

## Research

# Attitudes of Virginia Dental Hygienists Toward Dental Therapists

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### Abstract

**Purpose:** The state of Virginia faces a reported dental health professional shortage affecting approximately half of its residents. The purpose of this study was to assess the opinions and attitudes of dental hygienists in Virginia toward a mid-level dental provider model, dental therapists (DTs), and to determine whether current education level and years of practice affected opinions regarding the education requirements for DTs.

**Methods:** A 22-item questionnaire was distributed online to a convenience sample of Virginia dental hygienists (n=910). Items assessed attitudes of participants toward the DT using a seven-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). Participants were asked to provide demographic information and to respond to open-ended questions regarding potential advantages and/or disadvantages to DTs. Independent samples *t*-tests and chi-square analyses were used to analyze the data.

**Results:** A response rate of 22% was obtained (n=200). Most respondents agreed a DT was needed in Virginia (M=5.78,  $p<0.001$ ) and supported the concept that dental therapy could be a solution to the problem of access to care issues in Virginia (M=5.97,  $p<0.001$ ). While most respondents agreed it was important for Virginia to adopt legislation for a dental therapy model (M=5.89,  $p<0.001$ ), most disagreed that DTs' practice should be restricted to acknowledged underserved areas in the state (M=3.19,  $p<0.001$ ). No significant association was found between years of practice and opinions toward education requirements for DTs; however, a significant association was found between current education level and opinions toward education requirements for DTs (Fisher's Exact Test=34.17,  $df=9$ ,  $p=.000$ , Cramer's  $V=.28$ ).

**Conclusion:** Results revealed Virginia dental hygienists had overwhelmingly positive attitudes toward DTs. Research with a larger sample could provide more insight into opinions of the Virginia dental hygienist population regarding this mid-level oral health care provider.

**Keywords:** dental therapy, dental therapist, mid-level provider, dental hygienist, access to care, underserved populations

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### Introduction

The oral health objectives of Healthy People 2030 include increasing access to preventive and restorative dental care for all ages, reducing the number of persons unable to obtain timely dental care, and reducing the number of persons with untreated tooth decay and periodontal disease.<sup>1</sup> The United States (US) Department of Health and Human Services reports that the state of Virginia faces a dental health professional shortage affecting 55.61% of its residents, over 1.3 million individuals.<sup>2</sup> The most underserved populations include children, the economically disadvantaged, and individuals living in or near rural areas.<sup>3,4</sup> In alignment with these population groups, Virginians most frequently report

cost, location, and difficulty in finding a dentist as barriers to oral health care access.<sup>2</sup> Approximately 3.2 million Virginians lack any type of dental insurance,<sup>5</sup> and neither Medicare nor Medicaid cover routine dental care for most individuals.<sup>6,7</sup> For low-income or uninsured patients, Virginia has implemented safety net programs; however, 67 state localities still have no dental safety net provider, and communities with providers are only able to receive services on a part-time basis.<sup>5,8</sup> The state has also implemented free and charitable oral health care clinics, but these facilities rely on services donated by volunteers, limiting availability.<sup>8</sup> The Virginia Department of Health also reports difficulty recruiting oral health care

professionals in and around rural communities, with only 7% of Virginia dentists working in rural areas.<sup>3,9</sup> Furthering the shortage, the National Center for Health Workforce Analysis projects an 8% decline of the national dentist workforce by 2025, with a 4% decline in Virginia.<sup>3</sup>

New workforce models have been proposed to address access to care shortages. One such model is the mid-level oral health practitioner as defined by the American Dental Hygienists' Association (ADHA).<sup>10</sup> In this model, the mid-level provider would be "a licensed dental hygienist who has graduated from an accredited dental hygiene program and who provides primary oral health care directly to patients to promote and restore oral health through assessment, diagnosis, treatment, evaluation, and referral services. The Mid-level Oral Health Practitioner has met the educational requirements to provide services within an expanded scope of care, and practices under regulations set forth by the appropriate licensing agency."<sup>10</sup>

There are multiple models of mid-level dental providers (MLDPs).<sup>11</sup> While all models fill roles to bridge the gap between preventive and restorative care, each has unique characteristics. Dental hygiene-based MLDPs are dental hygienists with abilities to perform certain restorative treatments, whereas non-hygiene-based MLDPs perform certain restorative treatments without previous dental hygiene education and licensure.<sup>11</sup> Other oral health care providers that can also help address the access to care shortage include community dental health coordinators, who offer oral health education to underserved communities and help link residents to dentists, as well as dental hygienists with additional expanded functions to perform dental hygienist duties under direct access provisions.<sup>11</sup>

One emerging model of a MLDP is the dental therapist (DT). Currently, 13 states have adopted dental therapy legislation, though not all have actively-practicing DTs.<sup>12</sup> In Minnesota, DTs practicing under indirect supervision and advanced dental therapists (ADTs) practicing under general supervision each hold master's degrees; however, ADTs are required to complete 2000 clinical practice hours and pass an additional exam.<sup>11-16</sup> In Alaska, certificate-holding dental health aide therapists (DHATs) can work under general supervision in tribal communities.<sup>11</sup> Research suggests positive outcomes in areas where dental therapy has been implemented.<sup>15-25</sup> The Minnesota Department of Health reports greater access to care for underserved communities, decreased patient wait and travel times, and increased dental team productivity.<sup>15</sup> In interviews with 16 health providers and 125 community members exposed to DHATs in Alaska, Chi et al. found improved access to care for patients with previously limited or irregular access.<sup>17</sup> In

addition, Chi et al. also noted that providers observed reduced disease prevalence and severity, and dentists identified more availability to provide major dental services to patients.<sup>17</sup>

Though a relatively new field, dental therapy has educational program accreditation standards set by the Commission on Dental Accreditation (CODA).<sup>18</sup> A minimum of three years of dental therapy education at the post-secondary college level are required for CODA accreditation, with competencies that include simple extractions of erupted primary teeth, emergency palliative treatment of dental pain, preparation and placement of direct restorations in primary and permanent teeth, and prescriptive authority including administering analgesics, anti-inflammatory agents, and antibiotics.<sup>19</sup> The Commission recognizes DTs as members of the oral healthcare team, noting graduates must be competent in communicating and collaborating with other healthcare team members.<sup>19</sup> In 2020, Alaska became the first state to have a CODA-accredited dental therapy program.<sup>20</sup>

The field of dental therapy continues to grow, and this career path may be of interest to current practicing dental hygienists, particularly since the ADHA model defines the DT as a dental hygienist.<sup>10</sup> Accordingly, it is important to determine the opinions and attitudes of dental hygienists toward DTs, and previous studies began this exploration. In a survey of Oregon dental hygienists (n=440), Coplen et al. found 59% of those surveyed supported the need for DTs.<sup>21</sup> In another survey of dental hygienists in the Pacific Northwest (n=187), Ly et al. found 65% of the respondents supported an existing need for DTs.<sup>26</sup> Studies of dental hygienist perspectives in Maine, Colorado, Kentucky, and North Carolina have also demonstrated support for the DT.<sup>27-29</sup> Regarding potential interest in actually pursuing dental therapy education and licensure, Coplen et al. found 43% of the respondents in Oregon were interested in becoming a DT.<sup>21</sup> Comparatively, in a survey of Maine dental hygienists (n=268), Smallidge et al. found 65% of the participants expressed interest in enrolling in a dental therapy program.<sup>27</sup>

While previous research has provided valuable insight, there is a gap in the literature regarding dental hygienists licensed in the state of Virginia. The National Center for Health Workforce Analysis projects a 13% increase in dental hygienists in Virginia by 2025.<sup>3</sup> Given dental health professional shortages, barriers to oral health care access, and potential career enhancement, key policymakers are exploring opportunities for dental therapy legislation in Virginia; however the attitudes and support for DTs among dental hygienists in the state are unknown. The purpose of this study was to assess the opinions and attitudes of Virginia dental hygienists towards dental therapists (DTs) and to determine

whether current education level and years of practice affected opinions regarding the education requirements for DTs.

## Methods

A cross-sectional survey design was used to assess attitudes of a convenience sample of Virginia dental hygienists toward DTs. Following Institutional Review Board (IRB) approval, the investigator-designed questionnaire was sent via email to 1,015 Virginia dental hygienists from a purchased online email database (E-Database Marketing). The instrument was adopted, with permission, from a previously validated survey by Self et al.<sup>30</sup> and included additional researcher-developed questions. Eleven items assessed attitudes of participants toward DTs with responses using a seven-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). Participants were asked to respond to six demographic questions (age, gender, years of practice, predominant work setting, professional membership, and current level of education), appropriate levels of supervision and education for DTs, and two open-ended questions regarding potential advantages and/or disadvantages of DTs. A final open-ended question allowed participants the opportunity to provide additional comments. A panel of five dental hygiene faculty members reviewed the researcher-developed questions for content validity and clarity; adjustments were made based on their review.

The survey was initially distributed in March 2020; however, due to a low response rate likely related to the COVID-19 pandemic, a reminder survey was not sent until six weeks later. Three follow-up emails were sent to non-respondents over the next six weeks at one- and two-week intervals. Of 1,015 emails initially sent, 105 returned as undelivered, for a total of 910 survey invitations. The anonymous responses and data were collected by an electronic survey program (Qualtrics; Provo, UT, USA). Cronbach's alpha reliability coefficient among Likert-type scales revealed a value of .91, indicating high internal consistency.

Descriptive statistics such as means, standard deviation, and frequencies were used to describe attitudes and perceptions. Additionally, an independent samples *t*-test was used to compare mean values in Likert-type questions to a neutral rating of 4.0 with significance set at .05. Open-ended questions were transcribed and qualitatively analyzed by coding responses according to distinct ideas. All coding was reviewed by a colleague prior to frequency analysis to establish content validity and reliability. Chi-square analysis was used to analyze results related to education level, years of practice, and opinions toward education requirements for DTs. The Fisher's Exact Test was used when cells with expected frequencies were less than 5 and the Bonferroni adjusted criterion for statistical significance was established as  $p=.0125$ .

## Results

Of 910 emailed surveys, 200 were returned, resulting in a response rate of 22%. The majority of participants were female (94.5%,  $n=189$ ), age 40 or above (63%,  $n=126$ ), and held a bachelor's degree or higher

(85%,  $n=170$ ). The highest numbers of participants had been practicing for less than ten years (36%,  $n=72$ ) and worked predominantly in group practices (35%,  $n=70$ ). Among participants who selected "other" for predominant work setting, written comments included retired, military/federal settings, and full-time temporary hygienists. Approximately half of the respondents were ADHA members (53%,  $n=106$ ). Participant demographics are shown in Table I.

Results from descriptive statistics for Likert-type

**Table I. Sample demographics (n=200)**

	n	%
<b>Gender</b>		
Female	189	94.5
Male	3	1.5
Do not wish to disclose	8	4
<b>Age (Years)</b>		
Under 29	29	14.5
29-39	45	22.5
40-49	55	27.5
50 and over	71	35.5
<b>Highest education level</b>		
Associate degree	30	15
Bachelor's degree	118	59
Master's degree	44	22
Doctorate	8	4
<b>Years practicing dental hygiene</b>		
Less than 10	72	36
10-19	48	24
20-29	41	20.5
30 or more	39	19.5
<b>Predominant work setting</b>		
Community/Public Health	20	10
Education	31	15.5
Free/Safety Net Clinic	5	2.5
Group Practice	70	35
Solo Practice	62	31
Other	12	6
<b>American Dental Hygienists' Association membership</b>		
Yes	106	53
No	94	47

questions assessing attitudes and perceptions of participants toward DTs are shown in Table II. A one-sample *t*-test was used to determine statistically significant differences in Likert-type questions compared to a neutral rating of 4.0. Results revealed significantly more hygienists agreed than disagreed that a DT was needed in Virginia (M=5.78, SD=1.90) (d=1.78, 95% CI [1.51 to 2.04],  $t(199)=13.25$ ,  $p<0.001$ ) and supported the concept that dental therapy could be a solution to the problem of access to care issues in Virginia (M=5.97, SD=1.80) (d=1.97, 95% CI [1.72 to 2.22],  $t(199)=15.47$ ,  $p<0.001$ ). Similarly, significantly more respondents agreed than disagreed they had

an understanding of the services performed by DTs (M=5.90, SD=1.42) (d=1.90, 95% CI [1.70 to 2.09],  $t(199)=18.84$ ,  $p<0.001$ ) and agreed there was evidence DTs could perform high-quality work (M=5.75, SD=1.75) (d=1.75, 95% CI [1.51 to 1.99],  $t(199)=14.17$ ,  $p<0.001$ ). Further, significantly more respondents were interested than uninterested in becoming a DT if it was recognized in Virginia (M=4.96, SD=2.28) (d=.96, 95% CI [.64 to 1.27],  $t(199)=5.92$ ,  $p<0.001$ ). However, while significantly more hygienists agreed than disagreed it was important for Virginia to adopt legislation for a dental therapy model (M=5.89, SD=1.87) (d=1.89, 95% CI [1.72 to 2.15],

**Table II. Perceptions of dental therapists (n=200)**

	1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
A mid-level dental provider is needed in Virginia.	15 (7.5)	7(3.5)	6 (3.0)	13 (6.5)	16 (8.0)	24(12.0)	119 (59.5)
A mid-level dental provider, such as a dental therapist, could be part of the solution to the problem of access to care in Virginia.	13 (6.5)	5 (2.5)	7 (3.5)	8 (4.0)	15 (7.5)	21 (10.5)	131 (65.5)
It is important for Virginia to adopt legislation for a dental therapist model.	15 (7.5)	6 (3.0)	6 (3.0)	9 (4.5)	13 (6.5)	25 (12.5)	126 (63.0)
I have an understanding of the services dental therapists may perform.	5 (2.5)	2 (1.0)	9 (4.5)	12 (6.0)	28 (14.0)	53 (26.5)	91 (45.5)
There is evidence dental therapists can perform high-quality work.	12 (6.0)	4 (2.0)	5 (2.5)	22 (11.0)	19 (9.5)	34 (17.0)	104 (52.0)
Dental therapists' practice should be restricted to acknowledged underserved areas in Virginia.	58 (29.0)	34 (17.0)	26 (13.0)	30 (15.0)	17 (8.5)	15 (7.5)	20 (10.0)
I would be interested in becoming a dental therapist if it was recognized in Virginia.	33 (16.5)	12 (6.0)	6 (3.0)	19 (9.5)	24 (12.0)	22 (11.0)	84 (42.0)
A dental therapist should be able to perform simple extractions of primary teeth.	13 (6.5)	6 (3.0)	3 (1.5)	8 (4.0)	14 (7.0)	31 (15.5)	125 (62.5)
A dental therapist should be able to perform simple restorations (Class I occlusal or Class V buccal/lingual).	14 (7.0)	4 (2.0)	4 (2.0)	7 (3.5)	20 (10.0)	23 (11.5)	128 (64.0)
A dental therapist should be able to provide emergency palliative care; for example, pulpal capping.	13 (6.5)	5 (2.5)	10 (5.0)	18 (9.0)	15 (7.5)	34 (17.0)	105 (52.5)
A dental therapist should be able to prescribe non-narcotic analgesics, anti-inflammatory, and antibiotic medications.	13 (6.5)	3 (1.5)	6 (3.0)	7(3.5)	12 (6.0)	34 (17.0)	125 (62.5)

$t(199)=14.28, p<0.001$ ), significantly more disagreed than agreed that DTs' practice should be restricted to acknowledged underserved areas in the state ( $M=3.19, SD=2.02$ ) ( $d=-.81, 95\% \text{ CI} [-1.09 \text{ to } -.52], t(199)=-5.64, p<0.001$ ).

Significant differences were also found when evaluating participants' attitudes toward proposed scopes of practice. Significantly more respondents agreed than disagreed that DTs should be able to perform simple extractions of primary teeth ( $M=5.99, SD=1.76$ ) ( $d=1.99, 95\% \text{ CI} [1.74 \text{ to } 2.23], t(199)=15.92, p<0.001$ ), perform simple restorations ( $M=5.98, SD=1.77$ ) ( $d=1.98, 95\% \text{ CI} [1.73 \text{ to } 2.23], t(199)=15.79, p<0.001$ ), provide emergency palliative care ( $M=5.70, SD=1.83$ ) ( $d=1.70, 95\% \text{ CI} [1.44 \text{ to } 1.95], t(199)=13.08, p<0.001$ ), and prescribe non-narcotic analgesics, anti-inflammatory, and antibiotic medications ( $M=6.02, SD=1.73$ ) ( $d=2.02, 95\% \text{ CI} [1.78 \text{ to } 2.26], t(199)=16.56, p<0.001$ ).

Regarding proposed levels of supervision, nearly half of the respondents (45%,  $n=89$ ) indicated general supervision would be most appropriate for DTs, with 31% ( $n=61$ ) indicating no supervision was needed. Sixteen percent of respondents ( $n=32$ ) selected indirect supervision, and 9% of respondents ( $n=18$ ) believed direct supervision would be appropriate for DTs. For proposed levels of education, a majority (67%,  $n=133$ ) felt a master's degree was most appropriate for DTs, while 26% ( $n=52$ ) selected bachelor's degree. Seven percent ( $n=14$ ) felt an associate degree was appropriate, and 0.5% ( $n=1$ ) selected certificate.

Results for the chi-square test of association revealed a statistically significant difference in the frequency of responses based on a participant's

education level and their opinion toward education requirements for DTs (Fisher's Exact Test=34.17,  $df=9, p=.000$ , Cramer's  $V=.28$ ). Most participants (67%,  $n=133$ ), regardless of highest degree held, felt DTs should have master's degrees. However, roughly one-third of participants with associate degrees felt DTs should have associate degrees, compared to only 3% of all other degree holders (Table III). Results revealed no significant associations between frequency of responses based on years of practice as a dental hygienist and opinions toward education requirements for DTs ( $p>.0125$ ). Regardless of years of practice, respondents selected master's degree for the appropriate education level for DTs (Table IV).

**Table III. Opinions toward dental therapy education requirement by current education level (n=200)**

Education Level	What level of education should be required for dental therapists?			
	Certificate n (%)	Associate n (%)	Bachelor's n (%)	Master's n (%)
Associate degree (n=30)	—	10 (33.3)	8 (26.7)	12 (40)
Bachelor's degree (n=118)	—	4 (3.4)	35 (29.7)	79 (66.9)
Master's degree (n=44)	1 (2.3)	—	7 (15.9)	36 (81.8)
Doctorate (n=8)	—	—	2 (25)	6 (75)
Total	1 (0.5)	14 (7)	52 (26)	133 (66.5)

**Table IV. Opinions toward dental therapy education requirements by years of practice (n=200)**

Years of Practice	What level of education should be required for dental therapists?			
	Certificate n (%)	Associate n (%)	Bachelor's n (%)	Master's n (%)
Less than 10 (n=72)	—	2 (2.8)	19 (26.4)	51 (70.8)
10-19 (n=48)	—	5 (10.4)	14 (29.2)	20 (60.4)
20-29 (n=41)	1 (2.4)	4 (9.8)	7 (17.1)	29 (70.7)
30 or More (n=39)	—	3 (7.7)	12 (30.8)	24 (61.5)
Total	1 (0.5)	14 (7)	52 (26)	133 (66.5)

For open-ended questions, 182 responses were provided for potential advantages, 106 for potential disadvantages, and 32 for additional comments. "Increased access to care" (56%,  $n=102$ ) was the most frequent advantage cited by participants, followed by "autonomy/advancement of the dental hygiene profession" (13%,  $n=22$ ). The most frequent response for potential disadvantages was "Lack of support from dentists" (27%,  $n=29$ ), closely followed by "No disadvantages" (26%,  $n=27$ ). Categorized themes for responses to potential advantages and disadvantages are found in Table V.

## Discussion

Considering the shortage of oral healthcare providers affecting over 1.3 million residents in the state of Virginia, DTs could provide much-needed assistance to those experiencing access to care barriers.<sup>2</sup> In addition, Virginia may consider adopting dental therapy legislation in the future.<sup>2</sup> Assessing

**Table V. Open-ended responses to Potential advantages and disadvantages of dental therapists**

	n	%
<b>Potential advantages (n=182)</b>		
Increased access to care	102	56
Autonomy/advancement of dental hygiene profession	22	12.8
Provide support for dentist	18	10.5
Enhanced quality of care	16	9.3
More affordable care	12	6.6
Increase in revenue/production	6	3.5
No advantages	6	3.5
<b>Potential disadvantages (n=106)</b>		
Lack of support from dentists	29	27.4
Lower quality of care	19	17.9
Public confusion/acceptance	18	17
Cost/pay issues	16	15.1
Safety/liability concerns	14	13.2
More responsibility/stress for dental hygienists	12	11.3
No disadvantages	27	25.5

opinions of dental hygienists, the workforce expected to fill the role of the proposed DT, was essential<sup>10</sup> and the results from this study indicated overall positive attitudes of Virginia dental hygienists toward DTs.

Findings suggested that Virginia dental hygienists were aware of a need for DTs and supported implementing this MLDP model to address access to care barriers in the state. Participants added additional comments reflecting on the need for DTs in Virginia. These findings were comparable to other studies exploring opinions of hygienists toward DTs, notably Coplen et al. and Ly et al., in which the majority of surveyed dental hygienists in Oregon and Idaho supported the need for DTs.<sup>21,26</sup> Given that both Oregon and Idaho have adopted dental therapy legislation, it is possible that policymakers in Virginia may consider dental therapy legislation, considering the support

of dental hygienists within the state. However, findings from this study contrasted with those of Virginia dentists (n= 145) by Howell et al., in which most respondents strongly disagreed that DTs were needed in Virginia.<sup>31</sup> Other studies involving opinions of dentists toward DTs identified similar findings, such as To'olo et al. and Blue et al., in which most of the dentists surveyed did not support a need for DTs.<sup>32,33</sup>

Participants in this study acknowledged differing opinions between Virginia dentists and dental hygienists in open-ended comments; over one-fourth indicated “Lack of support from dentists” as the top potential disadvantage of this provider model. One reason for contrasting opinions could be the possibility of dental therapy leading dental hygienists away from the direct authority of dentists. Independently practicing DTs could also be perceived by dentists as competition for patients, thus impacting practice incomes. The second most-cited potential advantage to DTs was “Autonomy/ advancement of dental hygiene profession” (13%), second only to “Increased access to care” (56%). Concerns amid the COVID-19 pandemic appeared to fuel Virginia dental hygienists’ support for autonomy; additional comments included the following statements: “I really hope this paves the way for future dental hygienists to practice independently from dentists, especially with all the mistreatment from some dentists to many hygienists across the country. It’s been very difficult to hear how hygienists are being treated during this pandemic” and “If there is anything we have learned from the current pandemic it is that we are bound by the whims of our dentist employers. So many dental hygienists are being forced to return to work while feeling unsafe. It is imperative that we continue to work towards autonomy for dental hygienists, which includes the mid-level provider.”

Support for autonomy was also evidenced by most surveyed respondents believing general supervision was appropriate for DTs (45%), with nearly a third supporting no supervision (31%) at all. Additionally, all four Likert-type questions related to scope of practice were answered with the majority of respondents agreeing or strongly agreeing. These findings suggest Virginia hygienists supported the autonomy and advancement of the dental hygiene profession, to include a broader scope of practice. In contrast to dental hygienists, Howell et al. found 70% of Virginia dentists (n=145) believed direct supervision would be appropriate for DTs.<sup>31</sup> These findings were comparable to those of Ly et al. in the Pacific Northwest, in which nearly half of the dentists surveyed (48%, n=39) supported direct supervision for DTs, while most of the dental hygienists surveyed (57%, n=42) supported indirect or general supervision.<sup>26</sup> Dentists may have opposed less supervision for DTs given the potential financial implications of competition for patients with independently-practicing DTs.

Regarding education, most participants in this study chose the master's degree as the appropriate education level for DTs; it was the selected degree requirement regardless of the degree held by the respondent. Current dental therapy programs in Alaska and Minnesota, the two states in which dental therapy has been in practice the longest, have 2- to 4-year post-baccalaureate curriculums.<sup>34</sup> Respondents in this study may have been aware of the successes of dental therapy implementation in these states and acknowledged the need for higher education to practice safely as DTs. However, these findings were in contrast with other studies assessing dental hygienists' opinions of proposed dental therapy degree requirements. In the Ly et al. study of dental hygienists in the Pacific Northwest, only 24% of the respondents agreed a master's degree was necessary.<sup>26</sup> Coplen et al. found the highest number of dental hygienists surveyed in Oregon selected bachelor's degree (48%, n=205), while 39% (n=167) selected master's degree.<sup>21</sup> Interestingly, in this study, a significant association was found between education level and opinions toward dental therapy education requirements; respondents holding associate degrees were more likely to choose associate degree for the proposed education requirement. Dental hygienists in Virginia with higher levels of education may have placed more value on higher-level dental therapy education requirements. Also, respondents holding associate degrees might have felt apprehension toward completing the additional education required for a master's degree. If Virginia adopted dental therapy legislation with master's degree requirements, associate degree practitioners would be forced to spend more time and financial resources on their education to become a DT as compared to dental hygienists with bachelor's or master's degrees. Given the overwhelming support of the study respondents for the autonomy and advancement of the dental hygiene profession, associate degree holders may have felt a master's degree requirement would create a barrier to their own professional development.

When comparing years of practice and opinions regarding dental therapy education requirements, the researchers hypothesized dental hygienists with more years of experience would place more value on experience than formal education, choosing lower-level degree requirements for DTs. However, the findings did not support this. Results revealed participants chose master's degree as the appropriate dental therapy education requirement, regardless of the number of years of clinical practice. These findings suggest no significant relationship exists between years of practice and opinions toward dental therapy education requirements. More experienced dental hygienists may have had increased exposure and familiarity with nuances associated with restorative treatment, regardless of complexity, and subsequently understood the need for more formal education to become a DT.

Both dental hygienists and dentists in Virginia appeared to agree on the topic of education requirements for DTs. Howell et al. found most Virginia dentists (58%, n=84) believed master's degrees should be required for DTs.<sup>31</sup> The highest number of dentists (38%, n=28) in Virginia cited "lower quality of care" as the top potential disadvantage for DTs.<sup>31</sup> Findings from this study suggest dental hygienists acknowledged the importance of high-quality care based on their agreement with Virginia dentists regarding the required dental therapy education levels being set at the master's degree level. Most dental hygienists in this study (53%) agreed or strongly agreed that they would be interested in becoming a DT if this provider model were to be recognized in Virginia. Furthermore, two participants clarified that they would have been interested in becoming a DT if they were not in retirement. These were similar to other studies in which most surveyed hygienists expressed interest in becoming a DT.<sup>21,27,29</sup> Should Virginia policymakers decide to pursue dental therapy legislation, findings from this study demonstrate that dental hygienists in the state were most supportive of DTs.

### **Limitations**

Several limitations may have influenced the results of this study. A convenience sample was used from a purchased online database and the survey was sent digitally via email. Not all email addresses for dental hygienists in Virginia were included in the data set; with a digitally administered survey, all participants needed internet access and valid email addresses. Future studies could explore methods of sending surveys to all licensed dental hygienists in the state for a more representative sample. Upon viewing the survey invitation, dental hygienists who supported dental therapy may have been more likely to respond, while others may have felt they did not understand the concept of DTs well enough to participate. Future studies could include a brief synopsis of dental therapy in the invitation letter with a short explanation of the importance of participation. Lastly, the COVID-19 pandemic came to a forefront when the survey questionnaire invitation was initially distributed, and Virginia closed dental offices for routine care in March 2020. This disruption may have contributed to the low initial response rate, with participants unable to check work emails. Future studies could repeat this survey once the COVID-19 pandemic has subsided. Many pandemic-related comments were negative, and a delay in repeating the survey could allow dental offices opportunities to refine safety policies and procedures, possibly changing negative outlooks of some dental hygienists.

### **Conclusion**

Findings suggest Virginia dental hygienists were highly supportive of DTs in the state. Attitudes were overwhelmingly

positive, with most participants indicating interest in becoming a DT if it was recognized in Virginia. Most respondents supported a broader scope of practice for DTs and non-direct supervision. Most respondents, regardless of years of practice, supported a master's degree as the appropriate degree requirement for DTs. Data gathered from this study may provide policymakers with information for future initiatives regarding dental therapy legislation in Virginia. Findings underscore the need for more research with a larger sample, which could provide more insight into opinions of the dental hygienist population in Virginia.

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