Assessing Evidence-Based Practice Knowledge, Attitudes, Access and Confidence Among Dental Hygiene Educators

Jennifer L. Stanley, RDH, MS; Carrie L. Hanson, RDH, MS, EdD; Christopher J. Van Ness, PhD; Lorie Holt, RDH, MS

Abstract

Purpose: To assess U.S. dental hygiene educators' evidence-based practice (EBP) knowledge, attitude, access and confidence and determine whether a correlation exists between assessment scores and level of education, length teaching and teaching setting (didactic, clinical or both).

Methods: A cross-sectional survey was conducted with a sample of dental hygiene faculty from all 334 U.S. dental hygiene schools. ANOVA and Pearson correlation coefficient statistical analysis were utilized to investigate relationships between demographic variables and application of evidence-based principles of patient care.

Results: This study involved a non-probability sample (n=124), since the total faculty among all U.S. dental hygiene schools was not determined. Analysis demonstrated a positive correlation between EBP knowledge, access and confidence scores indicating that as knowledge scores increased, so did confidence and access scores ($r=0.313$, $p<0.01$ and $r=0.189$, $p<0.05$, respectively). Study findings also revealed that faculty who held advanced educational degrees scored significantly higher in EBP knowledge ($F3,120=2.81$, $p<0.04$) and confidence ($F3,120=7.26$, $p<0.00$).

Conclusion: This study suggests the level of EBP knowledge, attitude, access and confidence increases with additional education. Therefore, more EBP training may be necessary for faculty who do not possess advanced education. Results of the study indicate that further incorporation of EBP into dental hygiene curricula may occur as dental hygiene educators' knowledge of EBP increases, which in turn could enhance students' acquisition of EBP skills and their application of EBP principles toward patient care.

Keywords: evidence-based practice, evidence-based dentistry, dental hygiene, dental education

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Introduction

Evidence-based practice (EBP) has become a widely accepted systematic approach utilized by health professions including medicine, nursing, dental and dental hygiene.[1,2] The evidence-based movement was initiated to improve patient care by closing the gap between what is known and what is practiced.[3,4] An exponential growth in research literature provides a challenge for health care providers to stay abreast of the latest available evidence; however, the acquisition of knowledge alone is not sufficient to provide quality patient care.[5-7] Therefore, the evidence-based decision making (EBDM) process has evolved into a formalized and systematic process that not only includes finding and interpreting the best scientific evidence available, but also takes into consideration the patient's personal preferences/values, patient/clinical circumstances, and the clinician's experience and judgment.[6,7]

The American Dental Hygienists' Association (ADHA) Standards of Care state that it is a dental hygienist's professional responsibility to be able to access and utilize current, valid and reliable evidence in clinical decision making by appropriately analyzing and interpreting the literature and other resources.[7] Additionally, the new revisions of the Commission on Dental Accreditation (CODA) standards provide additional support for EBP by expanding the suggested competency criteria a dental hygiene graduate should be able to demonstrate regarding problem solving strategies related to comprehensive patient care and management of patients.[8]

A crucial component in the acquisition of knowledge and skills necessary for EBP is formal education in that specific area of expertise.[9-16] An assessment of health professions' education, including dental education, has identified the need for teaching EBP principles in program curricula in order to assist students in acquiring the necessary skills to provide quality patient care that is based upon valid and reliable evidence.[4,17-25] According to the literature, 2 major outcomes must be achieved to expe-

dite the translation of research into clinical practice: dental hygiene educators must develop and possess sufficient EBP knowledge and skills and be able to teach their students the EBP process.[7,26] Previously, dental hygiene program directors have reported they felt their faculty were lacking in EBP knowledge and skills.[11] Therefore, in order for EBDM to become the norm in clinical EBP, program curricula reform is necessary for practitioners to gain the skills necessary to apply EBDM principles that will close the gap between what is known and what is practiced.[13]

Literature suggests that dental hygiene faculty attitudes and knowledge can have an impact on the integration of EBP principles into program curricula.[5,17,23] Although limited, there is literature that suggests dental hygiene educators feel better prepared to teach and incorporate EBP philosophies into curricula once they have received sufficient training.[5] This in turn can affect the degree and ability of dental hygiene educators to teach EBP, which can impact EBP student learning outcomes. Currently, there is limited research assessing the impact education has on the utilization of EBP principles, however research supports that increasing the teaching of EBP principles has the potential to positively impact the students' perception of their ability to practice evidence-based oral health care.[12,14,27,28] Studies have shown that knowledge, attitude and confidence regarding EBP can have a direct impact on the extent a clinician practices evidence-based patient care.[29-31] Factors such as level of education, attitude toward EBP and perceived confidence in one's ability to use evidence-based principles have been shown to have an impact on the capability and degree of accessing scientific literature.[29,31-34] Although studies indicate that oral-health and other health care providers have a positive attitude toward EBP, there continues to be a lag in progress of all health care professions incorporating evidence-based principles into clinical care. The information from these studies suggests more support is needed for adding EBP education into health care curriculum.[35-37]

Studies have been conducted that have attempted to assess the knowledge, attitudes and utilization of EBP principles and the impact education has in acquiring those skills.[38-43] Systematic reviews of several studies have shown that the evaluation designs of much of this research were faulty and valid survey instruments were not utilized, which impacted interpretation of the study results.[44,45] Validated assessment instruments have been developed to assess EBP in the medical profession, which utilized questionnaires to evaluate perceived acquisition of EBP knowledge, attitudes toward EBP, search strategies, frequency of use of evidence sources, current application of EBP, intended future use of EBP and confidence in applying EBP principles.[46-49] These assessment instruments were developed for the medical profession and the questions, terminology and patient care scenarios were medically focused.[25] Therefore, in order to fill a void in the evaluation of EBP in 2011, an assessment instrument the Knowledge, Attitudes, Access, Confidence Evaluation (KACE) was developed and validated to assess EBP knowledge, attitudes, access and confidence specifically in dental education.[25] The KACE survey instrument was assessed and validated for consistency among the KACE scales, the ability to differentiate between individuals with varying levels of education or experience, and the capacity to detect the effects of education. Strengths of the KACE include its consistency within scales which reported Cronbach alpha coefficients from 0.21 to 0.78 for knowledge, 0.57 to 0.83 for attitude, 0.70 to 0.84 for accessing evidence, and 0.87 to 0.94 for confidence. Overall, the KACE was determined to hold a similar construct reliability to EBP assessment instruments utilized in medicine.

Current literature has explored the importance of EBP in improving patient care, the impact of education and assessed research utilization by health care and dental providers, but limited research has been conducted assessing dental hygiene educators' knowledge, attitude, ability to access research literature and confidence utilizing EBP principles. Therefore, the purpose of this research study was to assess U.S. dental hygiene educators' level of knowledge, access to evidence, attitude and confidence in using EBP principles by using the KACE assessment instrument. This study also sought to determine whether there is a correlation between the educator's level of education, years of teaching or teaching setting (didactic, clinical or both) and the participants' knowledge, attitudes, skills and confidence in utilizing EBP principles.

Methods and Materials

A cross-sectional survey was conducted with a convenience sample of dental hygiene faculty from 334 U.S. dental hygiene schools. This included 246 associate granting dental hygiene programs and 88 baccalaureate dental hygiene programs. Program director information was obtained from the ADHA web page (www.adha.org). A cover letter along with a link to the online survey was electronically mailed in September, 2013 to all 334 U.S. dental hygiene program directors. The program directors were asked to pass along the survey to all of their full and part-time faculty members. The electronically mailed cover letter informed the participants of the benefits and risks of participating and that their responses would be anonymous. Participants were also informed that all participation was voluntary and no incentives were given. A reminder cover letter with the link to the survey was sent to the same U.S. dental hygiene program directors after 2 weeks. Prior to conducting

the study, approval to collect and analyze the data was obtained by the UMKC Social Sciences Institutional Review Board (UMKC IRB Protocol 13-737).

Data were collected utilizing the KACE assessment instrument developed and validated by Hendricson et al of which the methods have been previously published.[23] The KACE assessment instrument includes a total of 35 questions: EBP knowledge (10), EBP attitudes (10), EBP access to evidence (9) and EBP confidence (6). The wording in the KACE instrument was modified to address dental hygiene educators rather than dental students. The knowledge questions are multiple choice in a 1-best-response format and the participants were given the option "I don't know" in order to minimize random guessing. All of the knowledge responses were recorded as either incorrect or correct and the correct responses were given a score of 1 and the incorrect/I don't know responses a score of 0. The survey questions assessing EBP attitudes, access and confidence utilize a 5-point Likert scale. The attitude questions include a scale ranging from 1 (strongly disagree) to 5 (strongly agree). The access of evidence questions include a scale ranging from 1 (never use) to 5 (very frequently use). For confidence, the scale ranges from 1 (not at all confident) to 5 (very confident).[23] Since the KACE assessment instrument was previously validated, a pilot study was determined not necessary.

In addition to completing the KACE assessment, participants were asked demographic items such as respondent's level of education, number of years teaching, degree awarded by institution (masters, bachelors, associate or certificate), work status (full time or part time) and teaching appointment (didactic, clinical or both). Exploratory analysis including descriptive statistics, percentages and frequencies was completed. ANOVA with post hoc pairwise comparison utilizing the Tukey-Kramer test and Pearson correlation coefficient statistical analysis were conducted to investigate whether significant differences or a correlation existed between demographic variables and the level of knowledge, attitudes, access to evidence and confidence in applying evidence-based principles toward patient care.

Results

There were 124 dental hygiene faculty who responded to the survey. Since the survey did not ask if the respondent was the program director or a faculty member, the number of responses represent a non-probability sample. Although the total number of faculty in U.S. dental hygiene programs was not determined, some very valuable and rich information was gathered from the survey responses. Figure 1 depicts the educational level of the respondents. Respondents' length of teaching and teaching appointment are reported in Tables I and II, respectively. Over half of the respondent's held an associate's degree (65%) followed by a baccalaureate degree (44%), master's degree (27%) and a certificate (11%).

Figure 1: Participant's Educational Level

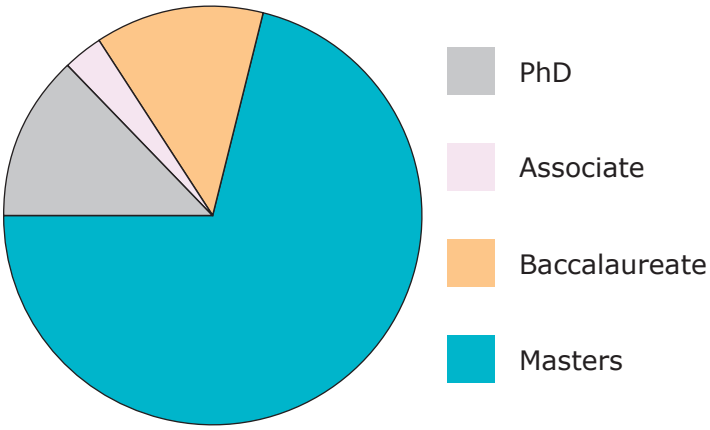

Table I: Participants' Length Teaching in Dental Hygiene Curricula

0 to 5 years	20% (n=25)
6 to 10 years	19% (n=24)
11 to 15 years	23% (n=28)
16 or more years	38% (n=47)

Table II: Participants' Teaching Appointment

Didactic	9% (n=11)
Clinical	15% (n=19)
Both Didactic and Clinical	69% (n=86)
Other	7% (n=8)

KACE Assessment

There were a total of 10 knowledge questions regarding evidence-based practice (Table III). Overall, the respondents were able to identify the components of a Patient, Intervention, Comparison, Outcome (PICO) question, determine the appropriate search strategy when using an electronic database, identify the type of research study utilized and appropriately analyze the results of a research study. Of the 2 questions related to rating the level of evidence, the majority (60.5%) responded correctly to one, but (58.9%) did not respond correctly to the other. Also, the majority (74.2%) of respondents were not able to correctly determine the appropriate study design for the type of research being conducted. Over half of the respondents were not able to correctly differentiate between sensitivity and specificity and all (100%) either did not know or incorrectly differentiated between incidence and prevalence.

Table III: Responses to Knowledge Questions

Type of Question	Correct	Incorrect/I don't know
Determining Level of Evidence	41.1% (n=51)	58.9% (n=73)
Determining Level of Evidence	60.5% (n=75)	39.5% (n=49)
Literature Search Strategy	61.3% (n=76)	38.7% (n=48)
Analyzing Study Results	75% (n=93)	25% (n=31)
Identifying PICO Components	69.4% (n=86)	30.6% (n=38)
Analyzing Study Results	60.5% (n=75)	39.5% (n=49)
Identifying Research Study Design	79% (n=98)	21% (n=26)
Determine Appropriate Study Design Needed	25.8% (n=32)	74.2% (n=92)
Differentiating Between Sensitivity and Specificity	48.4% (n=60)	51.6% (n=64)
Differentiating Between Prevalence and Incidence	0% (n=0)	100% (n=124)

Overall, the participants reported a positive attitude toward EBP and reported a variety of sources for accessing dental evidence. The majority of respondents reported they were moderately confident or confident in their critical appraisal skills of EBP. All responses to the attitude, access to evidence and confidence questions are reported in Table IV.

Analysis of KACE Responses with Demographic Variables

There was a moderate correlation between confidence score and knowledge scores. Participant confidence in using EBP increased as their EBP knowledge increased. Also, increased confidence was associated with a positive attitude toward EBP and as confidence using EBP principles increased so did the participants' access of evidence-based literature. A weaker correlation existed between access and knowledge scores. A correlation also existed between evidence-based access and attitude scores showing that a more positive attitude resulted in an increase in access of scientific literature. There was highly significant positive correlation between degree level attained and confidence scores, indicating that confidence increased with a higher level of education. There was also significant relationship between the highest degree offered and knowledge and confidence scores. Pearson correlation results are reported in Table V.

Statistical analysis of knowledge scores by ANOVA revealed an overall significant difference between knowledge and highest degree offered by the institution groups. Post hoc pairwise comparison using the Tukey-Kramer test among groups indicated that faculty teaching at educational institutions where a master's degree is the highest degree offered scored significantly higher on the knowledge and confidence scales than those teaching at institutions where an associate degree is the highest degree offered. A significant difference was shown between confidence scores and degree level obtained and post hoc comparisons indicated that confidence levels increased with the level of education. No statistical differences were seen between KACE scores and the type of institution where the faculty teach. For example, there were no differences between community colleges and university settings. Some statistical difference was seen only between length of time teaching and access to evidence scores. Post hoc comparison indicated that those teaching for 16 or more years accessed dental evidence slightly more than those teaching for 11 to 15 years. ANOVA showed a statistical difference between teaching appointment (didactic, clinical or both) and knowledge, evidence-based access and confidence scores. Post hoc comparisons indicated that those who teach didactic courses scored significantly higher for knowledge scales than those who teach only in a clinical setting. Post hoc comparisons showed that those that teach both didactic and clinic accessed dental evidence more than those that teach clinic only. Post hoc comparison also indicated that those that teach didactic or both didactic and clinic courses have more confidence utilizing EBP than those that teach in a clinical setting only. Post hoc comparison also revealed a statistical difference between work status (full/part time) and attitude and confidence scores showing those that teach full time have increased confidence and attitude toward EBP (Table VI).

Discussion

The purpose of this study was to assess current U.S. dental hygiene educators' knowledge, attitude toward, ability to access evidence and confidence utilizing EBP principles and to determine whether there is a relationship between variables such as degree level obtained, type of institution taught, years teaching, or teaching appointment. The majority of respondents understand the components of a PICO question, have knowledge of the various

Table IV: Attitudes, Access, and Confidence about Evidence-Based Practice (EBP) in Dentistry

	Strongly Disagree	Disagree	Uncertain	Agree	Strongly Agree
Attitudes Toward EBP					
I believe that evidence-based practice is valuable in the practice as a dental hygienist.	1.6% (n=2)	0.8% (n=1)	0% (n=0)	23.4% (n=29)	74.2% (n=92)
I personally appreciate the advantages of practicing evidence-based patient care.	1.6% (n=2)	0.8% (n=1)	0.8% (n=1)	29% (n=36)	67.7% (n=84)
EBP should be an integral part of dental hygiene school curriculum.	1.6% (n=2)	0% (n=0)	2.4% (n=3)	22.6% (n=28)	73.4% (n=91)
Accessing Evidence					
How frequently do you access dental evidence from …	Never	Rarely	Occasionally	Often	Very Frequently
Colleagues: other dental hygienists, dentists or health care providers	1.6% (n=2)	5.7% (n=7)	0% (n=0)	39.5% (n=49)	53.2% (n=66)
Textbooks	0.8% (n=1)	8.1% (n=10)	23.4% (n=29)	41.9% (n=52)	25.8% (n=32)
The Internet (excluding Cochrane reviews)	0% (n=0)	6.5% (n=8)	32.3% (n=40)	42.7% (n=53)	18.6% (n=23)
Original research papers published in peer-reviewed journals	0.8% (n=1)	4% (n=5)	16.1% (n=20)	47.6% (n=59)	31.5% (n=39)
Confidence in Critical Appraisal Skills					
How confident are you at appraising the following aspects of a published research report?	Not at All Confident	Not Confident	Moderately Confident	Confident	Very Confident
Appropriateness of the study design	2.4% (n=3)	4.8% (n=6)	48.4% (n=60)	30.7% (n=38)	13.7% (n=17)
Generalizability of the findings	1.6% (n=2)	8.9% (n=11)	35.5% (n=44)	42.7% (n=53)	11.3% (n=14)
Overall value of the research report	0.8% (n=1)	4.8% (n=6)	37.1% (n=46)	47.6% (n=59)	9.7% (n=12)

If you feel that you cannot respond because of lack of information, lack of experience or uncertainty, please check the column labeled "uncertain."

levels of evidence and are able to analyze the results of a research study. Dental hygiene educators' appear to possess more EBP knowledge as compared to dental practitioners.[43] Study participants had difficulty differentiating between the following statistical terms: sensitivity, specificity, prevalence and occurrence. The positive relationship between degree level obtained and EBP knowledge shown in this study supports the role education has in the attainment of evidence-based knowledge.[9-16] Faculty that teach didactic or both didactic and clinic scored higher in EBP knowledge than those that taught only in the clinic, which may indicate that additional education may be necessary for adjunct faculty who only teach in clinical settings. Therefore, education appears to play an important role in the attainment of EBP knowledge giving additional support to previous research studies.[9-16]

The respondents overall attitude was positive regarding the benefits of EBP toward patient care and the study results indicated that positive attitudes toward EBP increases the degree to which faculty access evidence-based literature, therefore, reinforc-

Table V: Pearson Correlation: Knowledge, Attitude, Access and Confidence Scores

	Knowledge Score (n=124)	Attitude Score (n=124)	Access Score (n=124)	Confidence Score (n=124)
Knowledge	–	–	0.189*	0.313**
Attitude	–	–	0.242**	0.291**
Access	0.189*	0.242**	–	0.423**
Confidence	0.313**	0.291**	0.423**	–
Degree Level Attained	–	–	–	0.38**
Highest Degree Offered	0.26**	–	–	0.24**

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

Table VI: Data Concerning KACE Assessment Scores With Significant Difference and Demographic Variables

KACE Assessment Scores and Demographic Variable	ANOVA
Knowledge and highest degree offered	F(2,121)=4.34, p<0.02
Confidence and degree level obtained	F(3,120)=7.26, p<0.001
Access and length of time teaching	F(3,120)=2.70, p<0.05
Knowledge and teaching appointment (didactic, clinical or both)	F(3,120)=2.79, p<0.04
Access and teaching appointment (didactic, clinical or both)	F(3,120)=3.00, p<0.03
Confidence and teaching appointment (didactic, clinical or both)	F(3,120)=3.82, p<0.01
Post hoc Tukey-Kramer test results	
Knowledge and degree offered (master's vs associate degree)	p<0.01
Confidence and degree offered (master's vs associate degree)	p<0.01
Knowledge and teaching appointment (didactic vs clinic only)	p<0.04
Access and teaching appointment (didactic and clinic vs clinic only)	p<0.05
Confidence and teaching appointment (didactic vs clinic only)	p<0.01
Confidence and teaching appointment (didactic and clinic vs clinic only)	p<0.05
Attitude and work status (full/part time)	p<0.001
Confidence and work status (full/part time)	p<0.02

ing previous research.[29-31] For example, Melnyk et al also found a positive correlation (r=0.32, p<0.001) between EBP beliefs and the extent to which the nurses practiced evidence-based care.[31] It is interesting, that although the foundation of EBP relies on routinely accessing evidence and integrating the most current and relevant research, the majority of educators reported that they rely on colleagues and textbooks most frequently for information. While experts in the field may have a wealth of scientific knowledge, clinical experience, credibility, and be a quick and easy source of information, their opinions can be subject to bias and conflict of interest.[50] Also, the use of textbooks as a source of evidence is problematic since the information may be more than a decade out of date at the time of publishing.[51] Ideally, clinicians as well as educators should be utilizing electronic databases to locate scientific literature for additional evidence to support their teaching and practice.[50] Although faculty in this study frequently reported looking to online sources for current evidence-based literature, the majority continue to look to colleagues and textbooks as common sources of information. The use of podcasts or databases of critically appraised topics were not reported to be frequent sources of information, which may be due to these sources being newer forms of resources to dental hygiene educators. Interestingly, the overall participants' responses relative to confidence were either moderately confident to confident rather than very confident suggesting that educators feel they may need more EBP education. Previous research has shown lack of time as a barrier to EBP, but the majority of respondents in this study reported that EBP was a routine part of their teaching and felt that it was feasible to apply its principles toward patient care.[31,37] There appears to be an increase in EBP utilization, which may be associated with participants' knowledge and attitude of EBP. The positive correlation of knowledge with access and confidence supports the important role EBP training has in education. The positive correlation between attitude, access and confidence supports previous studies that have shown that attitude can have an impact on EBP access or utilization.[32-34] The significant difference in knowledge and confidence scores depending on degree level obtained indicates that additional education may

provide more opportunities to gain EBP knowledge, which in turn can impact utilization of EBP principles into dental hygiene curricula. The positive relationship between increased knowledge and confidence and the highest degree offered by the respondents' teaching institution may be a result that faculty teaching at those institutions may hold a higher degree level, therefore, may possess additional EBP education. Also, it appears that those who have more experience teaching as well as possessing an advanced degree to teach didactic courses have increased levels of access of evidence-based literature and confidence in applying EBP principles. This may be a result of additional opportunities to gain experience with EBP as well as incorporating it into dental hygiene curricula.

Limitations

There are limitations in this study that may affect the generalization of the results. The study had a low response rate and the authors are not clear on the total number or population of full and part-time faculty in U.S. entry-level dental hygiene programs. There is the potential for bias with a convenience sample and small response rate that could impact whether the results are representative of all U.S. dental hygiene educators. Another limitation is that volunteerism bias may exist since those that chose to respond may possess fundamentally different EBP knowledge, attitudes and confidence than those that chose not to participate. Therefore, additional research is necessary that includes a stratified randomized sample representing various U.S. dental hygiene programs geographically as well as educators of varying teaching appointments and types of programs they teach. Caution interpreting the study results should also be taken, since the questions in the KACE assessment regarding prevalence and occurrence may not have been worded clearly.

Conclusion

Overall, survey results from this study indicate U.S. dental hygiene educators' have varying knowledge, access of evidence and confidence in the use of EBP. The study showed dental hygiene educators possess knowledge regarding levels of scientific evidence, PICO and analyzing research study results, however, knowledge of certain statistical terms were lacking. The limited knowledge of statistical terms may affect the ability to correctly interpret and apply study results to patient care. The positive association between degree level obtained and EBP knowledge, access to evidence and confidence may have an impact on incorporation of EBP into dental hygiene curricula and the ability to teach EBP principles impacting dental hygiene students' acquisition of EBP principles. Therefore, additional training for dental hygiene educators may be necessary to improve knowledge, access and confidence utilizing EBP principles. Since years of teaching was positively related to access and confidence as well, additional educational EBP opportunities may be necessary to improve confidence and access of EBP. Ultimately, educators must possess adequate EBP skills in order to incorporate EBP into dental hygiene curricula, teach EBP and feel confident in doing so.

Jennifer L. Stanley, RDH, MS, is a graduate student of the University of Missouri – Kansas City Master's Dental Hygiene Education Program and First Year Clinic Coordinator, Dental Hygiene Program, Oakland Community College. Carrie L. Hanson, RDH, MA, EdD, is Director, Dental Hygiene Program at Johnson County Community College. Christopher J. Van Ness, PhD, is a Research Assistant Professor and Director of Assessment, School of Dentistry, University of Missouri-Kansas City. Lorie Holt, RDH, MS, is Associate Professor and Director Degree Completion Studies, Division of Dental Hygiene, University of Missouri-Kansas City.

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