

Oral Health Literacy Education and Practice in US Dental Hygiene Programs:  
A National Survey

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ABSTRACT

**Purpose/Objectives:** Studies have shown a significant relationship between low oral health literacy (OHL) and poor oral health outcomes. National calls for action include better training of dental providers to meet the needs of the low OHL public. The purpose of this research was to determine the extent OHL education is being included in US dental hygiene (DH) education programs. **Methods:** In fall of 2020, a 23-item digital survey was sent to 321 CODA accredited DH schools in the US. **Results:** Survey generated 90 eligible responses (28%). Respondents reported that OHL education is being included in DH curricula to some degree. Communication strategies (82.4%) were the most likely OHL concept to be taught. Subject areas included community health (89%), cultural competency (78%), and special populations (78%). Respondents ranked lack of assessment instruments, lack of concrete activities, lack of clear understanding of OHL, and difficulty in implementing OHL concepts as the top barriers to incorporating OHL education in the DH curriculum. **Conclusion(s):** OHL is an established determinant of oral health. As prevention and patient education experts, dental hygienists play an important role in improving patient OHL. More fully integrating OHL into DH curricula would provide future DHs with the training needed to improve oral health outcomes and would better align DH education programs with national OHL initiatives.

**Key Words:** oral health literacy, dental hygiene curricula, oral hygiene, dental



## INTRODUCTION

Over 16 million US adults are considered functionally illiterate according to the US Department of Education's Program for the International Assessment of Adult Competencies (PIAAC).<sup>1</sup> This means these adults are unable to decipher the meaning of a sentence, find a piece of information in a short text, or fill out a simple form.<sup>1</sup> PIAAC found an additional 26.5 million US adults presented with low level English literacy proficiency, meaning they lacked the skills to compare and contrast information, paraphrase or make low level inferences.<sup>1</sup> The inability to use and engage written text hampers a person's ability to participate in modern society.<sup>1</sup>

Low literacy can be a determinant of low health literacy.<sup>2</sup> Health literacy (HL) builds on the concept of literacy as a set of skills needed to perform basic tasks to accomplish practical and everyday functions and applies it to a health setting. Oral health literacy (OHL) is derived from the same concepts as health literacy. The only difference being that it affects an individual's ability to access and navigate dental care.<sup>3</sup> The American Dental Association (ADA) defines OHL as "the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate oral health decisions."<sup>4</sup> Studies have found lower OHL levels can lead to worse periodontal health, less understanding of dental concepts, greater self-report of poor oral health, irregular follow-up dental visits, less seeking of health information, and less access to dental care.<sup>3,5</sup> Low OHL also reduces compliance with recommendations for dental treatment.<sup>3</sup> The consequences of oral disease are far reaching and can lead to difficulty with concentration and speech, low self-esteem, difficulty in eating, poor nutrition, difficulty in finding a job, and increased work and school absences.<sup>6</sup>

Language mastery is an important determinant of HL and OHL. In the US 21.6% of the population speaks a language other than English at home.<sup>7</sup> Speakers of foreign languages

face many communication barriers in health care settings. Even simple tasks, such as describing symptoms to a provider or asking a question, become an obstacle for those with limited English proficiency (LEP). People who speak English as a second language and racial and ethnic minorities face some of the greatest disparities in HL.<sup>8</sup> People with both LEP and low HL are twice as likely than others to experience poor health.<sup>8</sup> As a result of these overlapping relationships, the Institute Of Medicine (IOM) has called for the need to view HL in the context of language and culture.<sup>9</sup>

The 20<sup>th</sup> century has seen a paradigm shift in healthcare practice and delivery from a historically paternalistic model of care to a person-centered model. A fundamental principle of patient-centered care recognizes and values the whole person. This requires healthcare providers to consider unique patient needs such as literacy, language, and culture.<sup>10</sup> Future providers will need to be able to identify deficiencies in literacy skills and language comprehension in order to provide care and instruction at the appropriate level. Reports have shown that there is a need for health professionals who have the education and practice experience to promote effective health communication.<sup>5</sup>

Dental hygienists' focus on preventive care and patient education places them in an important position to assess and address the OHL needs of their patients. Direct access refers to dental hygiene practitioners who can treat patients independently without the authorization of or without supervision of a dentist. Dental hygienists who work independently generally work with underserved populations and those who lack access to dental services. The proliferation of direct access work force models across the US has placed additional weight on exposing future dental hygiene providers to OHL knowledge and education. Dental hygienists must understand how literacy, language, and culture contribute to inequities in dental disease and overall health. However, it is unclear how dental, dental hygiene, or health education programs approach OHL education. The American Medical Association, the

American Dental Association, and the American Dental Hygienists' Association have included effective communication in standards of care and recommend that principles of communication be included in the curricula.<sup>6</sup> While there are references to cultural competency and competence in interpersonal and communication skills, there are no standards specific to OHL in the Accreditation Standards for Dental Hygiene Education Programs.<sup>11</sup> As such, there is a lack of information on the degree to which dental hygiene education programs are meeting the need for OHL education. There is also a lack of information on the barriers programs face in providing such educational experiences for students.

The goal of this study was to explore OHL education and practice in US dental hygiene education programs. Specifically, this research sought to better understand what OHL concepts and methods dental hygiene students are being taught. This research also sought to identify barriers dental hygiene educators face in implementing OHL education in the dental hygiene curricula.

## MATERIALS AND METHODS

This non-experimental survey study was determined to be exempt from The University of Michigan (UM) Institutional Review Board (IRB) oversight by the UM Health and Human Services and Behavioral Sciences (HUM#00189411). A 23-item digital survey was developed using Qualtrics (Provo, UT) software. It was validated through assessment by the UM Survey Research Center and pilot feedback from eight dental hygiene faculty and program directors across three institutions. A power calculation was performed and it was estimated a minimum sample size of 98 programs was required. Survey items include multiple choice, Likert scale, open-ended, and ranking questions. In addition to respondent profile information the survey assessed the inclusion of OHL content in the dental hygiene program's curriculum by asking respondents three groups of questions related to a.) subject

areas where OHL is included in curricula, b.) OHL concepts taught in curricula, and c.) barriers to implementing OHL education in the curricula.

The study population consisted of program directors from all Commission on Dental Accreditation (CODA) accredited dental hygiene schools in the United States. Dental hygiene education programs included all certificate, associate's and bachelor's degree granting programs. Other dental hygiene faculty were invited to respond to the survey as a proxy for a program director if it was felt the proxy would be better suited to answer questions on OHL in the curriculum. The survey invitation and link were emailed to all dental hygiene program directors in the fall of 2020. Follow up emails were sent to non-respondents two weeks later. All responses were anonymous.

Analysis of the data was conducted using SPSS<sup>®</sup>v27. Descriptive statistics such as frequency distribution, percentages, and measures of central tendency and variation were used to provide an overview of the findings. Inferential analysis was used to explore differences between groups including between certificate or associate dental hygiene programs and bachelor programs. Significance was set at  $p < .05$ .

## RESULTS

The electronic survey was sent to program directors of 321 CODA accredited US dental hygiene programs in fall of 2020. A total of 102 responses were recorded. Twelve were excluded due to being incomplete. Ninety responses were included in the data analysis for a response rate of 28% (Table 1). Respondents represented the Midwest (38.9%), South (25.6%), West (25.6%), and Northeast (10.0%). Respondents also represented associate programs (62.2%), bachelor programs (35.6%), and certificate programs (2.2%). For the purpose of analysis, the certificate program responses were combined with the associate degree responses. Lastly, respondents represented program administrators (76.7%), course directors (17.8%), clinical faculty (4.4%) and coordinator (1.1%).

### **Subject Areas Where OHL is Included in Curricula**

Respondents indicated that OHL education was spread across multiple subjects with Community Health being the most frequent (88.9%)(Table 2). Respondents from bachelor degree programs were significantly more likely to report teaching OHL in subject areas related to communication (87.5%) and service learning (68.8%) compared to associate degree programs (65.5% and 39.7%) ( $p=.027$ ,  $p=.015$ ). The mean number of subjects in which OHL was included was significantly higher in bachelor degree programs ( $M=5.75$ ) compared to the associate programs ( $M = 4.76$ )( $p=.015$ ,  $SD=.412$ ) (Table 2). After adjusting for regions of the US, respondents from the Southern region were significantly less likely to report including OHL in Community Health than respondents from other regions ( $F=9.722$ ,  $p=.010$ ).

### **OHL Concepts Taught in Curricula**

Respondents most often reported including general OHL concepts related to communication strategies (93.3%) and identifying low OHL patients (80.0%)(Table 3). Nearly 85% of bachelor degree programs respondents reported teaching students to link OHL to patient outcomes compared to 58% of associate degree program respondents ( $p=.018$ ). Respondents from bachelor degree programs were more likely to make a distinction between the different types of HL (46.9%) compared to associate degree programs (37.9%).

As for teaching concepts related to measures of OHL, general assessment of low OHL status was taught in 81.3% of bachelor programs and in 58.6% of associate programs ( $p=.036$ )(Table 3). There was also a significant difference between bachelor 37.5% ( $n=12$ ) and associate programs 19% ( $n=11$ ) for teaching students to assess the reading level of patient forms ( $p=.017$ ). Using formal assessments was the least likely measure to be employed with only 13.8% ( $n=8$ ) of associate programs and 15.6% ( $n=5$ ) of bachelor programs teaching this concept.

As for forms of communication taught, respondents reported teaching oral communication (98.9%), models and illustrations (93.3%) and written documents (85.6%) (Table 4). Use of video (54.4%) and interpreter services (50%) were least likely taught in the dental hygiene programs. However, there was a significant difference between associate (41.4%) and bachelor programs (65.6%) in teaching students to use interpreter service ( $p=.047$ )(Table 4).

The most common specific communication strategies that students are taught to use were the use of illustrations and models (96.7%), plain language (87.7%), educational brochures (85.6%), and the teach-back method (80%)(Table 4). There was no significant difference between associate and bachelor programs for these communication strategies.

### **Barriers to Incorporating OHL**

The survey included a ranking question that was used to determine which eight pre-selected barriers respondents found most challenging. Survey respondents ranked lack of assessment instruments, lack of concrete activities, lack of a clear understanding of OHL and difficulty in implementing OHL concepts as the top four challenges (Figure1). Respondents from associate degree programs tended to rank these four challenges slightly more frequently than respondents from bachelor degree programs, however the differences were not significant.

### **DISCUSSION**

The purpose of this research was to determine the extent OHL education is being included in dental hygiene education programs in the US. In answer to the first study aim, the results found that dental hygiene education programs are including OHL concepts in their curricula. The concepts most often included focus on communication forms and strategies. The bachelor degree program respondents were more likely to include important OHL concepts recommended by the National Action Plan to Improve Health Literacy such as



linking OHL to oral health outcomes and using general assessments to identify low OHL patients. However, few associate or bachelor degree dental hygiene programs taught students specifically to assess reading level of patient forms, use definitive assessments to determine OHL level, nor taught to all three cognitive levels of health literacy.

Not only is health literacy a determinant of health, but health literacy is a better indicator of health status than age, income, employment status, education level, or racial or ethnic group.<sup>12</sup> As such, conclusively identifying patients with low OHL is an important aspect of person-centered care and decreasing barriers to equitable health care. In this respect increasing the number of dental hygienists that can accurately measure literacy level or assess the reading level of print materials becomes important.

The type of communication strategies found to be taught were similar to Horowitz and Kleinman and Flynn et al. who also found the use of simple language, models or radiographs, and print material to be the most frequently employed communication strategies by dentists and dental hygienists.<sup>13,14</sup> A majority of respondents (85.6%) reported teaching students to use the strategy of providing brochures. This provides an interesting example of why learning to use multiple communication strategies that can be used in conjunction with one another is important. Providing brochures is not necessarily a good strategy for patients with low OHL who often struggle with reading. Horowitz and Kleinman noted that only one out of ten US adults can proficiently understand health related written material.<sup>14,15</sup> Students must be taught to assess the reading level of printed material, read written material out loud, and underline key terms to ensure the material in brochures are understood. This study confirmed many students are not being taught a wide enough range of strategies nor how to use them in ways that complement each other.

Finally, interpreter services were the least taught form of communication with associate degree programs reporting significantly less use compared to bachelor programs.

The lower overall use may indicate that this strategy is less convenient for students in busy clinics. Additionally, bachelor programs may be more likely to use the strategy due to possible linkage with larger institutions that have greater resources to provide access to interpreter services. Professional interpreters are trained to interpret complex medical language and have advanced skills to meet the challenges of communicating health information with linguistically diverse patients. National standards for healthcare providers recommend that providers offer patients communication, both verbal and written, in the patient's preferred language including the use of interpreter services.<sup>16</sup>

Understanding barriers that dental hygiene education programs face in implementing OHL education was the second aim of this study. The barriers most frequently identified by respondents were lack of assessment instruments, lack of concrete activities, lack of a clear understanding of OHL, and difficulty in implementing OHL concepts, respectively. The order of responses indicate that program directors may understand the importance and need for OHL in the curriculum. However, they need more knowledge of OHL and assistance on how to operationalize OHL concepts. Lack of understanding of OHL concepts, lack of clear definitions and lack of standardization all contribute to these top four barriers. For instance, respondents ranked "lack of assessment instruments" for students as the largest barrier to implementing OHL. In order to meet this need, some consensus must be reached about what the core competencies of OHL should be, how OHL should be measured, and what communication strategies should be taught. There is a need to define terms to increase the faculty's understanding of the core concepts of OHL and for ideas to facilitate the implementation of OHL activities in the curricula.

The growing diversity of the US population, combined with the expansion of direct access workforce models, increases the need for effective advanced communication strategies to meet the OHL needs of patients. Interactive and critical health literacy cognitive skills are

as important as functional skills for patients. The recent COVID-19 pandemic provides a good example. Accessing care, interacting, and communicating with health care providers and the health care establishment are essential during a pandemic. Being unable to evaluate health care information in an environment where health misinformation abounds can turn deadly. Increasing the OHL of patients also requires more than providing understandable instructions or the rationale for treatment. Dental care providers need to meet the interactive and critical OHL needs of their patient to ensure they can successfully navigate the dental environment, interact with oral health care providers, evaluate information, and seek oral health information. Only then can patients make their own oral health care decisions for themselves and their families. Providing dental hygienists with the specific knowledge and the tools to help increase the OHL of patients will meet these ends and further public health initiatives on oral health.

### **Limitations**

A primary limitation of the study was that there is no standardization for OHL concepts for dental education programs. There are no recognized or clear definitions for “assessment” or “measure” or “competent” in this context. Participants most assuredly had difficulty answering questions due to this lack of standardization. The top four selected barriers all point directly and indirectly to lack of understanding of OHL concepts for many respondents. One way to increase generalizability in future studies would be to define terms which could be used as standards to measure competency.

The original intent of the barrier ranking question was to avoid having participants supplying more generic answers such as “not enough time.” Unfortunately, the question inadvertently forced the program directors to rank responses they may not consider barriers. In addition, the question required the respondent to click and drag responses. A few of the

participants indicated that they had trouble with that task itself. Being unable to do so resulted in some respondents skipping the question.

This study lacked the statistical power to draw reliable conclusions of significance. It is more likely that significance will not be determined with a sample size below the power calculation. Consequently, the lack of significance found in this study was more likely the result of the smaller than determined sample size. This could underestimate actual differences.

Finally, program directors who are unfamiliar with health literacy or may not be incorporating health literacy into their program curricula, may have been more likely to be among the schools that did not respond. Consequently, the results could mask a greater lack of incorporating OHL in dental hygiene education programs.

### **Future Research**

Establishing best practices for OHL in both dental hygiene practice and dental hygiene education is far from being realized. There are a few communication strategies that have been evaluated, but just as many have not faced the rigor of scientific investigation required for evidenced-based practice. Further research is needed to better understand the OHL strategies being taught in dental hygiene education, how that education translates into dental hygiene practice and the effectiveness of strategies in fostering increased understanding by patients. Introducing standards for OHL will go a long way in ensuring that all dental hygiene students are receiving the same information on OHL.

### **CONCLUSION**

National initiatives have promoted increasing the OHL of patients to achieve improved oral health outcomes and reduce oral health disparities for over a decade. Previous research found that health care providers are in the best position to contribute to the

betterment of the health outcomes of their patients and yet they do not receive adequate education and training. Dental hygienists have been no exception.

This study found that OHL is included in dental hygiene programs to some degree. However, not all concepts and communication strategies recommended for low OHL are included. Providing person-centered care is providing care and information at the level of the patient. Dental hygienists need to first be able to objectively identify patients with low levels of OHL. In addition, they need the complete repertoire of communication strategies to effectively address communication deficiencies and meet the needs of the patient. As prevention and patient education experts, dental hygienists play a key role in implementing strategies for improving patient OHL. Dental hygienists are the ideal provider in the dental practice to introduce health literacy tool kits, to assess the reading level of patient forms and brochures, and to inform office staff about effective communication with low literate and LEP patients.

Dental hygiene education programs play an important public health role in providing a competent workforce. The standardization of OHL concepts and establishing OHL competencies could reduce educators' confusion and uncertainty and ensure more complete inclusion of OHL in dental hygiene curricula. More fully integrating OHL education into dental hygiene curricula would provide future dental hygienists with more complete training needed to improve oral health outcomes and would better align dental hygiene education programs with national OHL initiatives.

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## Tables

**Table 1 Characteristics of Respondents (N=90)**

|  |                   | n (%)      |
|--|-------------------|------------|
| <b>Region</b>                            | Midwest           | 38.9% (35) |
|  | South             | 25.6% (23) |
|  | West              | 25.6% (23) |
|  | Northeast         | 10.0% (9)  |
| <b>Terminal Degree</b>                   | Bachelor          | 35.6% (32) |
| <b>Offered by Dental Hygiene Program</b> | Associates        | 62.2% (56) |
|  | Certificate       | 2.2% (2)   |
| <b>Role of Respondent</b>                | Program Admin     | 76.7% (69) |
|  | Course Director   | 17.8% (16) |
|  | Clinical Faculty  | 4.4% (4)   |
|  | Other-Coordinator | 1.1% (1)   |

**Table 2 Comparison of Subject Areas Oral Health Literacy Included by Degree Level (N=90)**

| <b>Subjects Taught</b>     | <b>All Programs<br/>n(%)</b> | <b>Associate<br/>n(%)</b> | <b>Bachelor<br/>n(%)</b> | <b>p&lt;.05</b> |
|----------------------------|------------------------------|---------------------------|--------------------------|-----------------|
| <b>Community Health</b>    | 88.9% (80)                   | 84.5% (49)                | 96.9% (31)               | .090            |
| <b>Cultural Competency</b> | 77.8% (70)                   | 74.1% (43)                | 84.4% (27)               | .302            |
| <b>Special Needs</b>       | 77.8% (70)                   | 74.1% (43)                | 84.4% (27)               | .302            |
| <b>Communication</b>       | 73.3% (66)                   | 65.5% (38)                | 87.5% (28)               | .027*           |
| <b>Clinical</b>            | 72.2% (65)                   | 72.4% (42)                | 71.9% (23)               | 1.0             |
| <b>Motivational</b>        | 67.8% (61)                   | 60.3% (35)                | 81.3% (26)               | .059            |

**Interviewing**

|                           |            |             |             |            |
|---------------------------|------------|-------------|-------------|------------|
| <b>Service Learning</b>   | 50.0% (45) | 39.7% (23)  | 68.8% (22)  | .015*      |
| <b>Mean # of Subjects</b> |            |             |             |            |
| <b>OHL Included(SD)**</b> | 4.51(2.45) | 4.76 (1.99) | 5.75 (1.65) | .018(.412) |

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\*Chi-squared test

\*\*Independent samples t-test

**Table 3. Comparison of Inclusion of OHL Concepts by Degree Level (N=90)**

|                                      |                                    | All Programs | Associate Degree (n=58) | Bachelor Degree (n=32) |
|--------------------------------------|------------------------------------|--------------|-------------------------|------------------------|
| <b>General Inclusion of Concepts</b> | Communication Strategies           | 93.3% (84)   | 89.7% (52)              | 100% (32)              |
|                                      | Identify low OHL                   | 80.0% (72)   | 77.6% (45)              | 84.4% (27)             |
|                                      | Consequences of low OHL            | 70.0% (63)   | 62.1% (36)              | 84.4% (27)             |
|                                      | (Link Low OHL to Patient Outcomes) | 67.8% (61)   | 58.6% (34)              | 84.4% (27)             |
|                                      | Differentiate types of HL          | 41.1% (37)   | 37.9% (22)              | 46.9% (15)             |
| <b>Types of HL</b>                   | Functional                         | 46.7% (42)   | 50.0% (29)              | 40.6% (13)             |
|                                      | Interactive                        | 41.1% (37)   | 41.4% (24)              | 40.6% (13)             |
|                                      | Critical                           | 32.2% (29)   | 36.2% (21)              | 25.0% (8)              |
| <b>Measures Of OHL</b>               | Assess for low OHL                 | 67.8% (61)   | 58.6% (34)              | 81.3% (26)             |
|                                      | Measure reading/OHL                | 41.1% (37)   | 37.9% (22)              | 46.9% (15)             |
|                                      | Assess patient forms               | 27.7% (23)   | 19.0% (11)              | 37.5% (12)             |
|                                      | Use formal assessments             | 14.4% (13)   | 13.8% (8)               | 15.6% (5)              |

\* Chi-squared test

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**Table 4. Comparison of Communication Forms and Strategies by Degree Level (N=90)**

|  |                                   | All Programs | Associate Degree (n=58) | Bachelor Degree (n=32) |
|--|-----------------------------------|--------------|-------------------------|------------------------|
| <b>Forms of Communication (Specific to low OHL)</b>        | Oral                              | 98.9% (89)   | 100% (58)               | 96.9% (31)             |
|  | Model/illustrations               | 93.3% (84)   | 96.6% (56)              | 87.5% (28)             |
|  | Written                           | 85.6% (77)   | 86.2% (50)              | 84.4% (27)             |
|  | Video                             | 54.4% (49)   | 58.6% (34)              | 46.9% (15)             |
|  | Interpreter services              | 50.0% (45)   | 41.4% (24)              | 65.6% (21)             |
| <b>Communication Strategies Taught to Use with Patient</b> | Use illustration/ models          | 96.7% (87)   | 98.3% (57)              | 93.8% (30)             |
|  | Use plain language                | 87.7% (79)   | 87.9% (51)              | 87.5% (28)             |
|  | Provide brochures                 | 85.6% (77)   | 87.9% (51)              | 81.3% (26)             |
|  | Use teach-back                    | 80.0% (72)   | 82.8% (48)              | 75.0% (24)             |
|  | Ask if family needed              | 75.6% (68)   | 79.3% (46)              | 68.8% (22)             |
|  | Language appropriate              | 74.4% (67)   | 74.1% (43)              | 75.0% (24)             |
|  | Limit concepts                    | 58.9% (53)   | 63.8% (37)              | 50.0% (16)             |
|  | Read out loud                     | 51.1% (46)   | 51.7% (30)              | 50.0% (16)             |
|  | Write/Print instruct.             | 52.2% (47)   | 48.3% (28)              | 56.3% (18)             |
|  | Underline in print                | 40.0% (36)   | 39.7% (23)              | 40.6% (13)             |
|  | Follow up call                    | 21.1% (19)   | 24.1% (14)              | 12.5% (4)              |
|  | Other: Translation apps on mobile | 11.1%(10)    | 8.8% (8)                | 2.2%(2)                |

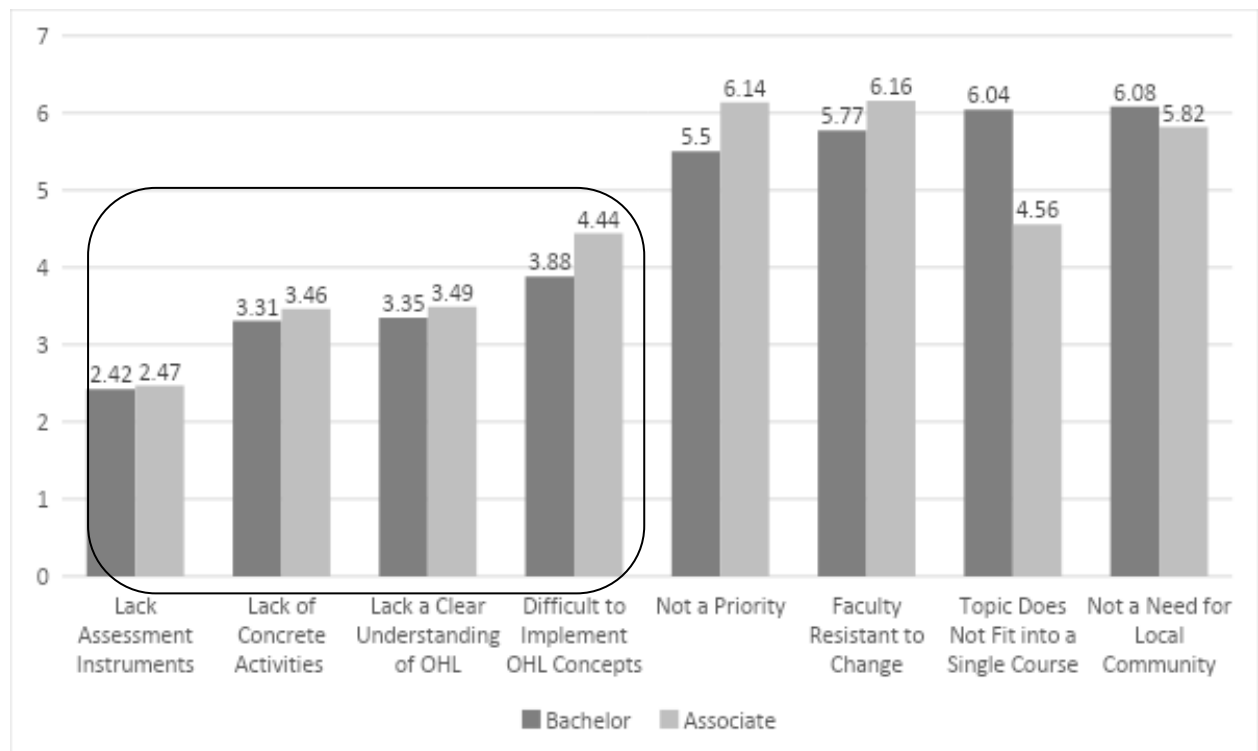
|                                 |                           |            |            |
|---------------------------------|---------------------------|------------|------------|
|                                 | device                    | 1.1% (1)   | 1.1% (1)   |
|                                 | Other: Evaluate next appt |            |            |
| <b># Strategies Included **</b> | Mean(SD)                  | 7.38(2.14) | 6.91(2.73) |

\* Independent sample

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## Figures

**Figure 1. Mean Rank of Top Four Barriers to Incorporating OHL in Curriculum  
(1 = Most Challenging 9 = Least Challenging)**



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