Summer 2024

Prevalence of Sexuality Implicit Bias in Entry-Level Dental Hygiene Students – A Pilot Study

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PREVALENCE OF SEXUALITY IMPLICIT BIAS IN ENTRY-LEVEL DENTAL HYGIENE STUDENTS – A PILOT STUDY

by

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B.S.D.H., May 2022, Old Dominion University

A Thesis Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirements for the Degree of

MASTER OF SCIENCE

DENTAL HYGIENE

OLD DOMINION UNIVERSITY
August 2024

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ABSTRACT

PREVALENCE OF SEXUALITY IMPLICIT BIAS IN ENTRY-LEVEL DENTAL HYGIENE STUDENTS – A PILOT STUDY

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Purpose: Bias and discrimination may create barriers and affect the delivery of culturally competent care to sexual minorities. An awareness of biases early in education may promote equitable care and increase the quality of oral healthcare delivered to diverse populations. The purpose of this study was to determine the prevalence of sexuality-implicit attitudes in entry-level dental hygiene students at one university. Methods: This cross-sectional study included a convenience sample of junior and senior dental hygiene students (n=74) and was determined exempt by a university Health Sciences Human Subjects Review Committee (2151633-2). The Implicit Associations Test (IAT) is a validated tool used to measure implicit bias. For this pilot study, the validated Sexuality IAT was modified for use in dentistry with permission from Project Implicit®. The IAT requires participants to rapidly pair two social groups, in this case, homosexual and heterosexual individuals, with either positive or negative attributes (words/concepts), using the "E" and "I" computer keyboard keys. Faster average response times to pairings indicate a preference for a group. Descriptive statistics were used to evaluate the means between groups and determine the prevalence of sexuality implicit biases. Independent samples t-test was utilized to examine for statistically significant differences ($p < 0.05$) in the level of implicit bias based on the year in the dental hygiene program (1^{st} or 2^{nd}). One way between subjects ANOVA was used to examine for differences in age groups ($p < 0.05$). Results: Seventy dental hygiene students (n=70) completed the survey, (n=34 1^{st} year, n=36 2^{nd} year).

The average overall implicit score for first-year students was 0.001 (no sexuality preference), and 0.069 for second-year students (no sexuality preference). When comparing year in dental hygiene program and age groups, no statistically significant differences were found. Conclusion: Undergraduate dental hygiene students had no sexuality bias for heterosexual or homosexual individuals. More research is needed on a larger sample to determine awareness. Additionally, the use of interventions that aim to mitigate biases towards LGBTQ+ individuals.

This thesis is dedicated to my husband, whose love, support, and encouragement have been my rock throughout this journey. Your belief in me has been my greatest strength, and I dedicate this thesis to you with all my love and gratitude.

To my parents, who have always been my pillars of strength and my source of inspiration. Your sacrifices, guidance, and endless love have shaped me into who I am today. This thesis is a testament to your unwavering support, and I dedicate it to you.

ACKNOWLEDGMENTS

First, I would like to express my sincere gratitude to my thesis director, Emily Ludwig, for her invaluable support and guidance in completing this thesis. Thank you for sharing your expertise and love for research with me. Special thanks to my committee members, Jessica Suedbeck and Adaira Howell, for their guidance and knowledge throughout this journey.

Finally, thank you to all the Professors at Gene W. Hirschfeld School of Dental Hygiene who have all contributed to my dental hygiene education.

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INTRODUCTION

In the United States, from 2012 to 2021, there has been a rapid increase in the number of individuals identifying as a sexual minority (3.5% in 2012 to 7.1% in 2021).[1] This may include lesbian, gay, bisexual, queer, questioning, intersex, asexual, and agender persons which we will refer to as LGBTQ+. Currently, around 20 million individuals identify as LGBTQ+.[2] While the public and legislation have become more accepting of sexual minorities, there are still challenges including discrimination and health disparities affecting this group. The 2011 Institute of Medicine report identified this population as underserved with many health disparities compared to the general public; citing a lack of attention to sexual and gender identity as a gap in efforts to reduce overall health disparities.[3] Some factors contributing to health disparities include negative experiences in healthcare settings, lack of healthcare provider training and knowledge in treating LGBTQ+ patients, and actual or perceived negative explicit and implicit biases among healthcare providers.[4] For example, one study among medical providers found unsatisfactory treatment of LGBTQ+ patients due to healthcare provider homophobia.[5] In a healthcare setting, those identifying as LBGTQ+ may be marginalized and subject to bias related to their sexuality and therefore treated differently than heterosexual individuals, which contributes to healthcare disparities.[6,7] Ultimately, provider biases and unequal treatment affect quality of life, mental and physical health, and the healthcare of LGBTQ+ individuals.[6]

Several reports from the Institute of Medicine, U.S. Department of Health and Human Services, and position statements from the American Association of Medical Colleges, American College of Physicians, and American Academy of Nursing have also indicated gaps in LGBTQ+ training and education for healthcare professionals.[7-11] Additionally, studies in dentistry have

also found a lack of educational curricula related to disparities in oral healthcare and dental education training to meet the needs of the LGBTQ+ population.[12-15] As the LGBTQ+ population expands, it is important healthcare providers, including oral healthcare providers, are trained and prepared to equitably meet the needs of this population. Knowledge of disparities and contributing barriers such as implicit biases are important in providing culturally responsive care and developing interventions to improve outcomes for LGBTQ+ patients.[16]

Implicit biases often operate outside of conscious awareness and can undermine an explicit commitment to providing equitable care.[17,18] Healthcare provider biases are correlated with poorer access to services, quality of care, and health outcomes.[19-23] Importantly, implicit biases towards vulnerable populations may persist in the absence of explicit attitudes. Implicit biases manifest in poorer patient communication, using a more dominant tone, negative perceptions about adherence to treatment, and spending less time with vulnerable populations.[18,23] These covert biases may create a negative experience for LGBTQ+ patients making them more likely to avoid care and further contribute to healthcare inequities. Importantly, the 2021 National Institute of Dental and Craniofacial Research report, "Oral Health: Advances and Challenges," also recognized the LGBTQ+ community as an underserved population facing discrimination, and more importantly, health inequities and barriers to access to quality healthcare compared to the general population.[24] Biases, discrimination, and lack of practitioner preparedness may contribute to quality-of-care discrepancies and may contribute to poorer overall health outcomes for individuals who identify as LGBTQ+.[25] As in healthcare, it is likely implicit biases are also affecting oral healthcare delivery and oral healthcare status of LGBTQ+ individuals but research in dentistry/dental hygiene is limited.

To reduce health disparities among patient populations, cultural humility and competence programs are recommended as training interventions for healthcare providers.[26] As research has expanded to understand the disparities within LGBTQ+ subpopulations, barriers such as implicit biases have been identified calling for educators to develop educational goals and competencies within curriculum to address issues of sex, sexuality, and gender-related care.[26] Awareness of provider implicit biases is an important first step in training professionals to provide more culturally competent care as awareness of implicit biases has been shown to be effective in decreasing biases.[27] Sexuality implicit biases can also easily be assessed using the validated Sexuality Implicit Association Test (IAT).[27] Additionally, the IAT can be modified to include dental/dental hygiene language to provide a more valid measure of oral healthcare-specific provider bias related to LGBTQ+ populations. The dental hygiene student level may be an ideal window for interventions to reduce biases because students are exposed to diverse patient populations and the opinions, attitudes, and behaviors of their faculty who impart professional norms and expectations that reflect their biases.[28] All healthcare, including oral healthcare, should be delivered objectively while considering unique patient characteristics. Awareness training at the student level and throughout curriculum may assist in graduating providers that are inclusive and sensitive to the needs of diverse populations. To the researchers' knowledge, there are no studies examining prevalence of sexuality implicit biases in dental hygiene students. Importantly, the American Dental Hygienists' Association's Code of Ethics states dental hygienists must "serve all clients without discrimination and avoid actions toward any individual or group that may be interpreted as discriminatory."[29] Further, Standard 2-15 of the Commission on Dental Accreditation (CODA) Standards for Dental Hygiene Education require graduates to

be competent in recognizing cultural influences impacting the delivery of health services to individuals and communities.[30]

Problem Statement

Sexual minorities have poorer health compared to the general population because they may receive lower-quality healthcare due to possible healthcare provider biases.[31-33] Knowledge of provider biases is essential in providing culturally sensitive care and developing effective interventions to improve health and oral healthcare outcomes in vulnerable populations. There is a need for more training and educational curriculum to effectively prepare clinicians to meet the needs of diverse populations. There is a gap in the literature related to prevalence and risk factors of sexuality implicit biases in dental hygiene students. A baseline measure of prevalence of sexuality implicit biases may assist dental hygiene students in recognizing biases early in their careers to increase skills in providing culturally equitable care in the future. Additionally, knowledge of student biases may assist educators in designing specific goals and curriculum to train students to provide optimal dental hygiene care to diverse populations. Therefore, the purpose of this pilot study is to assess the prevalence of sexuality implicit biases among entry-level dental hygiene students attending one university using a modified version of the Sexuality IAT. Additionally, this study aims to examine for differences in the level of sexuality implicit biases in different demographic variables. This study attempts to answer the following research questions:

1. What is the prevalence of implicit bias among student dental hygienists toward LGBTQ+ patients?
2. Does the year in dental hygiene education affect implicit biases toward LGBTQ+ patients?

3. Does age affect implicit biases toward LGBTQ+ patients?

Significance of the Problem

There are significant healthcare disparities affecting the overall health and well-being of LGBTQ+ individuals, which may be related to healthcare provider implicit biases. There are higher rates of certain diseases such as cardiovascular disease, certain cancers, and obesity.[34-38] Additionally, mental health disparities include higher instances of depression, suicide, and substance disorders.[39-43] Importantly, barriers such as discrimination and implicit biases of healthcare providers may exacerbate negative health outcomes for already vulnerable populations. Research has called for more training and education of healthcare providers to recognize disparities and barriers affecting sexual minorities to provide more equitable and sensitive care. Additionally, there is limited research in dentistry and dental hygiene on prevalence of sexuality implicit biases among practitioners. Students who are trained to recognize and address biases early in education may assist in providing more equitable care; ultimately, increasing oral health outcomes for LGBTQ+ populations in the future. The present study will expand the body of research related to possible biases affecting the delivery of equitable care to diverse patient populations. Diversity and inclusion are important in dental and dental hygiene education and this study will provide quantifiable information regarding possible biases towards LGBTQ+ patients.

Definition of Terms

For the purpose of this study, the following terms were defined as:

- Implicit Bias: Association or attitudes that may unknowingly affect an individual's perception or actions towards another. [44]
- Lesbian: Women who are primarily attracted to women.[45]

- Gay: Men and women who have same-sex attraction.[45]
- Bisexual: Individuals that are attracted to both males and females.[45]
- Transgender: A person whose anatomical birth sex is incongruent with their gender identity.[45]
- Queer: An umbrella term that encompasses a wide range of sexualities and genders that are outside the societal "norm."[45]
- Questioning: Somone who may be in the process of exploration and consideration of his or her sexual orientation or gender identity.[45]
- Intersex: Someone whose anatomy is not exclusively male or female.[46]
- Asexual: Someone who does not experience sexual attraction to anyone.[47]
- Agender: Someone who is genderless (male or female).[48]

Assumptions

This study was based on the following assumptions:

1. All participants understood the survey questions in a consistent way.
2. The survey questions were asking information participants had knowledge of and could retrieve.
3. The wording of the survey questions provided participants with enough information to be able to answer the question in the way intended by the researchers.
4. The participants answered the survey questions truthfully and honestly.

Hypotheses

The following null hypotheses was tested at the 0.05 level:

H_0: There is no statistically significant difference between year in program (1^{st} or 2^{nd}) and level of sexuality implicit bias as measured by the Dental Sexuality Implicit Associations Test.

H_0: There is no statistically significant difference between age and level of sexuality implicit bias as measured by the Dental Sexuality Implicit Associations Test.

CHAPTER II

REVIEW OF THE LITERATURE

Individuals who identify as a subset of the LGBTQ+ population are a rapidly growing demographic in the United States (U.S.).[49] As the dental profession fosters diversity and inclusion in clinical and academic settings, understanding the LGBTQ+ population is important to providing access to optimal healthcare, including oral healthcare.

Historically, LGBTQ+ individuals have been stigmatized and underserved with unique health needs and health disparities. It was only recently, in Healthy People 2020, that lesbian, gay, bisexual, and transgender individuals were identified in U.S. health priorities as an at-risk population.[50] There are significant disparities in physical and mental health outcomes for LGBTQ+ individuals compared to their heterosexual counterparts.[3] Related to disparities in mental health, the LGBTQ+ community has higher rates of depression and anxiety, substance abuse (alcohol, tobacco, other drugs), and suicide compared to heterosexual counterparts.[49,51-55] For example, one research study found that LGBTQ+ youth are more likely to be homeless and are three times more likely to attempt suicide.[45] In trans individuals, higher rates of self-harm and suicide have also been reported in the literature.[54-56] Research has also found higher prevalence of certain cancers such as colon, liver, breast, ovarian or cervical cancers among lesbian and bisexual women.[57,58] In gay and bisexual men, there are higher rates of transmission of human immunodeficiency virus (HIV), hepatitis, and other sexually transmitted infections (STIs) reported.[3,8,59]

These disparities in healthcare outcomes are often due to social risk factors such as discrimination, persisting stigmas, and lack of awareness about sexuality. Perceived discrimination from healthcare providers and denial of healthcare may also contribute to

LGBTQ+ health disparities.[60-62] For example, one recent U.S. study investigating experiences of discrimination against LGBTQ+ adults found that 18% of LGBTQ+ adults reported avoiding health care for themselves or a family member due to the fear of discrimination. Moreover, 16% of individuals reported experiencing discrimination in healthcare settings.[63] One national survey of LGBTQ+ patients found patients would postpone medical care due to discrimination, even if they were sick or injured.[64] Additionally, LGBTQ+ patients have reported anxiety about disclosing their sexual identity and avoid preventive treatments for fear of discrimination when being treated.[65,66] Studies have also reported negative experiences with healthcare professionals by LGBTQ+ patients including homophobia and unequal healthcare treatment.[63-66] Discrimination and lack of awareness could also be due to a lack of medical provider training in treating LGBTQ+ patients. For example, one study on medical students training to treat LGBTQ+ patients found over half of the participants reported no education on issues pertaining to homosexual men, 61% said they had no information about lesbian health, 78% said they had no information about bisexual health, and 76% said they had no information about transgender health.[65] These continual experiences of discrimination and perpetuating stigmas in the research ultimately contribute to healthcare disparities and contribute to negative healthcare outcomes for LGBTQ+ individuals.[61,67]

Implicit biases among healthcare providers may also contribute to disparities in healthcare for LGBTQ+ populations. Implicit biases are a covert type of discrimination embedded in the subconscious, which may weaken commitments to inclusive treatment even when providers make explicit commitments clear.[68] Implicit biases can be described as unconscious beliefs, assumptions, and prejudices, which influences one's decisions and attitudes without conscious awareness.[68] Racial implicit biases may influence how healthcare

professionals treat patients and healthcare professionals' implicit bias involving sexual orientation may produce similar behaviors and actions.[33] Importantly, implicit biases may unknowingly lead to discriminatory treatment of patients and significantly impact clinical judgment, decisions, and treatment decisions.[68] One study of heterosexual, first-year medical students found that over 80% of participants exhibited more negative evaluations of lesbian and gay compared to heterosexual individuals that were outside of their conscious awareness (i.e., implicit bias).[32] Additionally, half of the medical student participants also reported having explicit negative attitudes toward lesbian and gay people.[32] Ultimately, these unconscious feelings may lead to unfair or unequal treatment of LGBTQ+ patients compared to heterosexual patients. Sabin et al. also examined implicit and explicit attitudes toward gay and lesbian patients among several healthcare providers including nurses, physicians, and mental health providers, and found pervasive heterosexual preferences.[33] Unconscious biases among healthcare providers have been documented and it is likely oral healthcare providers may also harbor implicit preferences. These biases may compound negative experiences for the LGBTQ+ population and further contribute to healthcare barriers for this vulnerable population.[33] However, there is a need for more research on biases and disparities to understand the delivery of quality oral healthcare.

While there is research related to healthcare inequities experienced by LGBTQ+ individuals related to discrimination, bias, and lack of awareness, there is less research on oral health disparities. One study in dentistry found bisexual and homosexual individuals were more likely to report their oral health was poor but did not provide a clinical basis for this disparity.[69] Additionally, one study reported transgender individuals fear discrimination and maltreatment at the dental office with 10% reporting they do not visit the dentist regularly due to this fear of discrimination.[44] As in medicine, limited studies in dentistry have also indicated a lack of

educational curricula related to disparities in oral healthcare and dental education training to meet the needs of the LGBTQ+ population.[12-15] Importantly, one study examining curricula in treating LGBTQ+ populations found that 29% of dental schools and 48% of dental hygiene schools do not cover LGBTQ+ content.[12]

Based on these findings in healthcare and dentistry, LGBTQ+ individuals may be experiencing similar disparities in oral healthcare related to discrimination and lack of education, and implicit biases may be a contributing risk factor.[6] There is a need for more awareness and education in dentistry to effectively provide care to the LGBTQ+ population. An important starting point may be examining the prevalence of biases among dental and dental hygiene students. Awareness of biases affecting delivery of oral healthcare may also guide curricular changes and training interventions in treating LGBTQ+ patients.[32] Dental hygiene students may not be aware of biases toward LGBTQ+ individuals; as a result, the LGBTQ+ population may experience inequities in oral health outcomes.[44]

Cultural competence education during medical or dental training is important for providing inclusive care to LGBTQ+ patients. Increasing awareness and training to mitigate biases is important to create an inclusive environment, which decreases barriers to accessing care. One study of emergency medicine student residents utilized the race IAT to evaluate the effectiveness of implicit bias training on awareness.[70] The results showed a 33% increase in awareness of individual biases, and awareness of how their results influenced delivery of care to patients increased by 9.1%.[70] Emphasizing the importance of LGBTQ+ competency in early education may help reduce inequities and ensure every patient receives the highest quality care. Awareness is an important first step in combatting implicit biases to increase access to care for the LGBTQ+ population.

In summary, significant health disparities affect the LGBTQ+ population compared to heterosexual counterparts. LGBTQ+ individuals may be subject to discrimination and stigmatization in a healthcare setting, which creates barriers to access to care. Implicit biases are a type of unconscious discrimination and have also been shown to contribute to differing treatment and communication of minority populations in healthcare providers. There is a lack of research on training and awareness of implicit biases towards LGBTQ+ patients in oral healthcare providers. Ultimately, there may be oral healthcare disparities among LGBTQ+ patient populations and oral healthcare provider implicit preferences may be contributing. Awareness training early in education may increase knowledge of biases and mitigate negative biases which affect delivery of equitable oral healthcare. Therefore, the purpose of this study was to assess the prevalence of implicit biases in dental hygiene students as an important starting point in increasing knowledge of biases which may affect delivery of quality health and oral healthcare for the LGBTQ+ population.

CHAPTER III

METHODOLOGY

A cross-sectional survey design was used for this research study. A convenience sample of seventy-four ((n=37) first year, (n=37) second year) dental hygiene students in one baccalaureate entry-level dental hygiene program in Virginia were invited to participate in this voluntary, online survey. In an introductory statement, participants were informed of the identity of the investigators, the amount of time to complete the survey (approximately 20 minutes), participant anonymity and confidentiality, and that voluntary informed consent was understood upon return of the survey. No incentives were offered for survey completion. Participants were included if they were 18 years or older and enrolled as a first or second-year entry-level dental hygiene student in the university program where the study was conducted. Participants younger than 18 and not currently enrolled as a first or second-year entry-level dental hygiene student in the university program where this study was conducted were excluded from the study. No identifiable information was collected during the survey. Collected data was stored on an encrypted password protected computer and results were reported in aggregate form. The Health Sciences Human Subjects Review Committee determined this study as exempt (IRB #2151633-2).

Survey Instrument

The Sexuality Implicit Associations Test (IAT) is a validated tool used to measure implicit bias.[27] For this study, the Sexuality IAT was modified with permission from Project Implicit® to quantify sexuality implicit biases in the dental hygiene student population. Modifying the IAT to include dental/dental hygiene concepts may give more insight into oral healthcare provider bias related to LGBTQ+ populations.

An IAT requires participants to rapidly pair two social groups (in this case, heterosexual/straight and homosexual/gay) with either positive or negative attributes (words/concepts). The Dental/Dental Hygiene Sexuality IAT, requires participants to pair images/photos categorized as heterosexual or homosexual with good or bad dental terms like "health" or "inflammation." Depending on the latency in response to pairing of images and words or frequency of errors in pairing, the IAT measures the strength of association of each pairing. For example, more strongly associated categories are easier to pair resulting in faster response times in pairing and fewer errors in pairing. Response time is recorded by having the participants quickly sort the images and words into categories using the left ("E") and right ("I") computer keyboard keys. There are five main parts to the IAT. First, participants sort words relating to concepts (i.e., gay/homosexual, straight/heterosexual) into categories. So, if the category "heterosexual" were on the left, and an image representing heterosexual flashed on the computer screen, a participant would press the "E" key in response. In the second part, participants sort words relating to the evaluation (i.e., good, bad). So, if the category "good" were on the left, and a pleasant word like "health" appeared on the screen, the participant would press the "E" key. In the third part of the IAT, the first two categories are combined, and the participant is asked to sort both concept and evaluation words (i.e., heterosexual/good, homosexual/bad). In the fourth part, the placement of the concept switches from left ("E" key) to right ("I" key). For example, if the category "heterosexual" was previously on the left, it would now be on the right. Additionally, the number of trials is increased in this part to minimize effects or memorization or practice. In the final step of the IAT, the categories are combined in a way that is opposite to what they were before (i.e., if the category on the left was "heterosexual/good," it would now be "heterosexual/bad"). The final IAT score is based on how

quickly a participant sorts the words/concepts in the third part of the IAT versus the fifth part of the IAT. An implicit preference for straight individuals relative to gay people would be seen when a participant is faster to categorize words when heterosexual/straight and good share a response key and homosexual/gay and bad share a response key, relative to the reverse. When scored using the D algorithm, the average difference in response time across trials yields a continuous measure ranging from -2 to +2 which represent an estimate of effect size.[71] Scores ranging from 0-0.14 indicate no sexuality bias; slight straight preference (0.15-0.34); moderate straight preference (0.35-0.64); strong straight preference (>0.65). Scores in the negative range are categorized in the same degree and indicate a gay preference.

A panel of faculty reviewed the dental terms and images as well as demographic questions for content and face validity before deploying to participants. Additionally, the survey also included three demographic questions related to year in program, age, and ethnicity.

Statistical Analyses

The sample size was determined based on previous research on color-blind racial attitudes (a type of implicit bias) in dental hygiene students, which demonstrated significant differences between groups could be identified with seventy-one participants (n=71).[72] Descriptive statistics were analyzed to evaluate the means between groups and determine prevalence of sexually implicit biases. The data met the assumptions to perform parametric statistical analyses. Independent samples t-test was utilized to examine for statistically significant differences ($p < 0.05$) in level of implicit bias based on year in program (1^{st} or 2^{nd}). One way between subjects analysis of variance (ANOVA) was utilized to determine statistically significant differences ($p < 0.05$) among dental hygiene student participants based on age.

CHAPTER IV

RESULTS

Of the 74 entry-level dental hygiene students invited to participate in the online survey, n=70 completed the survey, resulting in a response rate of 94.5%. The Dental/Dental Hygiene Sexuality IAT can be seen in Figure 1.

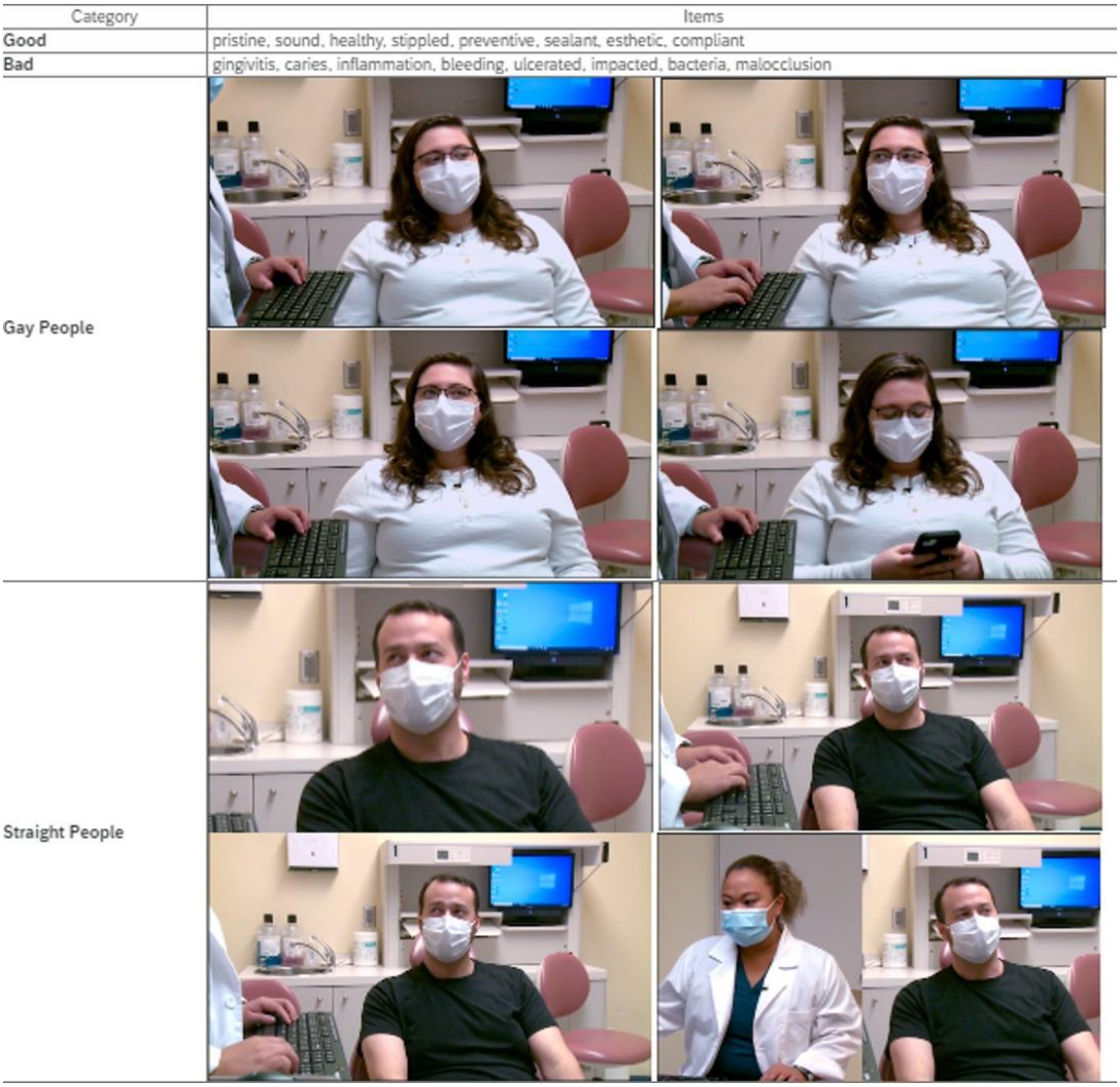


Figure 1. Dental Hygiene Sexuality Implicit Associations Test

There were approximately an equal number of participants in each program year, with 34 (48.6%) students in the first year and 36 (51.4%) in the second year. Most respondents were between the ages of 18-24 (n=59, 84.3%). Additionally, most participants were white (n=32, 45.7%). Demographic characteristics are displayed in Table I.

Table I. Demographic Characteristics of Dental Hygiene Student Participants (n=70)

Demographics	**n (%)**	
Year in Program		
1st Year	34 (48.6)	
2nd Year	36 (51.4)	
Age	**1st year**	**2nd year**
18-24	29 (85.3)	30 (83.3)
25-34	5 (14.7)	4 (11.1)
35-44	0 (0)	2 (5.6)
Ethnicity	**1st year**	**2nd year**
White	11 (32.4)	21 (58.3)
Black or African American	5 (14.7)	3 (8.3)
Hispanic	7 (20.6)	2 (5.6)
Asian	5 (14.7)	7 (19.4)
Mixed	5 (14.7)	2 (5.6)
Other	1 (2.9)	1 (2.8)

Results revealed an overall average D-score of 0.001 for the first-year students, and .069 for second year students, which indicates no sexuality preference. When comparing sexuality

implicit D-scores and year in the program (1st or 2nd), no statistically significant differences were found ($p > 0.05$). Independent samples *t*-test results are shown in Table II. Finally, when comparing age groups and sexuality implicit bias D-scores, no statistically significant differences were found ($F(2, 67) = 1.597$, $p = 2.10$) ($p > 0.05$).

Table II. *t*-test results comparing year in program (1st or 2nd)

Year in Program	Mean	t	df	Sig (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
						Lower	Upper
1st (n=34)	0.0014254089	-.959	68	.341	-.067645691	-.208427622	.0731362408
2nd (n=36)	0.0690710994						

When examining descriptive statistics and average D-scores among first- and second-year students, most first- and second-year students had D-scores in the "no sexuality preference" range (15 first year (44.1%) and 11 second year (30.6%)). Further, almost half of second-year participants had sexuality implicit D-scores that fell in the straight preference ranges (n=17, 47%). Only about one-fourth of all first- and second-year dental hygiene students had sexuality implicit D-scores falling into the gay preference ranges (n=18, 26%). First and second year dental hygiene student D-score ranges are shown in Table III.

Table III. Implicit Association Test D Scores (n = 70)

D score range	Implicit Associations	Year in Program	
		1st Year (n=34) n (%)	2nd Year (n=36) n (%)
-0.66 - -2.00	Strong Gay Preference	0 (0)	1 (2.8)
-0.36 - -0.65	Moderate Gay Preference	4 (11.8)	3 (8.3)
-0.16 - -0.35	Slight Gay Preference	6 (17.6)	4 (11.1)
-0.15 - 0.15	No Preference	15 (44.1)	11 (30.6)
0.16 - 0.35	Slight Straight Preference	6 (17.6)	10 (27.8)
0.36 – 0.65	Moderate Straight Preference	3 (8.8)	6 (16.7)
0.66 – 2.00	Strong Straight Preference	0 (0)	1 (2.8)

CHAPTER V

DISCUSSION

Bias and discrimination may contribute to healthcare inequities in the LGBTQ+ population in the United States. This may ultimately lead to poorer health and healthcare outcomes for this vulnerable population. There is a need for more cultural awareness and training of healthcare professionals, including dental professionals, to reduce biases which may affect delivery of quality care to LGBTQ+ patients. This pilot study aimed to examine the prevalence of sexual implicit bias among entry-level dental hygiene students at one university. Additionally, this study investigated differences in sexuality implicit bias based on year in dental hygiene program (first or second) and age groups.

Results from the Dental Sexuality IAT indicate overall mean implicit D-Scores for first- and second-year dental hygiene students were in the no sexuality preference range indicating no implicit bias against LGBTQ+ patients, which is positive. This finding contrasts with studies among nursing students which found moderate preference for straight individuals.[33,71] Interestingly, when this study was conducted, the first-year dental hygiene student sample had just started patient care, while the second-year students had been treating patients for one year. One research study among healthcare students found increasing patient care experiences increased their comfort levels and confidence in working with LGBTQ+ patients.[49] Additionally, another study of heterosexual medical students found over 80% of first year students exhibited more negative attitudes of lesbian and gay people compared to heterosexual people that were outside of their conscious awareness.[32] In this current study the first and second-year dental hygiene students seem comfortable treating LGBTQ+ patients as the majority are not exhibiting implicit preferences for straight or gay individuals as indicated by average D-scores. These

results could be due to increased media focus on biases towards LGBTQ+ populations, which increased awareness of sexuality inequalities.

One study examined dental student leaders' perception of educational efforts concerning LGBT topics and the cultural climate surrounding these issues.[14] The study found student leaders who believed their university had an honest interest in diversity were more likely to feel prepared by their dental school program to treat LGBT+ patients.[14] Further, the better they felt prepared, the more they perceived the clinic environment as sensitive and affirming for patients with different sexual orientations.[14] It is plausible the students participating in this study felt their program and university had a vested interest in creating a welcoming environment for diverse populations such as LGBTQ+ individuals which led to no implicit preference for sexuality. For example, the university dental hygiene program where this study was performed utilizes an electronic health record that asks for the patient to optionally disclose their preferred pronouns. Perhaps asking for preferred pronouns at the beginning of the appointment showed the dental hygiene program's commitment to respecting the individual's identity. This finding is further highlighted by a study of medical, dental, and nursing students' preparedness to address lesbian, gay, bisexual, transgender, and queer health.[73] This study found participating dental students who had fewer positive perceptions of their formal training in LGBTQ health had slightly less positive and more stereotypical attitudes towards LGBTQ populations.[73]

Additionally, the dental hygiene program where the study was conducted also has a Wellness, Inclusion, Diversity, Accessibility, and Sense of Belonging (Well IDEAS) student group, modeled after the American Dental Education Association (ADEA), which focuses on inclusiveness and making sure diverse students are represented during their education.[74] The student group also encourages peer to peer interaction and it is possible that gender and sexual

identity information was disclosed, which increased inclusivity, knowledge, and sensitivity to one another. Additionally, student participants were offered an adjunctive LGBTQ+ educational course through the Well IDEAS group during their education, which could have increased awareness. Students from diverse backgrounds interacting and working together are more likely to learn, empathize, and become culturally competent providers.[74] The above findings may have contributed to the majority results of no sexuality preference in the dental hygiene student participants.

Finally, it is important to note when examining individual implicit D-scores, almost half of second-year dental hygiene students scored in the straight preference ranges. While theis finding was not statistically significant it does point to a need for more education and training on treating LGBTQ+ patients in the dental setting. Dental and dental hygiene practitioners must be aware and able to address barriers commonly experienced by marginalized populations.[73] Increasing awareness may improve comfort treating LGBTQ+ patients to provide more equitable and optimal care. Education on implicit biases may include initial, frequent, and ongoing awareness training such as taking the IAT to motivate clinicians to monitor and change their interactions and make informed clinical decisions for LGBTQ+ individuals.[75] Further, teaching strategies should include methods to also reduce and mange implicit biases through increased contact with vulnerable patient populations. This could include more dental hygiene community outreach activities at LGBTQ+ specific institutions and programs. Additionally, perspective taking exercises such as LGBTQ+ case studies on treatment or barriers may be effective in decreasing implicit biases.[75]

Additionally, increasing education on clinical treatment of LGBTQ+ patients may assist in decreasing stigmas and discrimination surrounding treating this population. For example, one

study found medical and nursing students had more negative views about sexual minorities when they had less information and education about the population.[76] Education on relevant medical history or medication use by LGBTQ+ patients and implications may increase knowledge and comfort in treating this population.[73] Training interventions may also include methods to effectively screen for oral infections and diseases for which the LGBTQ population may be at higher risk such as oral lesions resulting from sexually transmitted infections.[73] An aware and well-trained oral healthcare practitioner should be able to effectively elicit relevant information from all patients by asking appropriate questions and speak knowledgeably about sexual health with all patients.[73] Increasing knowledge in health issues and treating the LGBTQ+ population may make providers more confident in their interactions and make for more positive oral healthcare interactions.

Overall, this pilot study provided a foundation for future research as it is the first assessment of prevalence of sexually implicit attitudes in entry-level dental hygiene students. Practicing dental hygienists, dental hygiene educators, and students may use this information to increase their understanding of prevalence and risk factors associated with sexuality implicit attitudes. Inclusivity and diversity are important in dental hygiene education. Dental hygiene educators should be committed to educate students on current patient trends and demographic changes to produce clinicians capable of meeting the oral healthcare needs of diverse populations.

Limitations

Several limitations may have influenced the findings of this study. This study utilized a convenience sample of entry-level dental hygiene students from one institution, which limits generalizability. Additionally, the researchers did not collect demographic information on

sexuality of the participants, or if they have family/friends who identify with the LGBTQ+ community, which may have influenced results. For the present study, many participants anecdotally reported having never taken an IAT, which may have impacted response times. This study piloted a modified version of the Sexuality Implicit Associations Test,[71] and the photos used did not offer noticeable variation between the heterosexual and homosexual individuals. This limitation may have influenced the response times on the IAT. Pictures used in the IAT may have been familiar to participants, which could have influenced results. Future studies should increase the sample and disseminate the instrument to dental hygiene programs across the United States and examine sexuality bias in first- and second-year students, separately. Further, studies examining prevalence of sexuality implicit biases in practicing dental hygienists should be conducted. Also, research examining different demographic variables such as age ranges, experience level, sexuality, and/or past training and the effects on sexuality implicit biases. Finally, further modifying and validating this dental/dental hygiene specific IAT would be important in providing more information specific to sexuality implicit biases in the dental profession.

CHAPTER VI

CONCLUSION

Findings from this pilot study suggest that the overall mean sexuality implicit D-score for first- and second-year participants fell into the “no sexuality preference” range. Almost half of the second-year dental hygiene students scored in the straight preference ranges for individual implicit D scores. This notable finding emphasizes the need for more education and training on implicit biases. Results from this study highlight the need to expand research in dentistry on the prevalence of sexuality implicit biases and associated risk factors. Future studies should expand the sample size to include dental hygiene programs in multiple geographic locations to examine sexuality implicit biases.

REFERENCES

1. Jones JM. LGBT identification in U.S. ticks up to 7.1% [Internet]. 2022 Feb 17 [cited 2024 Feb 21]. Available from: https://news.gallup.com/poll/389792/lgbt-identification-ticks-up.aspx.
2. United States Census Bureau. Household pulse survey. [Internet]. 2021. [cited 2024 Feb 5]. Available at: https://www.census.gov/data/tables/2021/demo/hhp/hhp33.html.
3. Institute of Medicine. The health of lesbian, gay, bisexual, and transgender people: Building a foundation for better understanding. Washington, DC: National Academies Press; 2011.
4. National Academies of Sciences, Engineering, and Medicine; National Academy of Medicine; Committee on the future of nursing 2020–2030. The future of nursing 2020-2030: Charting a path to achieve health equity. Flaubert JL, Le Menestrel S, Williams DR, Wakefield MK, editors. Washington (DC): National Academies Press (US); 2021 May 11. PMID: 34524769.
5. Marcelin JR, Siraj DS, Victor R, Kotadia S, Maldonado YA. The impact of unconscious bias in healthcare: How to recognize and mitigate it. J Infect Dis. 2019 Aug 20;220(220 Suppl 2):S62-S73.
6. Casanova-Perez R, Apodaca C, Bascom E, Mohanraj D, Lane C, Vidyarthi D, Beneteau E, Sabin J, Pratt W, Weibel N, Hartzler AL. Broken down by bias: Healthcare biases experienced by BIPOC and LGBTQ+ patients. AMIA Annu Symp Proc. 2022 Feb 21;2021:275-284.
7. Agency for Healthcare and Research Quality. National healthcare quality and disparities report. [Internet]. 2019 Sep 18. [Cited 2024 Feb 8] Available at: ahrq.gov/research/findings/nhqrdr/nhqdr17/index.html.
8. Daniel H, Butkus R. Lesbian, gay, bisexual, and transgender health disparities: Executive summary of a policy position paper from the American college of physicians. Ann Intern Med. 2015 Jul 21;163(2):135-7.
9. American Academy of Nursing, Position Statement on Health Care for Sexual Minority and Gender-Diverse Populations. Online J of Issues in Nursing. 2018 Nov 19; 24(1).
10. Hollenbach AD, Eckstrand KL, Dreger A. Implementing curricular and institutional climate changes to improve health care for individuals who are LGBT, gender nonconforming, or born with DSD: A resource for medical educators. 2014.
11. U.S. Department of Health and Human Services. Healthy people 2020 topics and objectives: lesbian, gay, bisexual, and transgender health [Internet]. 2013 [cited 2023 Apr 6]. Available from: https://www.healthypeople.gov/2020/topics-objectives/topic/lesbian-gay-bisexual-and-transgender-health
12. Hillenburg, K., Murdoch-Kinch, C., Kinney, J., Temple, H., & Inglehart, M. LGBT coverage in U.S. dental schools and dental hygiene programs: Results of a national survey. 2016. J Dent Educ. 80(12), 1440-1449.
13. Brondani M, Paterson R. Teaching lesbian, gay, bisexual, and transgender issues in dental education: a multipurpose method. J Dent Educ. 2011;75(10): 1354-61. 2.
14. Anderson J, Patterson A, Temple H. Inglehart M. Lesbian, gay, bisexual, and transgender (LGBT) issues in dental school environments: dental student leaders' perceptions. J Dent Educ. 2008;73(1): 105-18.

15. Behar-Horenstein LS, Morris DR. Dental school administrators' attitudes towards providing support services for LGBT-identified students. J Dent Educ. 2015 Aug;79(8):965-70. PMID: 26246536.
16. Özdemir RC, Erenoğlu R. Attitudes of nursing students towards LGBT individuals and the affecting factors. Perspect Psychiatr Care. 2022;58(1):239-247. doi: 10.1111/ppc.12941.
17. Greenwald AG, Banaji MR. Implicit social cognition: attitudes, self-esteem, and stereotypes. Psychol Rev. 1995;102(1):4–27. 35.
18. van Ryn M, Saha S. Exploring unconscious bias in disparities research and medical education. JAMA. 2011;306(9):995–6.
19. Burgess D, van Ryn M, Dovidio J, Saha S. Reducing racial bias among health care providers: lessons from social-cognitive psychology. J Gen Intern Med. 2007;22(6):882–7.
20. FitzGerald C, Hurst S. Implicit bias in healthcare professionals: A systematic review. BMC Med Ethics. 2017;18(1):19. 39.
21. Shavers VL, Fagan P, Jones D, Klein WMP, Boyington J, Moten C. The state of research on racial/ethnic discrimination in the receipt of health care. Am J Public Health. 2012;102(5):953–66. 40.
22. Chapman EN, Kaatz A, Carnes M. Physicians and implicit Bias: How doctors may unwittingly perpetuate health care disparities. J Gen Intern Med. 2013;28(11):1504–10.
23. Zestcott CA, Blair IV, Stone J. Examining the presence, consequences, and reduction of implicit Bias in health care: a narrative review. Group Proccess Interg. 2016;19(4):528–42.
24. National Institute of Dental and Craniofacial Research. Oral Health in America: Advances and challenges. 2021;3:A55-A56.
25. Hafeez H, Zeshan M, Tahir MA, Jahan N, Naveed S. Health care disparities among lesbian, gay, bisexual, and transgender youth: A literature review. Cureus. 2017 Apr 20;9(4)
26. Agency for Healthcare Research Quality (AHRQ), Evidence-based practice center systematic review protocol project title: improving cultural competence to reduce health disparities for priority populations, AHRQ, Eff. Health Care Progr. (2014) 32.
27. Greenwald AG, McGhee DE, Schwartz JLK. Measuring individual differences in implicit cognition: the implicit association test. J Pers Soc Psychol. 1998; 74(6):1464–80.
28. Conron KJ, Mimiaga MJ, Landers SJ. A population-based study of sexual orientation identity and gender differences in adult health. Am J Public Health. 2010;100(10):1953–60.
29. Dental Hygiene Standards. [Internet]. American Dental Association. 2016 Aug 5.[updated 2021 Aug 6]. Available from: https://coda.ada.org/-/media/project/ada-organization/ada/coda/files/dental_hygiene_standards.pdf?rev=aa609ad18b504e9f9cc63f0b3715a5fd&hash=67CB76127017AD98CF8D62088168EA58. Accessed September 22, 2023.
30. Commission on Dental Accreditation. Accreditation standards for dental education programs [Internet]. Chicago, IL: American Dental Association; 2016 [cited 2024 Mar 2]. Available from: https://coda.ada.org/-/media/project/ada-organization/ada/coda/files/dental_hygiene_standards.pdf?rev=aa609ad18b504e9f9cc63f0b3715a5fd&hash=67CB76127017AD98CF8D62088168EA58.

31. Lim FA, Brown DV, Jr, Justin Kim SM. Addressing health care disparities in the lesbian, gay, bisexual, and transgender population: a review of best practices. Am J Nurs. 2014;114(6):24–34.
32. Burke SE, Dovidio JF, Przedworski JM, Hardeman RR, Perry SP, Phelan SM. Do contact and empathy mitigate bias against gay and lesbian people among heterosexual first-year medical students? A report from the medical student change study. Acad Med. 2015;90(5):645–51.
33. Sabin JA, Riskind RG, Nosek BA. Health care providers' implicit and explicit attitudes toward lesbian women and gay men. Am J Public Health. 2015;105(9):1831–41
34. Conron KJ, Mimiaga MJ, Landers SJ. A population-based study of sexual orientation identity and gender differences in adult health. Am J Public Health. 2010;100(10):1953–60.
35. Caceres BA, Brody A, Luscombe RE, Primiano JE, Marusca P, Sitts EM, Chyun D. A systematic review of cardiovascular disease in sexual minorities. Am J Public Health. 2017;107(4).
36. Fredriksen-Goldsen KI, Kim HJ, Barkan SE, Muraco A, Hoy-Ellis CP. Health disparities among lesbian, gay, and bisexual older adults: Results from a population-based study. Am J Public Health. 2013;103(10):1802–9.
37. Darwich L, Videla S, Canadas MP. Distribution of human papillomavirus genotypes in anal cytological and histological specimens from HIV-infected men who have sex with men and men who have sex with women. Dis Colon Rectum. 2013;56(9):1043-52
38. Dilley JA, Simmons KW, Boysun MJ, Pizacani BA, Stark MJ. Demonstrating the importance and feasibility of including sexual orientation in public health surveys: health disparities in the Pacific northwest. Am J Public Health. 2010;100(3):460–7.
39. Lewis NM. Mental health in sexual minorities: recent indicators, trends, and their relationships to place in North America and Europe. Health Place. 2009;15(4):1029-45.
40. Bazargan M, Galvan F. Perceived discrimination and depression among low-income Latina male-to-female transgender women. BMC Public Health. 2012;12:663
41. Remafedi G, French S, Story M, Resnick MD, Blum R. The relationship between suicide risk and sexual orientation: results of a population-based study. Am J Public Health. 1998;88(1):57–60.
42. Lewis NM. Mental health in sexual minorities: recent indicators, trends, and their relationships to place in North America and Europe. Health Place. 2009;15(4):1029-45.
43. Kecojevic A, Wong CF, Schrager SM, et al. Initiation into prescription drug misuse: differences between lesbian, gay, bisexual, transgender (LGBT) and heterosexual high-risk young adults in Los Angeles and New York. Addict Behav. 2012;37(11):1289-93
44. Haley CM, Macri, D, Perez HL, Schwartz SB. LGBTQ+ and dental edu cation: Analyzing the present and recommendations for the future. J Dent Hyg. 2022, 86(9), 1191–1197
45. (IOM) Institute of Medicine, The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for Better Understanding, Institute of Medicine, Washington, DC, 2011, doi: http://dx.doi.org/10.17226/13128.
46. Lee P.A., Nordenström A., Houk C.P., Ahmed S.F., Auchus R., Baratz A., Baratz Dalke K., Liao L.M., Lin-Su K., Looijenga L.H., et al. Global disorders of sex development update since 2006: Perceptions, approach and care. Horm. Res. Paediatr. 2016;85:158–180.

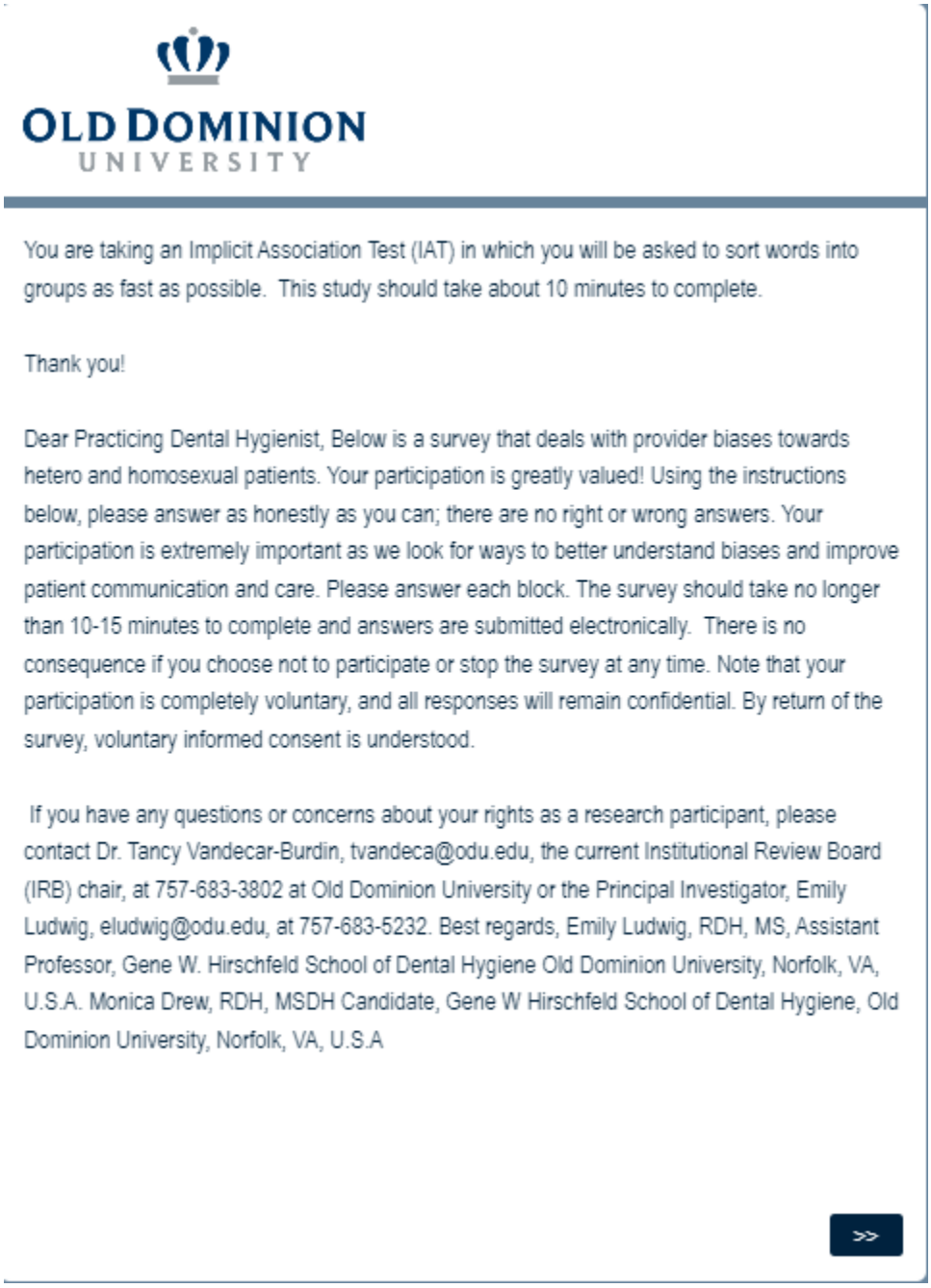
47. Asexual Visibility and Education Network. Overview [Internet]. 2018 Dec 19 [cited 2023 Apr 6]. Available from: https://asexuality.org/?q=overview.html
48. Ketola, Selander S, Ruvio A. Identity expressions of agender individuals in a digital world. In: The Routledge Handbook of Digital Consumption. 2nd ed. Routledge; 2023. p. 425-435.
49. Morris M, Cooper RL, Ramesh A, Tabatabai M, Arcury TA, Shinn M, Im W, Juarez P, Matthews-Juarez P. Training to reduce LGBTQ-related bias among medical, nursing, and dental students and providers: A systematic review. BMC Med Educ. 2019 Aug 30;19(1):325.
50. U.S. Department of Health and Human Services. Healthy People 2020: Disparities [Internet]. 2010 [cited 2014 Mar 18]. Available from: http://www.healthypeople.gov/2020/about/disparitiesAbout.aspx.
51. World Health Organization (WHO). FAQ on Health and Sexual Diversity. An Introduction to Key Concepts. 2016. [Cited 2021 Mar 20]. Available from: https://www.who.int/gender-equity-rights/news/20170329-health-and-sexual-diversity-faq.pdf.
52. Weinstein JN, Geller A, Negussie Y, Baciu A. The state of health disparities in the United States. In: Communities in Action: Pathways to Health Equity. Washington, DC: The National Academies Press; 2017. p. 57-98.
53. Remafedi G, French S, Story M, Resnick MD, Blum R. The relationship between suicide risk and sexual orientation: results of a population-based study. Am J Public Health. 1998;88(1):57-60.
54. Manzer D, O'Sullivan L, Doucet S. Culturally competent care of LGBT patients: The NP experience. Int J Adv Nurs Educ Res. 2019;4:53-68
55. Kaufman EA, Meddaoui B, Seymour NE, Victor SE. The roles of minority stress and thwarted belongingness in suicidal ideation among cisgender and transgender/nonbinary LGBTQ+ Individuals. Arch Suicide Res. 2023 Oct-Dec;27(4):1296-1311.
56. Lawrence AA. Transgender health concerns. The health of sexual minorities: Public health perspectives on lesbian, gay, bisexual and transgender populations. New York: Springer; 2007. p. 355-374
57. O'Hanlan KA, Isler CM. Health care of lesbian and bisexual women. In: Meyer IH, Northridge ME, editors. The health of sexual minorities: Public health perspectives on lesbian, gay, bisexual and transgender populations. New York: Springer; 2007. p. 506-522.
58. Weinstein JN, Geller A, Negussie Y, Baciu A. The state of health disparities in the United States. In: Communities in action: Pathways to health equity. Washington, DC: The National Academies Press; 2017. p. 57-98.
59. Fredriksen-Goldsen KI, Simoni JM, Kim HJ, Lehavot K, Walters KL, Yang J, Muraco A. The health equity promotion model: Reconceptualization of lesbian, gay, bisexual, and transgender (LGBT) health disparities. Am J Orthopsychiatry. 2014;84:653-663.
60. Lambda Legal. When health care isn't caring: Lambda Legal's survey of discrimination against LGBT people and people with HIV. New York. 2010. https://legacy.lambdalegal.org/sites/default/files/publications/downloads/whcic-report_when-health-care-isnt-caring.pdf

61. Grant JM, Mottet LA, Tanis J. National transgender discrimination survey report on health and health care. Washington, DC: National Center for Transgender Equality and National Gay and Lesbian Task Force; 2010.
62. Shires DA, Jaffee K. Factors associated with health care discrimination experiences among a national sample of female-to-male transgender individuals. Health Soc Work. 2015;40(2):134-141.
63. Casey LS, Reisner SL, Findling MG, Blendon RJ, Benson JM, Sayde JM, Miller C. Discrimination in the United States: Experiences of lesbian, gay, bisexual, transgender, and queer Americans. Health Serv Res. 2019 Dec;54(Suppl 2):1454-1466.
64. Grant JM, Mottet LA, Tanis JD. Injustice at every turn: A report of the national transgender discrimination survey. National Center for Transgender Equality [Internet]. 2011 [cited 2015 Feb 10]. Available from: http://transequality.org/PDFs/Executive_Summary.pdf.
65. Eliason MJ, Dibble SL, Robertson PA. Lesbian, gay, bisexual, and transgender (LGBT) physicians' experiences in the workplace. J Homosex. 2011;58:1355-1371.
66. Wilkerson MJ, Rybicky S, Barber CA, Smolenski DJ. Creating a culturally competent clinical environment for LGBT patients. J Gay Lesbian Soc Serv. 2011;23(3):376-394.
67. Chapman R, Watkins R, Zappia T, Nicol P, Shields L. Nursing and medical students' attitude, knowledge and beliefs regarding lesbian, gay, bisexual and transgender parents seeking health care for their children. J Clin Nurs. 2012;21:938-945.
68. Sukhera J, Watling CJ, Gonzalez CM. Implicit bias in health professions: From recognition to transformation. Acad Med. 2020 May;95(5):717-723.
69. Schwartz SB, Sanders AE, Lee JY, Divaris K. Sexual orientation-related oral health disparities in the United States. J Public Health Dent. 2019 Dec;79(1):18-24.
70. Zeidan AJ, Khatri UG, Aysola J, Shofer FS, Mamtani M, Scott KR, Conlon LW, Lopez BL. Implicit bias education and emergency medicine training: Step one? Awareness. AEM Educ Train. 2018 Sep 24;3(1):81-85.
71. Murphy MG. Implicit bias toward lesbian and gay persons among nursing students: A correlation study. Nurs Educ Perspect. 2024;45(1):19-24.
72. Ludwig E, Tolle S, Suedbeck J. Color-blind racial attitudes in dental hygiene students: a pilot study. J Dent Hyg. 2019 Oct;93(5):15-22.
73. Greene MZ, France K, Kreider EF, Wolfe-Roubatis E, Chen KD, Wu A. Comparing medical, dental, and nursing students' preparedness to address lesbian, gay, bisexual, transgender, and queer health. PLoS ONE. 2018;13(9):e0204104.
74. American Dental Education Association (ADEA). Need for diversity in dentistry [Internet]. Available from: https://www.adea.org/godental/dentistry_101/need_for_diversity.aspx.
75. Morris MC, Cooper RL, Ramesh A, Tabatabai M, Arcury TA, Shinn M, Wansoon I, Juarez P, Matthews-Juarez P. Preparing medical students to address the needs of vulnerable patient populations: Implicit bias training in US medical schools. Med Sci Educ. 2020 Mar;20(1):123–127.
76. McKelvey W, Webb JA, Baldassar LV, Robinson SM, Riley G. Sex knowledge and sexual attitudes among medical and nursing students. Aust N Z J Psychiatry. 1999;33(2):260-266.

APPENDICES

APPENDIX A

SURVEY/QUESTIONNAIRE



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UNIVERSITY

You are taking an Implicit Association Test (IAT) in which you will be asked to sort words into groups as fast as possible. This study should take about 10 minutes to complete.

Thank you!

Dear Practicing Dental Hygienist, Below is a survey that deals with provider biases towards hetero and homosexual patients. Your participation is greatly valued! Using the instructions below, please answer as honestly as you can; there are no right or wrong answers. Your participation is extremely important as we look for ways to better understand biases and improve patient communication and care. Please answer each block. The survey should take no longer than 10-15 minutes to complete and answers are submitted electronically. There is no consequence if you choose not to participate or stop the survey at any time. Note that your participation is completely voluntary, and all responses will remain confidential. By return of the survey, voluntary informed consent is understood.

If you have any questions or concerns about your rights as a research participant, please contact Dr. Tancy Vandecar-Burdin, tvandeca@odu.edu, the current Institutional Review Board (IRB) chair, at 757-683-3802 at Old Dominion University or the Principal Investigator, Emily Ludwig, eludwig@odu.edu, at 757-683-5232. Best regards, Emily Ludwig, RDH, MS, Assistant Professor, Gene W. Hirschfeld School of Dental Hygiene Old Dominion University, Norfolk, VA, U.S.A. Monica Drew, RDH, MSDH Candidate, Gene W Hirschfeld School of Dental Hygiene, Old Dominion University, Norfolk, VA, U.S.A

>>

Category	Items
Good	pristine, sound, healthy, stippled, preventive, sealant, esthetic, compliant
Bad	gingivitis, caries, inflammation, bleeding, ulcerated, impacted, bacteria, malocclusion
Gay People	
Straight People	

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What is your age range?

- ○ <18
- ○ 18-24
- ○ 25-34
- ○ 35-44
- ○ 45-54
- ○ 55+

Select your ethnicity.

- ○ White
- ○ Black or African American
- ○ American Indian or Alaska Native
- ○ Hispanic
- ○ Pacific Islander or Native Hawaiian
- ○ Asian
- ○ Mixed
- ○ Other

What year of dental hygiene are you enrolled in?

- ○ 1st year
- ○ 2nd year

>>

APPENDIX B

IRB EXEMPTION

OLD DOMINION UNIVERSITY

OFFICE OF THE VICE PRESIDENT FOR RESEARCH

Physical Address
4111 Monarch Way, Suite 203
Norfolk, Virginia 23508
Mailing Address
Office of Research
1 Old Dominion University
Norfolk, Virginia 23529
Phone(757) 683-3460
Fax(757) 683-5902

DATE:	February 12, 2024
TO:	Emily Ludwig
FROM:	Old Dominion University Health Sciences Human Subjects Review Committee
PROJECT TITLE:	[2151633-2] Prevalence of Sexually Implicit Attitudes in Entry-Level Dental Hygiene Students
REFERENCE #:	
SUBMISSION TYPE:	Amendment/Modification
ACTION:	DETERMINATION OF EXEMPT STATUS
DECISION DATE:	
REVIEW CATEGORY:	Exemption category # 2

Thank you for your submission of Amendment/Modification materials for this project. The Old Dominion University Health Sciences Human Subjects Review Committee has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact Harry Zhang at 757-683-6870 or qzhang@odu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Old Dominion University Health Sciences Human Subjects Review Committee's records.

VITA

Monica Mercedez Drew
Old Dominion University School of Dental Hygiene
4608 Hampton Blvd, Norfolk, VA 23529

EDUCATION:

2024	Master of Science, Dental Hygiene Old Dominion University Norfolk, Virginia
2022	Bachelor of Science, Dental Hygiene Old Dominion University Norfolk, Virginia

EXPERIENCE

Academic Experience:

2024-Present	Community Internship Old Dominion University, School of Dental Hygiene
2022-Present	Graduate Teaching Assistant Old Dominion University, School of Dental Hygiene

Private Practice Experience:

2024 – Present	Registered Dental Hygienist Spencer Dental
2022-Present	Registered Dental Hygienist (Temp)

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

2020-Present	American Dental Hygienists' Association, Member
2022-Present	Tidewater Dental Hygienists' Association, Member
2021-Present	Alpha Eta National Honor Society for Allied Health Professionals, Member Old Dominion University Chapter

To the best of my ability, this CV is accurate.

Monica Drew