Table II. Respondents' Levels of Agreement on Outcomes of Collaboration With DH Students

Variable	School Without DH Program n=43	School With DH Program n=51	p-value
	n (%)	n (%)	
Collaborating with DH students in school has given me, or would have given me, a better understanding of the value a dental hygienists brings to my future dental practice			0.02*
Strongly Agree	6 (14)	21 (41)	
Agree	20 (47)	16 (31)	
Neither Agree or Disagree	13 (30)	14 (27)	
Disagree	2 (5)	0 (0)	
Strongly Disagree	2 (5)	0 (0)	
Having a DH program at a dental school leads to patients receiving more comprehensive preventative care			0.01*
Strongly Agree	5 (11)	21 (41)	
Agree	11 (25)	13 (25)	
Neither Agree nor Disagree	18 (41)	17 (33)	
Disagree	8 (18)	0 (0)	
Strongly Disagree	2 (5)	0 (0)	

*Significant difference between the respondents from the two schools

tice" (Table V). Most of the subjects responded "very likely" or "somewhat likely." However, the reasons for not hiring a dental hygienist varied between groups. More respondents in the school without DH than those in the school with DH cited "I can provide the same treatment as a dental hygienists"; and more respondents in the school with DH than those in the school without DH cited "Financial cost associated with employing a dental hygienist is high" (Table V).

DISCUSSION

This study compared senior dental students from a dental school with DH with those from a school without DH in terms of knowledge and attitudes toward dental hygienists' contributions to optimal comprehensive patient care. More respondents from the school with DH than from the school without DH agreed that collaboration with DH students has, or would have, given them a better understanding of

the value a dental hygienist brings to their future dental practice and that having a DH program at a dental school leads to patients receiving more comprehensive preventive care.

Interprofessional Education (IPE), as defined by the Centre for Advancement in Interprofessional Education, takes place when two or more professions learn with, from, and about each other in order to improve collaboration and the quality of practice.⁸ Our findings are consistent with those of others, who reported that IPE enables students from other professions to obtain knowledge, skills, and attitudes from professions outside their own.^{9,10} Leisnart and colleagues demonstrated that dental students had increased understanding and appreciation of DH students merely after sharing patients, planning, and performing treatment together.⁴ Shared learning experiences during their professional education were reported to contribute to an overall more posi-

Table III. Extent of Working With and Outcomes of Collaborating With DH Students

Variable	School Without DH Program n=44	School With DH Program n=51	p-value
	n (%)	n (%)	
Extent of working with DH students in clinic*			0.17
None—no DH program in school	32 (73)	1 (2)	
I refer patients to DH students for cleaning	1 (2)	44 (86)	
DH student refers patients to me for restorative needs		9 (18)	
DH student and I work together to provide a treatment plan for the patient	0	1 (2)	
Collaborating with DH students in clinic results in*			
Providing optimal comprehensive patient care	31 (72)	46 (90)	
Developing a relationship of trust and respect between two professions	32 (74)	30 (59)	
Increasing awareness of each profession's responsibilities in the dental office	36 (84)	29 (57)	
None of the above	3 (7)	5 (9)	
Other	1 (2)	1 (2)	

*Respondents able to select more than one answer

tive outcome for collaboration in their future professional roles together.^{4,11} Curran and colleagues found that students from various health care professions, including medicine, nursing, and pharmacy, agreed that they had improved attitudes toward teamwork and increased knowledge of what different professions can offer when they had constant exposure to one another during their professional education.¹² Our results further support these studies in that more respondents from the school with DH than from the school without DH strongly agreed that being educated with dental hygienists will lead to patients receiving more optimal comprehensive patient care.

Respondents from the school with DH did not overwhelmingly select “developing a relationship of trust and respect between the two professions.” This finding is important because it implies that having two professional programs on the same campus, or in the same building, is not sufficient to develop these attributes. It is likely that to develop trust and respect it would be necessary to foster personal interactions between interested individuals in a supportive environment. Understanding of another’s profession may be foundational to creating trust and respect. To familiarize the students with one another’s skills a more extensive integration would need to have occurred. For example, adding more courses

or seminars for DH and dental students to attend together, enhancing the sharing of patient care, and collaborating on more case presentations would provide more educational integration. This approach has recently been developed and evaluated, as reported in a recent abstract; the authors stated that both dental and DH students felt that the combination of clinical collaboration coupled with communication and teamwork skills training was valuable to their training.¹³ Using the Attitudes to Health Professionals Questionnaire, researchers from Denmark studied the attitudes among students from different health care professions working together (i.e. students from nursing, occupational therapy, physiotherapy, and medicine).⁵ These researchers found that an educational intervention, involving a two-week inter-professional training unit working with real patients, was able to develop more positive attitudes toward the other health care professionals.⁵ The respondents from the school with DH in our study would have lacked this intensive intervention.

The level to which the dental and DH students worked together may not have been substantial, even with a DH program at the institution. Most respondents from the school with DH referred their patients to the DH student for dental cleanings. However, less than a quarter received referrals from DH students

Table IV. Respondents' Knowledge of Routinely and Nonroutinely Performed Duties of Licensed Dental Hygienists

Variable	School Without DH Program n=44	School With DH program n=51	p-value
	n (%)	n (%)	
Routinely performed duties of dental hygienist [#]			<0.001*
Administration of nitrous oxide*	15 (34)	31 (61)	
Application of pit and fissure sealants*	25 (57)	47 (92)	
Intra/Extra-oral examination of soft tissue*	17 (39)	40 (78)	
Nonsurgical treatment of periodontal disease*	21 (48)	45 (88)	
Administration of local anesthetic	28 (64)	32 (63)	
Coronal polishing	32 (73)	46 (90)	
Debridement and scaling & root planing	37 (84)	47 (92)	
Dental cleaning	38 (86)	51 (100)	
Fluoride treatment applications	34 (77)	51 (100)	
Nutritional counseling	33 (75)	31 (61)	
Community oral health education	30 (68)	46 (90)	
Taking impressions	21 (48)	46 (90)	
Nonroutinely performed duties of dental hygienists [#]			
Clinical diagnosis of carious lesions	5 (11)	5 (10)	
Four-handed dentistry	22 (50)	26 (51)	
Prescribing X-rays	9 (20)	16 (31)	
Writing prescriptions	1 (2)	2 (4)	
Vital sign assessment	27 (61)	38 (75)	

*Significant difference between respondents from the two schools

[#]Respondents able to select more than one answer

for their patients with restorative needs, and only one student worked together with a DH student to develop a treatment plan for the patient. While both groups of dental student respondents were in support of collaboration with DH students, this support appears not to have been actualized. Patient care has been shown to improve by incorporating IPE into schools' curricula for students in medicine, dentistry,

and nursing;¹⁴ however, our findings agree that IPE opportunities need to be made available for the collaboration of dental and DH students.

Klefobom and colleagues suggest that working together in entry-level education could be a way to enhance knowledge of respective dental professions' specific competencies.¹⁵ However, in our study only

Table V. Respondents' Likelihood of Employing and Reasons Not to Employ a Dental Hygienist

Statement	School Without DH Program	School With DH Program	p-value
Likelihood to employ a dental hygienist in future dental practice	n (%)	n (%)	
	n=44	n=51	0.19
Very Likely	26 (59)	27 (53)	
Somewhat Likely	8 (18)	10 (20)	
Undecided	5 (11)	13 (25)	
Somewhat Unlikely	1 (2)	0 (0)	
Unlikely	4 (9)	1 (2)	
Reasons not to hire a dental hygienist [#]	n=18	n=24	0.60
I can provide same treatment as a dental hygienist	7 (39)	6 (25)	
Patients prefer dentists to do their cleanings	2 (11)	3 (13)	
Financial cost associated with employing a hygienist is high	14 (78)	23 (96)	
Physical space is limited in the dental practice	3 (17)	2 (8)	
Other	3 (17)	1 (4)	

[#]Respondents able to select more than one answer

approximately half the respondents selected "Increasing awareness of each profession's responsibilities in the dental office" as a result of collaboration with DH students. It has been reported that in order to have a successful collaborative team between dentists and dental hygienists, it is critical that both disciplines be familiar with what each can contribute and are capable of doing.¹⁶ Thus, educating dental students in a school with a DH program would increase their exposure to DH students, and expand their knowledge of the others' scope of practice. Responses to the item identifying the routine and nonroutine performed duties of a dental hygienist indicated that respondents from the school with DH were more familiar with the scope of practice of a licensed dental hygienist. Most, but not all, respondents from the school without DH knew the traditional care provided by dental hygienists, such as dental cleanings, but lacked knowledge that hygienists are allowed to administer nitrous oxide-oxygen sedation, or perform extra/intra-oral examination of soft tissues. These respondents did not fully comprehend

the extensive skills that a dental hygienist has been educated to perform. A greater understanding of the dental hygienists' skills and expertise is gained when dental students collaborate with DH students in the clinics. This concept is supported by a study, recently reported in abstract format; dental students in the lower classes, who presumably had not experienced working with DH students in the clinic, were not fully aware of the dental hygienists' scope of practice.¹⁷

While most respondents agreed that collaborating with DH students leads to patients receiving more comprehensive preventive care, only approximately half, regardless of whether their school had a DH program or not, indicated that they would be very likely to hire a dental hygienist in their future dental practices. The respondents who were less likely to hire a hygienist agreed the primary reason was because of their perceptions of the high financial cost associated with employing a dental hygienist. These results indicate that more education regarding the contributions of dental hygienists to not only com-

prehensive patient care and risk management, but also to the economics of private practice, is required to understand the value a dental hygienist can bring to their practices. In a survey of California dentists as to the reasons why they employ or do not employ a dental hygienist, most dentists cited "personal preferences."¹⁸ These preferences could have been developed during their dental education, especially if they lacked collaboration with DH students, or if they had ever practiced in a country where the role of the dental hygienist was ill defined. More respondents from the school without DH than the one with DH agreed that they would not hire a dental hygienist because they could provide the same treatment as a dental hygienist. In order for clinic patients in a dental school without DH to receive comprehensive care, these dental students must perform the traditional care provided by a dental hygienist based on their knowledge of such care. These students perhaps are being socialized to the concept of dentists performing dental hygiene care in the absence of knowledge of a dental hygienist's specialized skills. A hygienist's expertise in oral health promotion and disease prevention offers significant benefits to comprehensive patient care within a dental practice

The ability to generalize these findings is limited due to the low response rate, which can be attributed to multiple factors. Recruiting dental students to participate in this study proved to be more challenging than anticipated. Many students were on rotations and externships, making it impossible to reach them during a class session. Some students were absent or late to class. It seems that the dental students did not perceive the value of the study and, thus, did not prioritize participation in their busy lives. Access to dental student time to obtain survey responses limited the number of responses. Moreover, it was not possible to collect the data in the same manner from both schools, and the lack of a standard data collection procedure may have contributed to response bias. Another limitation could have been investigator bias. Unintentionally the investigators may have phrased some of the questions in ways that may have led the respondents to answer in a particular biased direction.

CONCLUSION

In this study more respondents from the dental school with a DH program had greater knowledge of the routine and nonroutine performed duties of a licensed dental hygienist, as well as expressed more positive attitudes toward DH students' role in delivering comprehensive preventive care in the dental school clinic. Based on these results, it is concluded that these future dentists would be more familiar with the specific tasks to be delegated so that together, as a team, they could provide optimal comprehensive patient care. These dental students from the dental

school with a DH program seem to have a better understanding of the value a dental hygienist would bring to their future dental practice. More studies are necessary to establish a need for improved collaboration between dental and DH students. By creating more opportunities for dental and DH students to interact during their entry-level education, both professionals can learn of each other's contributions to patient care, which may ultimately lead to improved comprehensive patient care.

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The Importance of Developing Communication Skills: Perceptions of Dental Hygiene Students

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Abstract

Purpose: The purpose of this study was to gather data from first- and second-year dental hygiene students concerning their perceptions of the benefits and possible impediments to effective patient communication. Additionally, the students were asked to theorize as to the impact emerging communication technologies could have on oral health promotion, practice administration and patient/provider communication.

Methods: A self-administered questionnaire of 6 open-ended queries was employed. Thematic analysis was conducted to reveal themes related to their perceived ability to effectively communicate, perceived barriers to communication, possible solutions to lessen or eliminate these barriers, and the impact of emerging technologies on interpersonal communication.

Results: The questionnaire was completed by 63 of 68 students (93%). Patient apathy and patient unwillingness to change detrimental health-related habits were the most frequently cited barriers to effective communication. Of the students having patient contact, many stated that they were less sure of their ability to communicate effectively if the patient differed from themselves, such as being elderly or being from another culture. While most of the students believed their fundamental communication skills were good, many noted that improving their higher-order skills, such as conveying empathy or displaying a nonjudgmental attitude, were essential to being more effective communicators. Many students felt emerging technologies such as universal translators could potentially assist them in overcoming some of their perceived deficiencies.

Conclusion: While perceived inadequacies will likely diminish as the students gain more experience in school and later in private practice, dental hygiene programs may wish to consider implementing additional structured educational experiences to better prepare students to address patient apathy and to effectively convey a sense of personal compassion. Promoting student involvement in community outreach activities and providing a variety of service learning opportunities, including foreign travel, may broaden student experiences and deepen their awareness and appreciation of verbal and nonverbal communications displayed by differing cultures.

Keywords: behavioral research; dental and dental hygiene workforce models; education concepts and theory; health literacy; qualitative analysis

This study supports the NDHRA priority area, **Health Promotion/Disease Prevention:** Assess strategies for effective communication between the dental hygienist and the client.

INTRODUCTION

As health educators, dental hygienists are salient contributors to comprehensive health care, and they are often a source of information concerning the risks and benefits of proposed dental treatments.¹ Because of their focus on communication and education, they can develop trusting relationships, which may increase patients' adherence to recommendations and regimens proposed by the dentist.² Patients' expectations of obtaining quality oral care often lie more with the dental team's ability to communicate effectively and with establishing positive interpersonal relationships than with the provider's technical competence and clinical expertise.³ Two-

way communication that promotes dialogue and mutual respect plays a crucial role in minimizing barriers and strengthening the patient/provider alliance.⁴ Positive communicative interactions can enhance the value patients assign to participation in their own health care and are "key to influencing how well people's lives can go."⁵

However, improving patient outcomes through the facilitation of communication and the development of strong interpersonal relationships is more complicated than ever. Today, patients are likely to be treated by multiple health care providers. They may

be seen only briefly by these providers, and they may receive contradictory health information if coordination of treatment between the providers is lacking. In addition, patients having poor health and electronic-literacy skills may be incapable of accurately processing and conveying information read online, leading to further confusion. Conversely, proactive patients with good literacy skills will expect productive, two-way communication between themselves and the provider.⁶ Practitioners must be willing to spend the time and effort to communicate effectively with their patients regarding the information and the misinformation brought to them by their patients.⁶

Another complication to effective communication is the growing ethnic and cultural diversity of the United States, which makes it increasingly unlikely that patients will be thoroughly conversant in English. In addition, cultures do not share a universal pool of nonverbal cues. Therefore, it is imperative that the practitioner not only understands what is spoken but also the nonverbal context in which information is given, including gestures, facial expressions, maintaining personal space, touching, eye contact and other cultural norms.⁷

While a number of the core competencies in dental hygiene education relate to interpersonal communication, displaying empathy, caring for the individual and promoting health at the personal level, little data are available describing how students in these programs perceive their ability to attain the desired level of competency. The purpose of this study was to incorporate student voices in research to learn of their perceptions of communication and interpersonal relationship needs, as well as to learn of their perception of the barriers and benefits to effective communication and technologies relevant to future practice.

METHODS AND MATERIALS

Sample and Materials

After being approved by the Institutional Review Board (IRB) of Indiana University, an open-ended survey consisting of 6 questions was distributed to 2 large first- and second-year dental hygiene classes at Indiana University School of Dentistry. The data were collected anonymously during the latter part of the fall semester. The questionnaire gathered data from these students concerning their views of the importance of possessing effective communication skills, their perceived ability to communicate effectively based upon their personal experiences and observations, the barriers they had encountered or observed during their own or while observing other students' interactions with patients, and their thoughts concerning the impact that emerging technologies could have on interpersonal communication. The respon-

dents were also asked to provide potential solutions to the barriers they had encountered or observed. Participation in the study was not required of the students.

An inductive thematic analysis using the constant comparative method was conducted on the open-ended questions to uncover themes related to the students' perceptions of the aforementioned communication beliefs. A constant comparative methodology was employed to allow continuous comparison of newly collected data that had been coded. Open coding was initially developed with a pilot sample of responses reviewed and agreed upon by the authors. The data were then categorized using selective coding, which allowed connections to be made between categories.⁸ The constant comparative analysis method is useful for comparing data from multiple open-ended interviews/questions and focus groups.⁸ (See Table I for examples of codes.)

RESULTS

Sixty-three of 68 students completed all sections of the questionnaire for a response rate of 93%. Questionnaires that had incomplete responses or unanswered questions were not included in the tabulation and analysis. Of the 63 students, 29 were first-year students and 34 were second-year students. The majority of the respondents were female (n=58), self-identified as Caucasian (n=62), and were native to the United States (n=58). There were no significant differences in demographic characteristics between the 2 classes.

Eighty-two percent of the students reported having some experience working with patients. All second-year students reported interacting with patients in the school's on-site or off-site clinics. Sixty percent of first-year students reported experience working with patients, either by providing care, observing other students' patient interactions, or through previous work experience, primarily in the role of a dental assistant in private practice.

Question 1: Do you think you use communication effectively? What types of communication do you feel you do well and what types do you feel less comfortable with?

Overall, the majority of students believed themselves to possess adequate basic verbal communication skills, although ratings of being "somewhat effective" or "not confident" were more frequent from first-year students. Both groups of students believed their writing skills and their use of nonverbal communication to be less well developed in comparison to their verbal skills. Both years also felt confident in using visual aids for demonstration, displaying respect and encouragement to their patients, and

communicating with the aid of a translator. Students reported less confidence communicating technical and detailed health information and communicating with patients differing from themselves, including patients from other cultures and those who are much younger or older.

Question 2: “What are the most important communication issues/barriers you have experienced or observed with patients?”

The responses from both years could be divided into patient-related and provider-related responses. For all students, the most common patient-centered impediment to effective communication was believed to be patient apathy or inattentiveness. This included communicating with patients who were perceived to be less than truthful concerning their oral habits and communicating with those who stated they were unwilling to change their oral hygiene behaviors. As a result, students felt the time and efforts to communicate with such patients were “wasted.” Less commonly, poor health literacy, patient physical disabilities (eg hearing disabilities), and language differences were also cited.

On the provider side, two barriers were cited. The first was having insufficient time during the appointment to affect positive patient change, and the second was the inability to eliminate or minimize dental jargon when discussing oral health. Lack of time was cited more often by students who had treated patients in the off-site facility.

Question 3: What communication skills or abilities do you think a dental hygienist must have today?

Second-year students overwhelmingly believed good speaking and writing skills are important to today’s practice. First-year students agreed but were more likely to put such skills in the context of being able to communicate at the individual patient’s level. All students identified the ability to communicate empathy as being of primary importance as well as having active listening skills and being multilingual, including the ability to sign.

Question 4: What areas of communication do you think will be important to you in your future practice?

The ability to communicate without jargon, write clearly and correctly, and keep abreast of new technologies for patient education were the skills most often cited as necessary to future practice. Displaying empathy, conversing in a nonbiased, nonjudgmental manner, and adapting information to account for different levels of health literacy were mentioned with less frequency. First-year students mentioned the

importance of being able to communicate to achieve the trust and respect of patients as well as to project confidence when communicating with patients more often than did second-year students.

Question 5: What trends in communication do you perceive to be “up and coming” in dental hygiene? Why?

The use of digital information and technology such as intraoral cameras and the ability to communicate utilizing mobile technology were considered very important by a majority of students. Mobile technology was seen as being useful for reminding patients of appointments, maintaining oral care regimens between office visits through personalized reminders and as a possible tool for recruiting new patients. The use of universal translators was also seen as important in dealing with a more diverse patient population in the future.

Question 6: What communication skills do you think would be useful to learn or explore in your education?

The skills most often listed as being the ones they wanted to learn mirrored those they believed to be “up and coming”: the ability to communicate via technology and media and the ability to work with universal translators to communicate with patients who speak foreign languages. Some first-year students also reported wanting more experiences to improve their interpersonal communication skills with patients and increased training designed to develop and display a confident persona when relaying technical information. (See Table I for examples of quotes.)

DISCUSSION

The perspectives of the students that responded were similar regardless of the year of training in identifying potential barriers to effective communication, current and future communication needs in hygiene practice, and technologies that could allow more effective interpersonal communication. Similarly, all students indicated that their interpersonal communication skills would benefit once their higher-order communication skills improved, particularly when interacting with the very elderly or the very young, with those with physical impairments, and with those with poor literacy skills. It is commendable that the students placed such high value upon attaining these higher-order skills.

Patients place value on having a supportive and empathetic dentist and a dedicated dental team and respond favorably to suggested changes in personal behavior and attitudes toward maintaining their oral health.^{3,9} The inclusion of patients having inter-

ous medical conditions as part of student education has proved effective in helping students to relate to patients undergoing life-threatening illness.¹⁰ Videos of patients describing their dental experiences have also been shown to be effective in raising students' awareness of the importance of empathy toward patients.¹¹ Earlier and additional exposure of students to a greater number of these experiences could allow them to develop confidence in projecting empathy. In particular, as the population ages, interacting with elderly and infirm patients will be more common, and the ability to show concern for their condition will be of importance.

In the study, most students felt the most difficult people with whom to effectively communicate with were unwilling or complacent patients. This perception was slightly stronger among students who reported being assigned to the off-site facility and may be related to the shorter appointment times and rotational nature of the experience, which often results in an inability to interact with the patient at subsequent visits. This may have also been the cause for perceptions of not being successful in modifying their patients' attitudes concerning their oral health, as previously noted. Patients seen at the school's clinics are often treated by the same student over a long period—sometimes over several years. Therefore, multiple opportunities to communicate and form relationships with these patients exist.

However, there are communication techniques that are potentially amenable to motivating even the most complacent patient. Prospect theory research postulates that the way information is framed, in terms of losses or gains, can affect people's decisions to protect their health.¹² In health communication, a loss-frame refers to phrasing an argument in terms of the consequences that will occur if a behavior/treatment is not undertaken.¹³ A gain frame takes the opposite approach. A recent meta-analysis of the effects of prospect theory on health behaviors, including dental health, demonstrated individuals tend to be more motivated to perform detection behaviors (e.g. screenings) when the communication is phrased in terms of what the patient will lose. Conversely, patients are more inclined to perform preventive behaviors (e.g. brushing and flossing) when the message is phrased in terms of what will be gained.¹⁴

It may be of benefit for students to be given additional education concerning the use of prospect theory in motivating patients to perform desired behaviors. A line of future research may be to conduct seminars in health communication theories and experimentally compare patient adherence outcomes between dental hygiene control groups who have not participated in seminars and experimental groups who have. The results did find that first-year stu-

dents verbalized a greater recognition of the importance of applying oral, written, and nonverbal skills at the patient's level than did second-year students. However, this is stressed repeatedly early in the first year of their education, and the difference seen may be just a reflection of the most recent discussions heard rather than true response differences. A notable difference between first-year and second-year students was that first-year students felt less confident in their overall ability to communicate, including by telephone, and in their ability to convey confidence when interacting with patients. These results are typical of differences between students who have had less clinical experience with patients in other health fields.¹⁵ In a meta-analysis of educational strategies that increase confidence in communication and interpersonal skills, clinical experience had the greatest influence upon developing confidence—more so than peer or faculty mentoring.¹⁶ The perceived lesser confidence expressed by first-year students may indicate the need for earlier clinical experiences communicating with patients or utilizing objective structured clinical examinations (OSCE) with faculty feedback.

Students in this sample were also very aware of the various cultures represented in their work and the need to communicate effectively with a wide range of health beliefs, status, and behaviors, yet, understandably, perceived it to be a more challenging aspect of care. Cross-cultural adaptability is a two-way process, in which both the patient and provider are influenced by factors such as attitudes, beliefs, behaviors, interpersonal relationships, environment, education, and economic conditions.¹⁷ Integrating cross-cultural experiences into a curriculum can help students develop cross-cultural competency. Service learning projects are one means for allowing educational experiences that can foster understanding of the social, cultural, or economic factors impacting underserved populations. Service learning experiences can be implemented domestically or internationally. All dental hygiene students at IU are required to participate in 9 hours of service learning. Most select service learning opportunities in the community, while a few are able to participate in international experiences. While international service learning experiences are posited to be more effective than domestic experiences at fostering cross-cultural understanding,¹⁸⁻²¹ little empirical evidence exists in support. Experimental studies are needed to test perceptions and beliefs of cultural understanding of hygiene students who participate in both methods.

Emerging technologies and media that promote communication were seen to be very important. This perception is in line with the tenor of the Millennial generation, who use informational and communication technology for general dental and educational services more than their older counterparts.²² This

perspective is also in line with the current high-tech nature of dentistry, including the common use of intraoral cameras, digital radiography, and computer tomography (CT) imaging.²³

In conclusion, it should be recognized that the results are based on limited data derived from a convenience sample of students who were primarily Midwestern, white, and native to the United States. Because culture, race, and ethnicity play a large role in shaping health-related values, beliefs and behaviors,²⁴ a more diverse group could display differing opinions of what may be necessary for effective interpersonal communication. Recruitment of more diverse students is an area of consideration.

Despite the limitations provided by the sample, the study provides a novel pilot understanding of student's perceptions of the meaning and importance of interpersonal communication today and in future practice from the voice of dental hygienists themselves. Although the importance of considering student voice in higher education research is well established, it is a poorly developed element in dental education research.²⁵ Teaching and communication are complex two-way processes, and gaps may occur between what the sender believes is being conveyed and what is understood by the receiver. The inclusion of student perceptions may assist dental hygiene faculty to better understand how their students perceive their ability and confidence with interpersonal communication skills in order to inform dental hygiene education aimed at assessing strategies for effective communication between the dental hygienist and patient. It would be of interest to compare the results of this questionnaire with additional data collected from practicing hygienists at varying levels of their career.

CONCLUSION

First-year and second-year dental hygiene students conveyed an understanding of the importance of possessing effective interpersonal communication skills. The most common barrier to effective communication was dealing with complacent patients. Instruction of health communication theories such as prospect theory and framing could be useful for improving patient adherence to behavioral recommendations.

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Table I: Codes and Examples

Question 1: Comfortableness with communication

Overall confidence:

- "I believe I use excellent communication skills"
- "Yes, I feel I have good verbal communication."

Less confidence:

Writing and nonverbal

- "I feel uncomfortable using non-verbal language when we are behind a mask."

Technical information and "others"

- "I don't do as well with in-depth, technical conversations."
- "I feel less comfortable with presenting hard to understand information."

Interpersonal communication with "others"

- "I am much less comfortable speaking with those who speak a different language."
- "I am not sure of how to talk to children sometimes."

More confidence:

Visual aids

- "I'm good at using charts and visual aids to describe treatment."
- "Yes, as a hygiene student, I use lots of visuals such as a dentoform and chairside instruction manual."

Respect

- "I can talk to people, and explain things, while still letting them make a decision."
- "Can show patients that I care"

Translator

- "I feel like I communicate well with a translator."

Question 2: Barriers to communication

Patient-related barriers:

Apathy/inattentiveness

- "We don't usually have long-term interaction with these individuals, therefore, they sometimes just want to get in and out."
- "Patients who use tobacco don't like to listen to the negative effects unless they are willing to quit."
- "It is hard to communicate with patients that simply do not care or do not feel the need to change."

Provider-related barriers:

Lack of time

- "We don't have enough time to spend on a long presentation with them."
- "(Need) More time in dental chair to communicate."

Reducing jargon

- "Hard to speak to them in non-college language."
- "There is a lot of information to distil."

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Question 3: Necessary communication skills today

Good verbal and written skills (first-years in context of health literacy)

"We must be able to explain things to patients of all ages, in terms they can understand." (first-year)

"Have to have good verbal communication."

"We have to be able to speak to the patient in ways they understand. Constantly as if they understand." (first-year)

Empathy/Nonjudgmental

"(Hygienists need) to effectively communicate without sounding judgmental."

"Respect their personal opinions."

Listening

"Today, hygienists must be able to listen, apply answers to the situation and explain treatments and prevention methods."

"Listen and then share knowledge."

"Reflective listening"

Languages and signing

"Communication skills with others from various countries."

"Speaking Spanish"

"Speaking with the deaf"

Question 4: Necessary skills for future practice

Technologies

"Use of visual aids to explain prevention and treatment."

"Digital communication"

"Indirect communication with visual aids, charts, etc."

Empathy/nonjudgmental/health literacy/trust and respect

"We have to be able to gauge their current knowledge and transfer dental term(inology) to "normal terms."

"We need (to be able) to sympathize with the patient."

"Good, empathetic understanding"

"Have the trust of patients" (first-year)

Question 5: Communication trends in hygiene

Technology (digital and mobile)

"I believe texting is upcoming in dental hygiene, as they (patients) can receive reminders via text."

"(Hygienists) need to be able to use tools, x-rays and technology in order to show patients their condition/ finding, etc."

Translators and other languages

"Need to be bilingual; more patients are wanting to receive oral care."

"Need to be able to learn different languages and show and explain concepts to them."

"Work with translators."

Question 6: Communication skills to explore in education

Technology (digital and media)

"Learning to present information via media resources such as videos."

"More training on use of X-rays intraoral cameras, and other devices for visual aids."

"Want to learn how to recruit patients online and retain them."

Translators and Language

"Taking Spanish and sign language."

Confidence (first years)

"Just learning how to be confident in what we are saying."

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Disaster Preparedness and Response: A Survey of U.S. Dental Hygienists

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Abstract

Purpose: The purpose of this study was to assess dental hygienists' interests, current involvement, formal education, views, comfort levels, and intentions for involvement with disaster preparedness and response.

Methods: Dental hygienists (n=400) were asked to respond to a 21-item online survey. Data was analyzed using descriptive statistics, chi-square goodness-of-fit tests, and a paired-samples t-test. Common themes were identified and categorized from open-ended questions.

Results: A response rate of 84% (n=334) was obtained. Most respondents (97%) reported no involvement with disaster preparedness and response; however, a majority (86%) reported interest. Of those who indicated an interest in disaster preparedness and response, 92% had intentions for becoming involved. A majority of dental hygienists (93%) had not received formal education in disaster preparedness and response; yet, 95% shared the view that dental hygienists could have a vital role in this specialty area. Although results indicated a mean difference of 9% increased comfort with activities not requiring physical contact with human remains, dental hygienists were relatively comfortable with activities requiring contact: taking photographs (76%, n=254), taking radiographs (83%, n=273), resecting the mandible (55%, n=184), cleaning skeletonized remains (67%, n=221).

Conclusion: Dental hygienists view themselves as professionals who could have a vital role in disaster preparedness and response. Efforts should be made to increase dental hygiene formal education in disaster preparedness and response with needed curriculum models and competencies for best outcomes when dental hygienists are serving their communities.

Keywords: dental hygiene education, disaster preparedness and response, disaster victim identification, mass fatality incident

This study supports the NDHRA priority area, **Professional Education and Development:** Investigate training and certification of competency in specialty areas (e.g., forensics).

INTRODUCTION

Multidisciplinary efforts from both paid emergency responders and unpaid volunteers are needed to improve the capacity of community responses to mass fatality incidents (MFIs).¹⁻³ Failure to identify and organize disaster response teams leads to errors, slows the victim identification process, increases confusion and frustration, and could compromise the safety of responders.⁴ Due to the demand for better organization of trained responders, the U.S. Department of Homeland Security has recommended all allied health care professionals obtain specialized training to prepare for, manage, and recover from MFIs.⁵ The American Board of Forensic Odontology (ABFO) recognizes dental hygienists as allied health professionals who have the education and licensures applicable to disaster preparedness and response training, particularly in terms of disaster victim identification (DVI).⁶ DVI is a scientific and formal process utilized when a disaster results in a large number of human fatalities, where victim identification needs to be confirmed. This is often accomplished by comparing

accurate antemortem (AM) dental records to a victim's postmortem (PM) dental evidence.⁶

There are multiple examples of MFIs, which have been negatively affected by the challenges of organizing disaster preparedness and response trained personnel. DVI errors made during the 1983 Beirut, Lebanon, terrorist disaster and 1985 Arrow Airlines accident were attributed to unorganized and untrained DVI team members.⁷ These errors were thought to be a result of inappropriate use of forms, charting errors, use of nonsecure areas for AM record management, and poor transcribing skills.⁷ More recently, during the September 11, 2001, New York terrorist attacks, an estimated 350 dental health professionals responded as DVI volunteers. Excluding 78 compensated Disaster Mortuary Operational Response Team (DMORT) personnel, most responders did not have specialty training.⁸ For the purpose of avoiding significant delays in the victim identification process, responders were not turned away de-

spite difficulties collecting documentation showing each volunteer's specific qualifications; therefore, a significant burden was created for incident managers regarding chain of command and accountability.^{1,8-9}

In a 2007 survey by the American Dental Hygienists' Association (ADHA), dental hygienists listed forensic dentistry as a topic of interest;¹⁰ however, existing research does not provide data on recent disaster preparedness and response involvement by dental hygienists during MFIs. Of the minimal information that could be found, dental hygienists' involvement with disaster preparedness and response appears to be limited to few individuals when considering the estimated 150,000 dental hygienists across the United States.¹⁰⁻¹¹

Role of the Disaster Preparedness and Response Trained Dental Hygienist

Dental hygienists have knowledge and skills that are helpful to disaster preparedness and response and DVI efforts.¹² Competencies of licensed dental hygienists that make these professionals assets include knowledge of dental root morphology, the intricacies of the oral cavity, dental nomenclature, communication skills, exposing diagnostic quality dental radiographs, and manual dexterity accessing the oral cavity.¹¹⁻¹⁴ To ensure successful outcomes of assigned roles and responsibilities, all volunteers should seek disaster preparedness and response training prior to becoming involved, regardless of their professional specialty or background.¹⁵

Dental hygienists' roles during disaster preparedness and response can vary. Roles recommended for dental hygienists include managing dental personnel, obtaining and standardizing AM dental records, assisting authorities, transcribing data into databases, assisting surgical procedures, exposing radiographs, aiding multiple verifications during PM exams, monitoring team members for fatigue, assisting with PM dental charting and evidence collection, triaging dental records, assisting the search for matches, and sorting charts.^{11-14,16} Disaster response roles can be emotionally and psychologically challenging due to activities involving exposure to commingled and scattered human remains. Therefore, some responders may prefer a role serving the team by managing records, equipment, or personnel rather than performing duties that require physical contact with victim remains.^{13,17}

Antemortem (AM) Data Management for the Dental Hygienist

The accuracy of AM dental records is a legal responsibility of the dental team, but records are known to occasionally contain errors. During the 2004 Asian tsunami, DVI team members reported

that of the 106 AM dental records received, 54% of accompanying radiographs were of poor quality, several charts contained no AM radiographs, and half of the AM records had to be returned due to insufficient information.² One of the most basic ways clinical dental hygienists can assist DVI efforts is by advocating for and providing accurate and comprehensive AM dental record-keeping techniques.

According to Brannon and Connick, dental hygienists are capable of working with legal authorities for the purpose of obtaining relevant AM dental record information from health care providers.¹¹ It has also been suggested that dental hygienists with psychological first aid training could communicate with the victim's family to obtain items showing visual identification information (photographs) or household items containing the victim's DNA (such as a toothbrush).⁸ Once all AM materials have been collected, administrative control of the AM record and chain-of-evidence can be managed by the dental hygienist to ensure proper security.¹¹ The interpretation and organization of official AM records is considered one of the most time-consuming and difficult tasks facing forensic odontologists due to the variations of each dental professional's own subjective style.¹⁸ Since dental hygienists are familiar with common notations, abbreviations, and dentition numbering systems often used in dental charting, they can provide interpretation verification attempts and transcribe for official odontogram forms.¹¹⁻¹² Efficiency would be gained by the DVI team utilizing trained dental hygienists for all AM-related tasks.¹²

Postmortem (PM) Data Management for the Dental Hygienist

Dental hygienists can have a role during PM dental evidence collection through exposing dental radiographs, taking photographs, surgical assisting, cleaning victim remains of debris, charting examination observations, and cross-checking for quality assurance.¹¹⁻¹⁴ Cross-checking involves one odontologist completing the exam and verbalizing the details documented by a dental hygienist; a second odontologist will then verify the final documentation.¹³ This multiple-verification system helps to avoid errors. Proper storage and labeling of surgically removed remains, as well as the chain of custody for other collected evidence such as hard-copy images and hard-copy odontogram forms can be assigned to dental hygienists after physical examinations are completed.¹³

Once the AM and PM data collection portions of the identification process are complete, comparison work can begin by using victim identification software.¹¹ Trained dental hygienists who choose to work in the capacity of data entry could relieve odontologists of this time-consuming task. Assigning forensically

trained dental hygienists to these duties can increase the efficiency and accuracy of the DVI process.

Disaster Preparedness and Response Formal Education for the Dental Hygienist

All health care disaster responders should have the opportunity for learning about their roles through formal education. According to Hsu et al., disaster preparedness and response competencies need to be identified, and instruction should be tailored to all health care workers.¹⁹ Many health care disciplines, with encouragement from the federal government,⁵ are slowly incorporating disaster preparedness and response curriculum into formal education and continuing education; yet, coursework for DVI and disaster preparedness and response is lacking within the dental hygiene formal curriculum.¹²⁻¹³ Cognitive concepts and skill competencies for dental hygienists responding to MFIs or serving DVI teams are not fully understood or available for reference. Although disaster preparedness and response competencies have not been established for dental hygienists, general cross-discipline competencies have been suggested.¹⁹ These health care worker competencies include recognizing disaster events and implementing appropriate response actions, applying principles of disaster management, demonstrating safety in disaster situations, understanding emergency operation plans, demonstrating effective communication, understanding the chain of command, and having the knowledge and skills needed to fulfill the personal role.¹⁹ Details for each of these competencies as it relates to dental hygienists is unknown, but could assist curriculum developers interested in building disaster preparedness and response educational opportunities for dental hygienists.

Reasons for this deficiency in the dental hygiene curriculum are not fully understood; however, Hermesen et al. examined similar deficiencies in the dental curriculum and cited possible contributing factors such as a lack of qualified instructors, lack of time or interest for course development among faculty, lack of implementation interest among administrators, and a lack of time for inclusion in an already rigorous curriculum.²⁰ Hermesen et al. also offered possible solutions to these challenges: schools could consult a local medical examiner or coroner to locate forensic odontologists willing to offer support in the development and delivery of forensic classes; students could participate as volunteers in community disaster drills; forensic courses could be taught using distance educational technology, and interested faculty members could be trained through American Society of Forensic Odontology (ASFO)-accredited courses and travel to school programs to facilitate hands-on learning activities.²⁰ These solutions may assist dental hygiene curriculum developers who wish to incorporate forensics coursework.

Table I: Disaster Preparedness and Response Organizations

Organization Name	Website
Disaster Mortuary Operational Response Teams (DMORT) ²²	http://www.phe.gov/Preparedness/responders/ndms/teams/Pages/dmort.aspx
Medical Reserve Corps (MRC) ²³	https://www.medicalreservecorps.gov
Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP) ⁹	http://www.phe.gov/esarvhp/pages/default.aspx
Community Emergency Response Teams (CERT) ²⁵	https://www.fema.gov/community-emergency-response-teams
American Red Cross ²⁴	http://www.redcross.org/take-a-class/disaster-training
American Society of Forensic Odontology (ASFO) ^{13,26}	http://asfo.org

Topics of disaster preparedness and response training that dental hygienists may need in addition to their educational background and work experiences include: infection control protocol for DVI, recommended personal protective equipment (PPE), dental radiology techniques, equipment utilization, and working knowledge of identification software such as WinID.^{14,20-21} Organizations devoted to identifying, recruiting, training, and organizing medical health professionals prior to MFIs maintain registrations so that volunteers can be quickly and efficiently activated when needed.

Disaster preparedness and response organizations have become the authority on disaster management, and serve as resources for health care professionals interested in community service during MFIs. A list of organizations offering training and their website can be found in Table I. Dental hygienists can contact these organizations as a route for becoming trained and becoming more involved with disaster preparedness and response.

The scientific literature does not offer sufficient data about dental hygiene professionals regarding disaster preparedness and response. The purpose of this study was to fill a gap in the literature by investigating information on U.S. dental hygienists' interests, current involvement, formal education, views, comfort levels, and intentions for involvement with disaster preparedness and response. The survey investigated four research questions:

1. Does interest in disaster preparedness and response among U.S. dental hygienists reflect

Table II: Demographic Statistics for the Sample (n=334)

Demographics	n	%
Gender		
Female	332	99.4%
Male	2	0.6%
Highest Degree		
Associates	144	43.1%
Bachelors	151	45.2%
Masters	37	11.1%
PhD	2	0.6%
Years of Dental Hygiene Work Experience		
0 to 5	60	18%
6 to 10	50	15%
11 to 15	49	15%
16 to 20	31	9%
21 to 25	41	12%
26 to 30	27	8%
31 to 35+	76	23%
Current Job Capacity		
Clinical Practice	296	89%
Educational Faculty/Staff	38	11%
Community Service/Public Health	29	9%
Research	3	0.9%
Sales/Marketing	2	0.6%
Currently not working in dental hygiene	9	3%
Work collaboratively with other professionals	10	3%
10 Highest Responding States		
Virginia	129	39%
Pennsylvania	19	6%
Massachusetts	18	5%
Michigan	13	4%
New York	11	3%
Florida	10	3%
New Jersey	10	3%
Ohio	10	3%
South Carolina	9	3%
North Carolina	8	2%

their current involvement?

2. Have dental hygienists' been formally educated on disaster preparedness and response roles, and what are their views?
3. What level of perceived comfort do dental hygienists feel regarding DVI tasks?
4. Do dental hygienists have intentions for becoming involved with disaster preparedness and response?

METHODS AND MATERIALS

A 21-item online, electronically delivered survey was utilized for the study. There was no previously existing survey of this kind in the dental hygiene literature; therefore, the survey was researcher-

designed by dental hygiene faculty with MFI disaster preparedness and response training.

Approval from the College of Health Sciences of Old Dominion University (ODU) Institutional Review Board (IRB) was obtained prior to administrating the survey. Ten full-time dental hygiene faculty members from the ODU School of Dental Hygiene pilot-tested the online, electronic survey. Survey questions were clarified based on comments and responses resulting from the pilot test prior to deployment. Two groups of respondents participated in the deployed survey: (1) U.S. dental hygienists who attended the February 2014 ODU Dental Hygiene Winter Weekend Continuing Education Conference in Virginia Beach, Virginia; and (2) U.S. dental hygienists who belonged to randomized dental hygiene groups on the social media website Facebook. Attendees for the Winter Weekend continuing education conference were provided

computers to take the online survey, and those belonging to the randomly selected 4 Facebook groups were provided a website link to open the survey. Prospective participants consisted of a random sample who were willing to respond to the online link posted. A cover letter explained the purpose of the study and informed consent requirements. Survey instructions explained inclusion/exclusion criteria and asked that only U.S. dental hygienists participate.

Statistical analysis was performed using SPSS software. Data were analyzed using descriptive statistics, chi-square goodness-of-fit tests, and a paired-samples t-test; the significance level was set at $\alpha=0.05$. Qualitative responses were identified and grouped into common themes from open-ended questions.

RESULTS

Demographics

The survey was completed by 334 U.S. dental hygienists. Respondents were primarily female (99.4%) clinical practitioners (89%) with a bachelor's degree (45.2%); 31-35+ years of work experience was indicated most frequently (23%). Respondents in the study represented 41 of the 50 United States, with the Commonwealth of Virginia having the highest percentage of participation (39%, $n=129$). Of the respondents, 67% indicated residing in a community susceptible to at least one potential hazard (natural, accidental, or terrorist in nature) that could result in an MFI. Table II summarizes the sample's demographics.

Disaster Preparedness and Response Interest Among Dental Hygienists

When survey respondents were asked to indicate their level of professional interest in disaster preparedness and response, 86% of the dental hygienists indicated interest, while 14% were neutral or not interested (Figure 1). A chi-square goodness-of-fit test was performed, revealing the interest in this specialty area to be statistically significant among the respondents ($p=.000$).

Current Involvement With Disaster Preparedness and Response

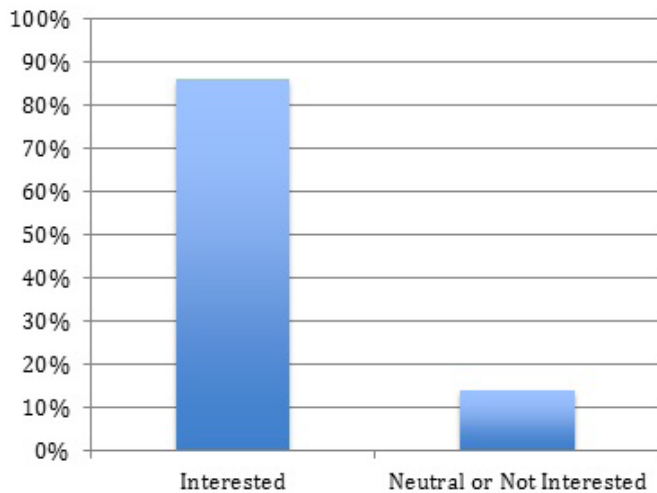
The majority of respondents in the current study indicated not being a member of disaster preparedness and response organizations (95%) and not having ever participated in an MFI (97%). Eight respondents indicated membership with the following disaster preparedness and response teams: American Board of Forensic Odontology (ABFO) ($n=1$), American Red Cross ($n=1$), Disaster Mortuary Operational Response Team (DMORT) ($n=1$), Emergency

Table III: Select Comments by Respondents Explaining Views on the Role of Dental Hygienists for DVI

<p>Education and experience: We are highly educated health professionals. We are properly trained in extensive head and neck anatomy. Because of our knowledge we would be a great choice. We can identify dentition very quickly if we have been practicing for a long time. We know the oral cavity and what to look for in terms of the mouth in identifying patients. Dental hygienists could help identify victims with the use of radiographs and other records and facilitate the identification of victims. Dental hygienists are familiar with infection control protocols, are experienced working in team settings, possess medical knowledge, are proficient in record keeping. Being able to read radiographs and chart dental restorations and relay the information to the medical examiner. We are more than capable of identifying people based on comparing dental records. I believe that we are just as qualified as dentists to identify victims. We are able to quickly identify dental charting and materials. I believe our education is advanced enough that our knowledge and experience could benefit MFIs. We would definitely be a benefit with identification of teeth and other oral landmarks. Because it's within our scope of practice. We are very familiar with the head and neck. I believe that our curriculum could qualify us. We have training to read X-rays and match that to what is seen in the mouth.</p> <p>Need more information on the topic: Don't know enough about it. We have the skillset just need to be taught appropriate ways to apply. I don't feel I have enough knowledge about the subject to have a strong opinion at this time.</p> <p>Miscellaneous: I went to a continuing education class given by a hygienist who has been working at Ground Zero since 2011, seems like she plays an important role.</p>
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System for Advance Registration of Volunteer Health Professionals (ESAR-VHP) ($n=1$), Medical Reserve Corps (MRC) ($n=3$), and Community Emergency Response Team (CERT) ($n=1$). Regarding types of MFI scenarios the dental hygienists would consider being involved in as a responder if called in the future, 93% indicated willingness to serve for a small-scale disaster, 68% chose large-scale disasters, 58% said they would be willing to travel to any U.S. state, and 34% said they would consider international travel.

Figure 1. Disaster Preparedness and Response Interest Among Dental Hygienists



Concerns among the dental hygienists related to responding to an MFI included: too gruesome (34%), too depressing/sad (40%), difficulty with post-event emotions (38%), risk of exposure to radiation during a nuclear incident (36%), safety regarding increased risk of exposure to infectious diseases in a mortuary setting (31%), cost of training (34%), and inability to leave family in order to serve (31%). Only 42 respondents (13%) indicated that they had no concerns about responding to an MFI.

Formal Education and Views Among Dental Hygienists for Disaster Preparedness and Response

Analysis of survey data found that respondents typically did not receive formal education about disaster preparedness and response roles for dental hygienists (Figure 2). A chi-square goodness-of-fit test with expected equal proportions indicated a statistically significant difference in the number of people who affirmed (7%) and the number of people who denied (93%) receipt of such formal instruction ($p=.000$). Additionally, over half of the respondents agreed that there were not enough continuing education opportunities available for this specialty area. When respondents were asked if the disaster preparedness and response role of dental hygienists should be covered in the formal dental hygiene curriculum, 86% agreed.

Comments were offered by 117 of the respondents to explain their view on whether or not hygienists could have a vital role in disaster preparedness and response. Most of these responses made reference to the traditional formal education and experience common to all dental hygienists prior to obtainment of any specialized training. Twenty comments were selected and organized into themes: education and

experience, need more information on the topic, or miscellaneous (see Table III for select comments).

Perceived Comfort Regarding DVI Activities

Respondents were asked to rate their perceived comfort for 9 activities related to DVI work; 4 of those activities involved contact with human remains while 5 activities did not involve direct contact with human remains (Table IV). A paired-samples t-test revealed a statistically significant mean difference between the perceived comfort felt when respondents were asked about contact activities compared to no contact activities. Respondents indicated more comfort with no contact activities ($M=84%$, $SD 15%$) when compared to contact activities ($M=74%$, $SD 18%$), a statistically significant mean difference of 9%, (95% CI [.08, .11], $t(324)=13.2$, $p<.05$). Out of the 5 no-contact activities, respondents were most comfortable with digitizing information collected from dental records into identification software (89%) and working collaboratively with members of other professions (97%). Out of the 4 contact activities, respondents were most comfortable with taking photographs of victim remains (76%) and exposing dental radiographs on victim remains (83%).

Intentions for Involvement With Disaster Preparedness and Response

Respondents were given a list of scenarios for becoming involved with disaster preparedness, and response and were asked to indicate their intentions for each (Table V). Two scenarios with the most agreement were: "I will serve by maintaining accurate antemortem dental records" ($n=210$, 64%) and "I will seek more information and decide once I am better informed" ($n=220$, 67%). Agreement for a negatively worded scenario and considered as a negative response for becoming involved was: "I will stay informed about dental hygiene's involvement, but I will not pursue this type of work." ($n=147$, 47%).

DISCUSSION

A search of the literature gave minimal information about the dental hygiene profession as it relates to disaster preparedness and response; therefore, the intent of this study was to serve as a basis for building the dental hygiene literature on the topic. The broad findings of this study provide information about dental hygienists' interest and formal education in disaster preparedness and response, perceived level of comfort regarding DVI tasks, and intentions of dental hygienists to become involved with disaster preparedness and response. Considering recommendations from the federal government and ABFO for dental hygienists to become involved, along with interest among dental hygienists revealed by the current study, justification exists for making

Table IV: Respondents' Reported Perceived Comfort With 9 DVI Activities*

	% (n)	% (n)
Contact Activities:	Comfortable	Not Comfortable
Taking photographs of victim remains	76% (254)	22% (79)
Exposing dental radiographs on victim remains	83% (273)	17% (56)
Assisting with resecting a mandible after the onset of rigor mortis	55% (184)	45% (150)
Using a cleaning solution to remove debris from skeletonized remains	67% (221)	33% (110)
No Contact Activities:	Comfortable	Not Comfortable
PPE suit ups in mortuary setting	84% (280)	16% (52)
Helping with infection control in mortuary setting	88% (295)	11% (38)
Recording postmortem findings made by an odontologist on official forms	89% (297)	10% (33)
Digitizing information collected from dental records into identification software	89% (298)	10% (35)
Working collaboratively with members of other professions (health care and law enforcement)	97% (320)	3% (10)

*Exclusions made for statistical analysis are not reflected here.

disaster preparedness and response educational opportunities more accessible for these professionals. Results of this study could aid dental hygiene professionals and program administrators in realizing the need for establishment of more opportunities for disaster preparedness and response education to initiate involvement.

The response for this study included dental hygienists from much of the United States with a wide range of educational backgrounds and years of work experience, as well as a range of dental hygiene professional capacities. Results suggest that interest in disaster preparedness and response among dental hygienists is overwhelmingly positive, yet the majority of respondents indicated not being a member of disaster preparedness and response organizations and not having ever participated in an MFI. Therefore, it is proposed that reported low participation is not due to a lack of interest. A possible explanation for low participation could be a lack of dental hygiene educational opportunities. Dental hygienists who are not educated about this topic may be unaware of this service opportunity or unsure of possible routes for being involved. As indicated by respondents, over half felt that there are not enough continuing education opportunities, and almost all said this specialty topic was not a part of their formal education. When respondents were asked if the disaster preparedness and response role of dental hygienists should be covered in the formal dental hygiene curriculum, 86% agreed. The findings of this study that a lack of educational opportunities for this topic exists in dental hygiene are supported by the paucity of information available on how dental hygienists are prepared in this specialty, as well as suggestions from Nuzzolese et al. and Ferguson et al. about the lack of disaster preparedness and response in dental hygiene curriculum.¹²⁻¹³

According to survey results, the respondents were mostly comfortable with DVI activities regardless of whether or not the activity required physical contact with human remains. The literature suggests that disaster preparedness and response participants should be screened for their levels of comfort, and task assignments should take reported comfort levels into consideration.³ Therefore, this finding is important when considering the need to identify participants who are able and willing to perform ac-

Table V: Respondents' Intentions for Involvement With Disaster Preparedness and Response

	Agree	Disagree
	% (n)	% (n)
I will seek courses to become trained and certified for disaster preparedness and response.	31% (104)	16% (54)
I will register with my local disaster organization.	31% (103)	17% (54)
I will check with my local morgue to find out if they are seeking assistance.	18% (61)	33% (109)
I will serve by maintaining accurate antemortem dental records.	64% (210)	9% (30)
I will seek more information and decide once I am better informed.	67% (220)	7% (24)
I will stay informed about dental hygiene's involvement, but I will not pursue this type of work.*	47% (147)	18% (59)

*=negatively worded item

Table VI: Roles for Dental Hygienists From the Literature

Roles	Rawson, Nelson, & Koot (1982) ^{16*}	Brannon & Connick (2000) ¹¹	Ferguson, Sweet, & Craig (2008) ¹³	Nuzzolese et al. (2008) ¹²	Newcomb, Bruhn, & Giles (2015) ¹⁴
Administrative Duties					
Duplicate records		X			X
Secure areas		X			
Evidence chain of custody		X			X
Manage dental personnel	X	X			X
Maintain records of daily accomplishments			X		
Maintain master list of identifications	X		X		X
Restock and maintain equipment			X		
Antemortem Team					
Standardize AM dental records		X			X
Assist authorities		X	X		
Interview victim's family for identifying characteristics	X				
Obtain AM dental records	X	X	X	X	
Transcribe data into databases			X		
Postmortem Team					
Surgical assistance	X	X	X	X	X
Dental radiology	X	X	X	X	X
Photography			X		
Clean skeletonized remains		X			
Aid multiple verification approach	X	X	X		X
Record verbalized PM data findings	X		X		
Label and store victim remains			X		
Monitor members for fatigue		X	X		
Comparison Team					
Triage dental records		X			
Search for matches	X	X	X		X
Categorize charts		X			

*Rawson et al. described tasks performed by a team of dentists and dental hygienists, but were not specific about which tasks were exclusively performed by dental hygienists.

tivities associated with the sensitive nature of DVI work.¹⁷ Table VI provides an up-to-date list of roles for trained dental hygienists suggested by the literature from 1982-2015.

The literature suggests that specialty-trained dental hygienists have a vital role in disaster preparedness and response and are able to serve as needed personnel;¹¹⁻¹³ respondents of the current study overwhelmingly agreed, which is encouraging. Comments offered by respondents explaining their views on why dental hygienists have a vital role primarily made reference to the traditional formal education and experiences common to all dental hygienists prior to obtainment of any specialized training. Also, a majority of respondents reported they would consider responding to participate in MFIs; yet, less than

half of the responders agreed to seek disaster preparedness and response courses for obtainment of specialized training and certification. However, dental hygienists who intend to become involved without proper training have a misconception about their abilities to adequately perform disaster response and DVI activities. As pointed out in the literature, while disaster responders are needed, those who lack training are cause for concern as it relates to the effectiveness of disaster response work and the participants' safety.^{4,15}

The current research provides new information, which should serve as a basis for designing numerous future studies of this topic. Research is needed to develop disaster preparedness and response competency-based skills specifically for dental hy-

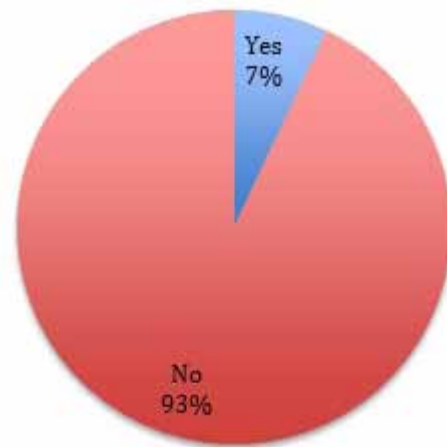
gienists, determine the amount of specialized training needed prior to involvement, further define the role of dental hygienist disaster responders, and assess misconceptions about disaster preparedness and response held by dental hygienists. Specifically, research could be conducted to determine the aptitude of forensically trained dental hygienists as compared to untrained dental hygienists in the following areas: taking documentation photographs and dental radiographs on human remains, assisting with the collection and verification of dental evidence, the ability to utilize special equipment, and PM surgical assistance. Ideal learning approaches for dental hygienists based on specific roles they would have when participating with disaster preparedness and response need to be identified through studies conducted within learning institutions. It would also be beneficial for investigators to gather information on safety protocols dental hygienists would need to follow when performing disaster preparedness and response roles. Such research published in dental hygiene journals would help build the literature, strengthen the dental hygiene community service response for MFIs, and assist with recruiting disaster preparedness and response organization members from the dental hygiene profession.

There are several limitations to this study. The survey tool was researcher-designed; therefore, the reliability and validity of the survey may not have been fully established. This study included dental hygienists from a random sample of the U.S. dental hygienists population and targeted those who chose to be professionally active through social media groups and a continuing education conference; the population may not represent viewpoints of dental hygienists who choose to be professionally active in other ways. A large portion of the surveyed population was from Virginia as a result of the continuing education conference, and 2 of the 4 Facebook groups included in the study were (Tidewater Dental Hygienists' Association and Virginia Dental Hygienists' Association) based in Virginia. It is possible that dental hygienists of Virginia, where disaster types and frequencies can vary from that of other U.S. regions, may have affected the outcomes of the research due to knowledge or feelings generated by past experiences with disasters in their residential proximity. While over half of the respondents did indicate residential proximity to hazards that could result in MFIs, the research design did not look for correlations of how such factors could have impacted responses.

CONCLUSION

Dental hygienists are interested in becoming more involved with disaster preparedness and response. They view themselves as professionals who could have a vital role in disaster preparedness and response and are comfortable with DVI related tasks.

Figure 2. Respondents' Receipt of Formal Education About Disaster Preparedness and Response Roles of Dental Hygienists



Competency and curriculum on this topic should be developed and made readily available to create educational opportunities for dental hygienists who choose to serve their communities in this capacity.

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SHORT REPORT

Implications for Improving Oral Health Care Among Female Prisoners in Georgia's Correctional System

Henrie M. Treadwell, PhD; Starla H. Blanks, MBA, MPH; Carlos C. Mahaffey, PharmD, MPH; Whitney C. Graves, MPH

Abstract

Georgia has the eighth-highest state rate of incarceration and fourth-highest number of prisoners in the country. Aside from receiving a dental examination at intake to assess oral health needs, there are no efforts to determine the barriers and determinants that contribute to the presenting oral health status of Georgia's state prisoners. Also, there is no prerelease planning to establish a health care home for prisoners being released back into the community to continue oral health care services in an effort to support successful reentry.

This study assessed the barriers that impact N=98 female inmates' access to oral health care, prior to incarceration, within Georgia's prison system using a 21-item survey developed by a division of an academic institution and administered by the staff of a state department. Majority of the survey respondents reported that they do not have a regular dental provider (83%), lack insurance coverage (66%), and had their last dental visit more than a year ago because they did not have money for service or treatment (64%). The data collected from this study will be utilized to inform future project efforts to both reduce costs and increase access to oral health care for Georgia's uninsured and underinsured, and especially the incarcerated and reentry populations.

Keywords: access to care, health promotion, oral health prevention, public health, women's health issues

This study supports the NDHRA priority area, **Health Promotion/Disease Prevention:** Identify, describe and explain mechanisms that promote access to oral health care.

INTRODUCTION

The total state prison population in Georgia consists of approximately 56,783 persons, with women comprising approximately 7% of this total.^{1,2} Also, Georgia's incarceration rate of 533 per 100,000 is much higher than the national rate of incarceration at 478 per 100,000 U.S. residents, which results in Georgia having the eighth-highest state rate of incarceration and the fourth-highest number of prisoners in the country.³ Consequently, having one of the largest prison populations in the country would warrant having adequate health care services for those who are incarcerated. However, aside from receiving a dental examination at intake to assess oral health needs, there are no efforts to determine the barriers and determinants that contribute to the presenting oral health status of Georgia's state prisoners, and no prerelease planning to establish a health care home to continue oral health care services to support successful reentry for prisoners being released back into the community.⁴

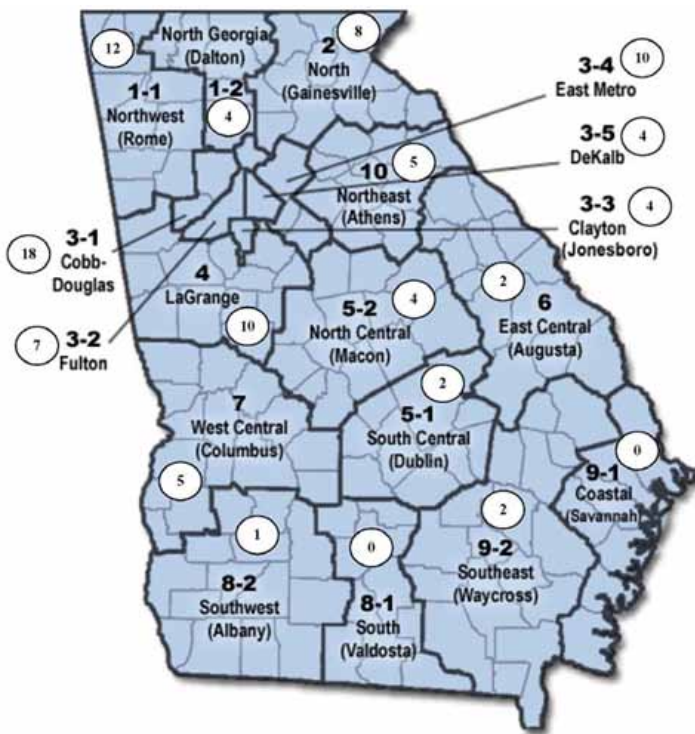
The correctional health care system under the Georgia Department of Corrections is the responsibility of the Office of Health Services. This office is responsible for providing physical, mental, and dental health care to inmates in the following categories: Primary Care, Infirmary Care, Medical Diagnostics, Chronic Care, Acute Care, Dental Care, and Mental

Health. These services are limited on-site depending on the level classification of the incarceration facility. For example, lower-level facilities, such as transition centers (Level I), may not have in-house medical professionals and will instead arrange for health care from private health care practices. In contrast, higher-level facilities, such as maximum security prisons (Level VI), will have on-site dental offices with a dentist and dental staff.

Oral health has a direct effect on well-being and quality of life.⁵ The occurrences of dental diseases are often associated with modifiable lifestyle behaviors, socioeconomic disparities, and lack of access to or existence of oral health care programs and services.^{6,7} Oral health is also important in monitoring overall health. Inaba and Amano compiled positive associations between dental diseases and other systemic health conditions including diabetes, preterm delivery low-birth weight, cardiovascular disease, and osteoarthritis.⁸

Discepolo and Kaplan reported that approximately one-third of the population will most likely experience higher rates of dental diseases due to lack of dental insurance, little or no Medicaid reimbursement for dental service, and the low number of active dentists in the United States that are not in private practice:

Figure 1. Map of the Number of Survey Respondents per Health District



about 8 percent.⁹ Dental Health Professional Shortage Areas (DHPSAs) are designated by the U.S. Department of Health and Human Services as state counties that either have population to full-time dentist ratios of 5,000:1 or greater, have barriers limiting access to dental providers in the area (such as rural areas with no public transportation), or correctional institutions with inmate population to full-time dentist ratios of 1,500:1 or greater.¹⁰ Georgia currently has 130 of the state's 159 counties designated as DHPSAs: 72 are based on Population designation, 46 are based on the Single County designation, and 12 of those 130 counties are designated as Correctional Facility DHPSAs. Those 12 Correctional Facility DHPSAs include metropolitan Atlanta counties: Fulton, DeKalb, and Gwinnett.¹¹

The purpose of this study was to assess the barriers that impact female inmates' access to oral health care prior to incarceration within Georgia's prisons. This study sought to determine the need for improved comprehensive oral care programs within Georgia's prisons and the community at large and identify service and policy gaps in the oral health network in Georgia to assist currently incarcerated women and those re-entering society with oral care needs.

METHODOLOGY

Study Assessment and Administration

This study was approved by the Georgia Depart-

ment of Corrections Institutional Review Board, and consent was obtained from each survey participant. The 2012 Oral Health Access Survey was developed by the division of an academic institution and a state department. The survey was administered over a 4-week period in June 2012 by state department staff to adult inmates upon processing into 2 state correctional facilities in Georgia. The 21-question survey collected information on participant demographics, access to oral health care, oral health risks, and the utilization of oral health services.¹²

Study Participants

There were a total of N=1,501 inmates who participated in the completion of the Oral Health Access Survey. To be eligible for participation in the survey, the inmates had to be processed into the selected study sites (the 2 state correctional facilities) during the designated study period and had to be at least 18 years of age and older. For the purpose of the current study, inclusionary criteria included adult female inmates who completed the survey, reported ZIP codes of residence within the state of Georgia, and who reported that they have not seen an oral health provider within the past year. This resulted in a study sample of N=98. Only female inmates were included in the current study as a pilot project to conduct future research with longer, more in-depth research tools to collect accurate data from both male and female state prisoners.

Data Analysis

PASW Statistics 18 software was used to conduct all data analyses. Descriptive statistics were performed for each of the targeted variables of interest: demographics (race and location of residence), access to care (having a regular dentist, reason for one's last dental visit, insurance status, and source of insurance coverage), and barriers to care (reason why last dental visit was more than a year ago and ease of finding a dentist).

RESULTS

Participant Demographics

Of the N=98 survey respondents, 51.0% (n=50) were Caucasian/White, 41.8% (n=41) were African American/Black, 6.2% (n=6) were Hispanic or of another racial/ethnic group, and 1% (n=1) chose not to answer. With respect to location of residence, the majority of the respondents (59.2%; n=58) resided in the following state health districts: Cobb-Douglas (District 3-1), Northwest (District 1-1), East Metro (District 3-4), LaGrange (District 4), and North-Gainesville (District 2). Figure 1 displays a map of the number of survey respondents per health district.

Access to Care

The majority of the survey respondents (82.7%; n=81) reported that they did not have a regular dental provider. Fifty-seven percent (n=56) of the survey respondents reported that the reason for their last dental visit was for pain. Only 30.6% (n=30) reported that the reason for their last dental visit was to get their teeth cleaned. These results may be due to a lack of insurance coverage, as 66.3% (n=65) of survey respondents who provided their insurance status reported that they do not have health insurance that would pay for dental/oral health services. Of the female inmates who reported that they did have insurance coverage (n=28; 28.6%), approximately 54.0% reported Medicaid as their source of coverage, while 46.0% reported that they had private insurance through their employer (Table I).

Barriers to Care

As previously noted, the study sample was limited to eligible adult female inmates who reported that their last dental visits were more than a year ago (N=98). The majority of these inmates reported that this was due to not having money for treatment (n=63; 64.3%). Only 13.3% (n=13) of these inmates reported that they were afraid or disliked going to the dentist, and 11.2% (n=11) reported that they did not feel there was a need. However, in spite of these barriers, approximately 78.6% of the survey respondents reported that they think it is easy or somewhat easy for them and their families to find a local dentist.

DISCUSSION

The findings from this survey suggest that one of the most critical barriers to oral health care are the costs associated with receiving those services, which is comparable to the results of a previous study.¹³ Yarbrough, Nasseh, and Vujicic conducted a survey among an adult, nationally representative sample that reported cost as a primary reason for not intending to visit a dentist within the next year. This barrier was found at a higher rate among those who were low-income and Medicaid-insured than others.¹³ Under Georgia's Medicaid program, dental benefits are currently limited to beneficiaries up to age 21.¹⁴ In addition, despite the aims of the Patient Protection and Affordable Care Act (ACA) to increase access to health care, this legislation does not address or mandate any dental benefits for adults, which consequently results in neglecting their unmet oral health needs.⁹

With the majority of the women from the current study being uninsured or underinsured, there is an urgent need to develop new policies that will address the fiscal barriers impacting adults and their ability to establish and maintain an oral health home. All

Table I. Source of Health Insurance Coverage

Health Insurance	% (n)
Medicaid	53.5% (n=15)
Private Through Work	46.4% (n=13)
Total	n=28

though these women did not have a regular dental visit within the previous year, the majority still reported that they think it is easy or somewhat easy to find a local dentist for them and their families. This poses the idea that oral health promotion and prevention efforts must move beyond solely focusing on accessibility, and expand to include multifaceted solutions that can address cost issues and directly connect underserved, high-risk populations with regular dental providers in their area. Having a primary oral health home can help consumers foster effective relationships with providers they trust to provide quality care, increase visits to receive dental services, and maintain optimal oral health. This is essential, especially for vulnerable, incarcerated populations, as previous research has demonstrated the limited ability for correctional institutions to provide quality dental care.

There are 12 correctional facilities designated as a DHPSA in the state, meaning there is less than one provider for every 2,500 inmates. Therefore, incarcerated persons are less likely to be able to follow oral health recommendations, which include regular visits to the dentist. Harner and Riley found two dentists having a patient load of 1,600 in one example at a female prison facility.¹⁵ Women in the focus groups conducted by Harner and Riley reported being on waiting lists (lasting 21 months in one instance), waiting in pain, poor quality of care (ie tooth extractions that aren't needed), and unprofessionalism by the dentists once they were seen. The women were told to wait for dental treatment until they were released, were cut off abruptly when speaking to dentists, and forced to choose only one issue to be addressed in spite of presenting with multiple dental conditions.¹⁵ In addition to assessing the oral health status of inmates at their admission into state correctional facilities, formal policies and procedures need to be established to ensure that inmates receive quality oral health care by implementing regularly scheduled dental services at little to no costs. State reentry-planning committees should also coordinate continued services for inmates upon their release as they return to their community.

To support the establishment of oral health homes, the data collected from this study will be used by other investigators to create a new study that aims to create a new workforce model in efforts to both reduce costs and increase access to oral health care.

This new study will support emerging workforce models where midlevel providers are certified and work under licensed dentists to deliver oral health care services to low-income and uninsured populations, especially in areas declared as a DHPSA. This impact of this project will serve as a solution to address oral health care access in Georgia's prisons as well as in communities statewide and beyond. Collectively, these studies will help foster the development of population-specific access to care strategies and multidisciplinary partnerships that will improve oral health promotion and prevention efforts among medically underserved populations.

CONCLUSION

Women, specifically those who reside within correctional settings, represent only a fragment of the total unserved population. Despite the overwhelming plurality of respondents understanding the need for care, cost and dental insurance status still hindered care attainment. Dentists, dental hygienists, organized dentistry, and policymakers must be engaged to support the development of policies and practices needed to reduce oral health disparities and advance oral health equity. Moreover, comprehensive solutions should be created that address the systemic challenges associated with establishing or maintaining an oral health home, providing quality oral health services, and reducing the costly burden of episodic care.

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