ASSESSING THE LEVELS OF RACIAL IMPLICIT BIAS AMONG ANESTHESIA PROVIDERS

by

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ABSTRACT

NGOZICHI DEBIE OGBONNAYA. Assessing The Levels of Racial Implicit Bias Among Anesthesia Providers. (Under the direction of DR. DAVID LANGFORD)

Implicit biases are detrimental to patient care and outcomes, yet they are prevalent among providers. Research has shown implicit bias hinders rapport between patient and provider, leading to patients becoming resistant to medical advice and treatment protocols. The prevalence of implicit bias among healthcare providers must be recognized by healthcare systems, along with understanding the varying levels of bias among different levels of providers and the ramifications. This doctoral project aims to assess and establish baseline levels of existing implicit racial bias among anesthesia providers working at a hospital of a large healthcare system in the Southeastern US. The Harvard's Implicit Association Test was administered to anesthesia providers using an online survey platform. Comparisons were made between providers by type (CRNA, SRNA, Anesthesiologist) and age. Results demonstrated a level of racial bias between slight and moderate (D score 0.15-0.35). There was no statistical difference between groups of anesthesia providers assessed for racial bias.

ACKNOWLEDGEMENTS

This project was a subsect of a larger implicit bias project and would not have been possible without my team members Shanita George and Mel Okuta. Thank you both for your unwavering and encompassing support. Dr. David Langford, thank you for your guidance and insight on successfully conducting a doctoral level quality improvement project and your role as committee chair. Dr. Dianne Earnhardt, thank you for your support in all phases and at all levels of this study. Dr. Zhuo Job Chen, your assistance with the analysis was invaluable; thank you so much. Lastly, I deeply appreciate the clinical support and fervent advocacy provided by Paula OspinaGomez, Gina Stavrakas, and Dr. Kimberly Blasius. Thank you all, sincerely.

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
CRNA	Certified Registered Nurse Anesthetist
fMRI	functional Magnetic Resonance Imaging
IAT	Implicit Association Test
IRB	Institutional Review Board
MDA	Medical Doctor of Anesthesiology
SRNA	Student Registered Nurse Anesthetist
PDSA	Plan, Do, Study, Act
WHO	World Health Organization
MF	Metropolitan Facility
SF1	Suburban Facilty 1
SF2	Suburban Facility 2
AF	Ambulatory Facility

INTRODUCTION

Defining the Problem

Bias is universal and can be positive or negative. Negative implicit bias is of particular concern among healthcare providers as it can perpetuate disparities in vulnerable populations. McQuade et al. (2021) define implicit bias as "the attitudes or stereotypes that affect understanding, actions, and decisions unconsciously" (pg. 1). Multiple studies have shown implicit bias exists in healthcare providers. Bias can occur due to various factors, such as gender, race, sexual orientation, and weight. Individuals hold implicit biases that favor their ingroup, though research has shown that individuals can still have implicit biases against their ingroup (Greenwald & Krieger, 2006; Reskin, 2005). The categorization of ingroup vs. outgroup is often automatic and unconscious (Reskin, 2000). Implicit bias and racism may increase the morbidity and mortality observed among certain racial minority groups and people of low socioeconomic status (Ehie et al., 2021).

In a systematic review conducted by (Gopal et al., 2021), most studies found that healthcare professionals have a negative bias toward individuals who are not White, demonstrated by their Implicit Association Test (IAT) scores, which were significantly associated with poorer patient outcomes. Sim et al. (2021) found that "Black patients were more likely to receive tooth extraction rather than restorative care. They were less likely to receive cardiac catheterization and pain treatment (pg. 2,4)." Patients of color were thought to possess low levels of intelligence and could not follow the recommended plan of care, contributing to their poor outcomes (Sim et al., 2021).

Literature Review

A review of literature on Implicit Bias within Healthcare was conducted using Cochrane, CINAHL Complete, PubMed, and Google Scholar databases published between January 2000 and February 2022. The search criteria included: '*Implicit bias in healthcare, race bias, effects of racism in healthcare.'* The terms searched targeted peer-reviewed academic journals pertinent to implicit bias among health care providers. Hundreds of journal articles resulted across the four sites. After screening for inclusion of research on implicit bias, specifically among advanced healthcare providers, his project utilized seven race bias articles.

Bias Due to Race

There are disparities in United States healthcare that predominantly affect people in racial minorities. A report from the Institute of Medicine entitled "Unequal Treatment" identifies how disparities arise from "bias (or prejudice) against minorities; greater clinical uncertainty when interacting with minority patients; and beliefs (or stereotypes) held by the provider about the behavior or health of minorities" (Institute of Medicine, 2003, p. 3).

Implicit Bias and attitudes shape healthcare communication and patient perception of their care. Subconscious alterations in tone, verbiage, and body language can affect feelings of welcome, medication compliance, and follow-up care, significantly contributing to health disparities. According to Cooper et al. (2012), bias toward African American patients manifests in communication and patient ratings as more verbal dominance. A higher ratio of physician statements relative to patient statements indicated verbal dominance. Additionally, bias manifested as less patient-centeredness and poorer patient ratings of interpersonal care. These

findings can be due to the perception of patients who are not White as less compliant, which leads to clinical verbal dominance. Physicians display a less positive emotional tone and reflect frustration with patients perceived as nonadherent. In contrast, provider bias toward White patients manifests as less verbal dominance, shorter clinic visits, and more patient-centeredness (Cooper et al., 2012).

Implicit bias influences physician-patient communication by altering talking ratios. Physicians who were not African American and held implicit racial bias, had larger talk time ratios with African American patients. Physicians with negative racial attitudes talked more, and African American patients with higher levels of perceived discrimination talked less (Hagiwara et al., 2013). Patients communicating less, clarifying less, and asking fewer questions regarding their care due to perceived discrimination can lead to the decreased understanding, and compliance physicians see, perpetuating and validating their bias while contributing to existing healthcare disparities.

In addition to shaping communication and patient perception of care, implicit racial bias contributes to existing healthcare disparities by altering provider interventions. Studies conducted by Fiscella et al. (2000) found that African American are less likely to receive a wide range of inpatient and outpatient procedures and experience longer waiting times for post-hospitalization nursing home placement, regardless of clinical and demographic characteristics. In children, African American and Hispanics are more likely to have potentially avoidable asthma hospitalizations and less likely to receive a diagnosis of ADHD or even medication for ADHD. Parents and patients report bias-motivated discrimination, with lower scores on provider communication, provider-patient interpersonal relationships, and less participatory decision-making, facilitating existing healthcare disparities (Sabin & Greenwald, 2012).

Implicit racial bias can be challenging to assess as it is subconscious. Various methods exist to measure its occurrence in healthcare; however, psychological experts have broadly agreed that implicit measures, such as the implicit association test (IAT), reveal implicit attitudes (Fitzgerald & Hurst, 2017). The assumption method, similar to the IAT, measures participant response to identical clinical vignettes except for one factor -usually the bias being assessed, such as race or BMI. According to Fitzgerald and Hurst (2017), the assumption process is more appropriate for naturalistic contexts than labs, and 20 of 25 assumption studies revealed bias in patient questioning, provider interventions, treatment recommendation, and diagnosis. A systematic review conducted by Hall et al. found low to moderate levels of implicit racial/ethnic bias among healthcare professionals in all but 1 study. Implicit bias was significantly related to patient-provider interactions, treatment decisions, treatment adherence, and patient health outcomes (2015).

IAT and the assumption method in clinical settings best measure racial implicit bias. These methods do not assess for variations in healthcare system characteristics or culture, characteristics of patients with multiple racial identities, socioeconomic factors, or other aspects that may contribute to bias, such as age, gender, weight, sexual orientation, religion, or disability. The Implicit Association Test has demonstrated good internal consistency but low test-retest reliability (Hall et al., 2015). Additionally, the studies included are not specific to the provider's specialty.

Stakeholder

Moran (2017) states, “Stakeholders are those individuals or groups who touch the project somehow or have an interest in the project outcome. These individuals can affect or could be

affected by the project's outcome (p. 135).” This project's stakeholders are patients, patients’ families, anesthesia providers, the Healthcare system, and the larger community. Paula GomezOspina is a practicing CRNA identified as a positive influence stakeholder and will champion the project with the aid of Gina Stavrakis and Dr. Kimberly Blasius. On November 16, 2021, this topic was presented at the Diversity, Inclusivity & Health Equity meeting to a diverse crowd primarily composed of anesthesia providers working within the healthcare system. At the meeting, partnerships were formed, and insight was gained from individuals who work within the healthcare system and are also interested and passionate about health equity.

Project Description

This project is a subset of a larger one, which aims to examine levels of implicit bias among anesthesia providers in age, weight, and race categories. The Quality & Safety Committee at a large urban medical center identified bias as an area requiring improvement among providers. The project aims to establish a baseline of implicit bias related to race among current anesthesia providers that can lend insight into the current practice environment. Specifically, the level determined for student registered nurse anesthetists (SRNAs) will be essential in changing bias's impact and optimizing interventions. This value can also aid in creating a foundation for educators to increase awareness and foster an early understanding of the CRNA’s role in addressing racial and ethnic disparities in anesthetic care, as described by the American Association of Nurse Anesthesiology (American Association of Nurse Anesthesiology, 2021).

The four facilities included in this project utilize a team care model in providing anesthesia, requiring the medical doctor of anesthesiology (MDA) and certified registered nurse

anesthetist CRNA to work in conjunction. The MDAs are often leading the team; therefore, it is imperative to collaborate with them to facilitate a unified approach to reduce bias toward the patient. The CRNA determines the anesthetic interventions patients receive while undergoing surgery and significantly shapes the course of care for individual patients. Establishing a baseline of implicit bias among these providers can improve the patient's experience, improve interprofessional communication, elevate hope, and advance healing.

Project Goals

This doctoral project is a quality improvement project that aims to assess and establish baseline levels of implicit racial bias among anesthesia providers in specified healthcare facilities of a large healthcare system located in the Southeastern US. The PICO question: “Among three types of anesthesia providers, to what degree do they hold implicit bias toward race” will be used to guide this project.

METHODOLOGY

Methods

A descriptive survey was used to establish a baseline of implicit bias (IB) among anesthesia providers. Participants were anesthesia providers from 4 hospitals in an extensive healthcare system; a large trauma center, an outpatient surgery center and two suburban hospitals. An email was sent instructing participants how to complete the Implicit Association Test (IAT). Instructions included step-by-step pictorial directions for accessing the website and where to return the surveys. After the project, an additional educational pamphlet on implicit bias was distributed to the anesthesia department, incorporating recent literature on implicit bias and highlighting the project's findings.

Participants were informed of the survey's anonymity and confidentiality. They received details on its use and were asked for their commitment to finish the survey and provide demographic information (age, title, and practice location before completing an IAT). The process occurred in 3 distinct stages, beginning with an invitation via email with instructions on how to access and complete the IAT. Participants were instructed to either upload test results to a secure server or deliver their test results to a designated dropbox after full completion. Stages 2 and 3 consisted of data collection, analysis, and result interpretation.

According to Pedersen & Nielsen (2016), poor survey responses skew the data and reduce the effectiveness of a project. Therefore, a high response rate is vital to reduce the rate of sampling bias and promote the validity of the findings. Generally, survey responses are lower in online surveys, averaging approximately 11% lower responses than in other types of surveys. (Pedersen, & Nielsen 2016, pg. 230). For this project to be successful, a 30-50% return rate on the post-survey will quantify meaningful participation and provide sufficient data for analysis.

Reminder emails were sent to participants every two weeks to increase participation. Paula GomezOspina, Gina Stavrakis, and Dr. Kimberly Blasius agreed to help facilitate participation among the different providers in meetings and clinical interactions.

Results were collected and analyzed according to their corresponding D scores. Each group's average was compared to a single D-score number, and an analysis of variance (ANOVA) test was conducted between different groupings of anesthesia providers, establishing a mean, standard deviation, and 95% confidence interval related to the groups. There were three age groups: 20-29, 30-39, and those 40 and above. Location of work and self-identified race further divided results. This project was submitted to the IRB at the hospital system and university. IRB letters are located in Appendix X and Y.

Conceptual Theoretical Framework

The Plan, Do, Study, Act (PDSA) model is used to guide interventions and continually evaluate outcomes to achieve the desired goals for this project. This framework encourages continual quality change assessment and allows necessary modifications before starting the cycle again. Initial PDSA cycles are typically implored to examine change implementation on a small scale (Perla et al., 2013). In this case, the planning phase included gathering research on implicit bias and its effects. This project focused on optimizing access to the IAT and facilitating result collection. After analysis, the focus turned toward compiling the informal pamphlet. The next phase emphasized implementing the methodology section of the project. A link to the IAT and instructions containing what test to choose and how to report test scores anonymously was sent to anesthesia personnel during this phase. He period of data collection lasted six weeks. The data is analyzed during the "study" phase of the PDSA cycle.

The “act” phase of the PDSA model entails reporting the findings and recommendations. Due to time constraints, an educational brochure that summarizes the findings will be distributed in January 2023. The PDSA cycle is a quality improvement model designed to be continuously adjusted and therefore depicts the goals of our project. Implicit Bias is a subject matter that healthcare organizations need time to understand better in order to decrease its impact on health outcomes. With project results, follow-up projects can implement change under more robust conditions (Perla et al., 2013).

Participants

Individuals selected to participate in this project were employed certified registered nurse anesthetists (CRNAs) and anesthesiologists (MDAs) in a large healthcare system. Student registered nurse anesthetists (SRNAs) conducting their clinical rotations within that healthcare system were also invited to participate. The criteria for inclusion were those identified as active anesthesia providers within the healthcare system at the four selected hospitals. Exclusion criteria were applied to anesthesia providers within the healthcare system who did not work in either of the targeted health facilities.

Approximately 410 active anesthesia providers are in the healthcare system’s metropolitan region. Of those anesthesia providers, 60 identified as MDAs, 318 as CRNAs, and 32 as SRNAs. The link sent to the anesthesia providers contained the Harvard IAT test and instructions on taking the correct assessment and capturing and reporting results anonymously. In addition, demographic information, such as title and race, was collected from the participants.

Setting

The setting for this project focused on four facilities of a large integrated and nonprofit healthcare system that serves patients at 40 hospitals. The first location selected is an 800-bed, Level 1 Trauma Center in a metropolitan area. This metropolitan facility (MF) contains roughly thirty-three operating rooms and over 25 non-operating room anesthesia (NORA) sites. The second location selected is a smaller, suburban facility (SF1) specializing in orthopedic and bariatric procedures. This 185-bed facility includes 16 operating rooms with 3 NORA sites. The third location is another suburban facility (SF2), performing various surgical procedures, including cardiac and orthopedics. This hospital has 12 operating rooms, 13 NORA sites, and 235 patient beds. Lastly, the fourth location is an ambulatory facility (AF) adjacent to the MF

Tools/Measures

The implicit association test was proposed by Greenwald, McGhee, and Schwartz in 1998, as a measure of individual differences in implicit social cognition (Schimmack, 2021). In the years to follow, this test gained popularity in psychology and sociology, garnering over 4000 citations (Schimmack, 2021). “IAT evaluates the relative strength of a person’s mentally-held automatic associations of two opposing attributes (e.g., positive and negative)” (Chevance et al., 2017, pg. 72). Implicit attitude is measured by the speed of response to associate an image with a letter or word. For instance, in the IAT on race, one is asked to use the letters “E” or “I” to classify words as either positive or negative quickly. When an image emerges on the screen, the respondent is rated by how fast or slow they respond to categorize the two objects. The developers of the IAT explain the results as having an implicit preference, e.g., “flowers compared to insects is if you responded faster when Flowers + Good/ Insects + Bad are paired

together compared to when Insects + Good / Flowers + Bad are paired together." (Project Implicit, ----n.d.). Therefore, receiving a moderate or strong implicit preference corresponds with how fast you responded to, for instance, "Flowers + Good / Insects + Bad versus Insects + Good / Flowers + Bad." (Project Implicit, n.d.). Numerous studies have been conducted to assess the reliability and validity of Harvard's IAT, with many approving or debunking its authenticity. One criticism of the IAT is that trying to explain behavior based on the results of the IAT is problematic because the test relies on an arbitrary metric (Blanton et al., 2009; Marcelin et al., 2019).

Greenwald et al. (2009) conducted a study to investigate the reliability of IAT and found that even when participants were asked to alter the test by slowing their response time deliberately, only the self-report questionnaires were skewed while the IAT results were not. This further indicated that the sensitivity of IAT measures to activated associations is resistant to faking (Greenwald et al., 2009). The IAT is the only measurable test for implicit bias that uses response latency (Staats, 2014). This delay in response highlights the implicit associations the test-taker holds. An educational series by the *Kirwan Institute for the study of Race and Ethnicity* highlights the different ways implicit bias has been measured throughout the years. This series evaluates methods, including priming methods, where a subliminal initial prime influences or increases the sensitivity of a respondent's subsequent behaviors as well as utilizing functional Magnetic Resonance Imaging (fMRI) to assess bodily and neurological reactions to stimuli. In this method, the "fMRI focused on the amygdala that responds to fear and threat to emulate race-related mental process" (Staats, 2014, pg 18). Other means of determining implicit bias relied on measures such as facial electromyography (EMG) and cardiovascular and hemodynamic changes. Researchers believe measuring the delay in response is a useful way of measuring

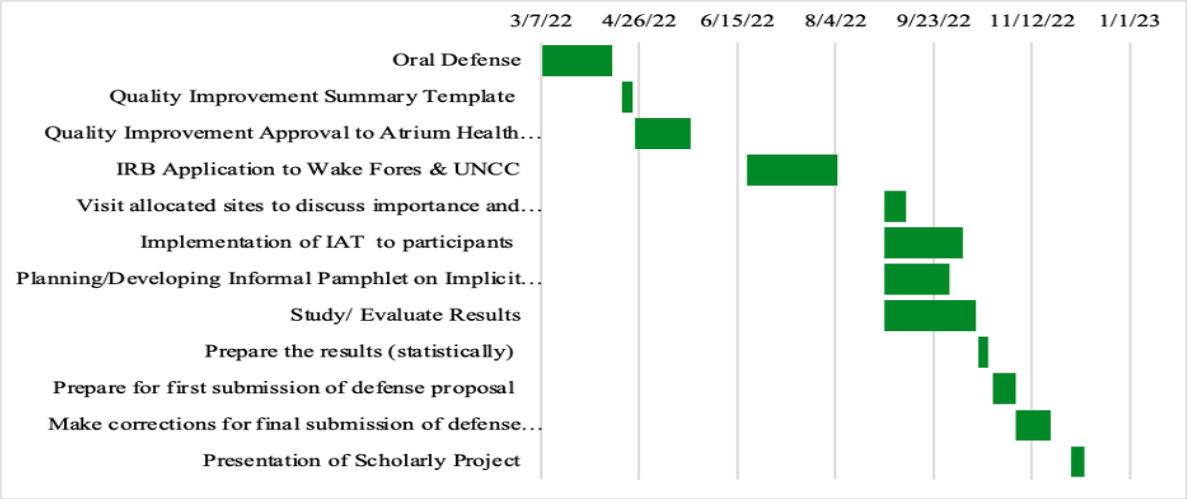
implicit bias compared to other methods mentioned (Staats, 2014). The Implicit Association Test offered by Harvard was selected due to the reduced burden on participants, and it is able to be independently accessed from any location with only an electronic device capable of accessing the internet.

Data Collection

An email was provided to guide participants in the data collection process to ensure maintained anonymity and confidentiality when reporting their test results. IAT results were collected from participants by utilizing a secure online server.

Additionally, the locations of four drop boxes were included in the email where results could be printed and placed. Drop boxes were emptied weekly. In addition to the email explaining the process of how to take the IAT and report the scores, a QR code was provided to serve as an adjunct to foster quick access and participation. The designed QR code was placed in the anesthesia break room and took the users directly to the IAT test when scanned. Results were stored on an encrypted website. The timeline for this project took place over six months and can be seen in the diagram below. The IAT was implemented using email. The participants were allotted seven weeks to complete tests and upload results, August 26, 2022 -October 14, 2022. Within those seven weeks, a reminder email was sent every two weeks.

Timeline


3/7/22
4/26/22
6/15/22
8/4/22
9/23/22
11/12/22
1/1/23
Oral Defense
Quality Improvement Summary Template
Quality Improvement Approval to Atrium Health…
IRB Application to Wake Fores & UNCC
Visit allocated sites to discuss importance and…
Implementation of IAT to participants
Planning/Developing Informal Pamphlet on Implicit…
Study/ Evaluate Results
Prepare the results (statistically)
Prepare for first submission of defense proposal
Make corrections for final submission of defense…
Presentation of Scholarly Project

RESULTS

Participant Demographics

46 responses were received, with 13 participant input errors bringing the sample to 33. The majority of valid inputs were from participants who identified as White (n = 20), with two participants identifying as Black, one identifying as multi-race, and one identifying as Hispanic. Nine participants with valid inputs did not disclose race. One score from a Black participant was invalid due to an input error, and 12 scores from White participants were invalid due to input errors.

Data Analysis

28% of responses received were invalid due to input error, with an inaccurate format of survey results provided. When assessed by location, the most valid inputs (n = 27) were from participants who worked at the Level 1 Trauma metropolitan facility (MF). Valid data was received from three participants who worked at the suburban facility (SF1) specializing in bariatric and orthopedic cases, As well as two participants who worked at the ambulatory outpatient facility (AF). One participant with valid input kept their location private. Eight scores from participants who worked at MF were invalid due to input error. One score from a participant at AF was invalid due to input error, and the sole score from a participant working in the suburban facility (SF2) providing a broad spectrum of cases was invalid due to input error. Additionally, four scores from participants who did not provide a location were invalid due to input error.

Analyzing valid inputs from participants by title, 20 participants were CRNAs, and 13 were SRNAs. Six scores from CRNA participants were invalid due to input error. Five scores from SRNA participants were invalid due to input error. The two sole scores from MDA participants were invalid due to input error.

Table 1 displays the demographic distribution of the sample and the mean racial implicit bias D scores and their standard deviations. The scores ranged from -0.35 to 0.65, with a positive score indicating a preference for individuals who are European American (vs. African American) and a negative score indicating a preference for individuals who are African American (vs. European American). The first row ('Overall') displayed the mean score and standard deviation for all participants. 0.20 ± 0.27 is the overall score, it indicates a level of racial bias between the categories of slight (0.15) and moderate (0.35). Subsequent rows analyze mean scores according to participant's age group, title, location, and race. Ages were grouped in ranges from 20-29, 30-39 and 40 and above. Only two groups of titles display data (SRNA and CRNA), the two MDAs were not included in the analysis. Scores for three locations are displayed, MF, SF1 and AF.

Table 1. Implicit biases

	Race (bias against AA)
Overall	0.20 ± 0.27
Age groups	*p* =.479
20-29 years (*n* = 14)	0.23 ± 0.33
30-39 years (*n* = 11)	0.20 ± 0.23
40 or above (*n* = 8)	0.14 ± 0.24
Title	*p* =.303
CRNA (*n* = 20)	0.16 ± 0.24
SRNA (*n* = 13)	0.26 ± 0.32
Location	*p* =.529
MF (*n* = 27)	0.23 ± 0.29
SF1 (*n* = 3)	0.16 ±0.18
AF (*n* = 2)	0.0 ± 0
Race	*p* =.574
European American (*n* = 20)	0.2 ± 0.29
Black (*n* = 2)	-0.08 ± 0.11
Multiracial (n=1)	0.15
Hispanic (*n* = 1)	0.35

Note. Implicit biases were measured on a -0.35 to 0.65 scale with higher values indicating stronger levels of bias. In the cells are mean ± standard deviations. Analysis of variance (ANOVA) compared group differences across age, group, title, location, and race respectively.

Participants between the ages of 20-29 produced an average D score of 0.23 ± 0.33, which is above the overall average of 0.2, while individuals in the age groups 30-39 and 40 or above scored equal to or less than the overall average (0.20 ± 0.23 and 0.14 ± 0.24). CRNAs scored an average racial bias D score of 0.16 ± 0.24, below the overall average score of 0.2 and still between slight and moderate categories. In contrast, SRNAs averaged a racial bias D score of 0.26 ± 0.32, higher than the overall average D score of 0.2.

Participants located at MF averaged a D score of 0.23 ± 0.29, slightly higher than the overall average, in contrast to participants located at SF1 and AF, who averaged scores of 0.16 ±0.18 and 0, respectively. A D score of 0, achieved by both participants from AF, significantly differs from the average as it represents neither a slight nor moderate level of racial bias but rather the lack of racial bias towards either European American or African American. The average racial bias score among participants who identified as White was 0.2 ± 0.29, nearly equal to that of the overall average of 0.2, while participants who identified as Black scored an average D score of -0.08 ± 0.11. The negative score produced by participants who identified as Black is an outlier from the overall average D score of 0.2, which represented a level of bias between slight and moderate. A D score of -0.08 signifies a general preference for African Americans and a bias levels between slight (-0.15) and no preference (0.0). Participants who identified as multi-racial and Hispanic produced D scores of 0.15 and 0.35, respectively.

Analysis of variance (ANOVA) compared the means across groups based on age, title, location, and race. There was no statistically significant difference across the groups (ps > .303).

Table 1 categorized mean bias scores across three age groups, two title groups, three location groups, and four participant-identified racial categories. The number of participants per group varied greatly, with some groups only having one participant and the highest group having 35 participants. Table one also includes the p scores generated by ANOVA per group, which failed to demonstrate a significant variance. The variance between D scores obtained per racial group demonstrated the highest statistical value at $p = 0.574$. The variance between D scores obtained by participants per location was a close second, at $p = 0.529$. While the D score variance between participant titles demonstrated the lowest variance at $p = .303$, the variance per age group produced a value of $p = 0.479$. Figure 2 shows this score distribution among the three different age ranges on isolated graphs per age range. Figure 3 displays the score distribution of biases across title groups.

Figure 1. Racial Implicit biases – by Age

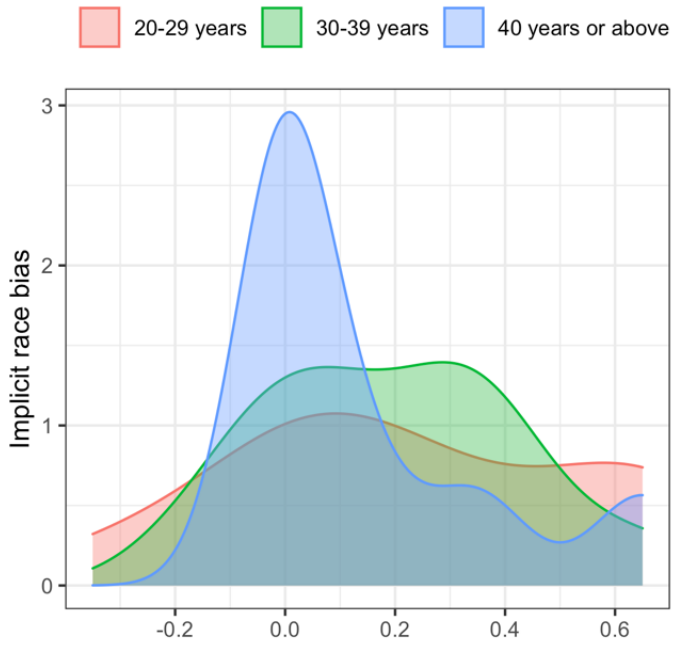
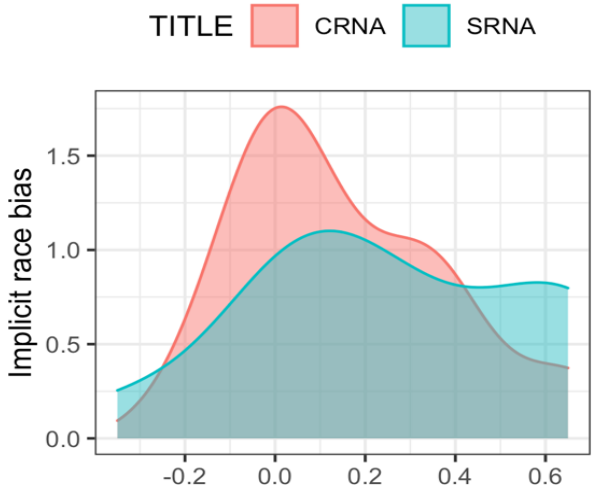


Figure 2. Racial Implicit biases -by Title



DISCUSSION

The baseline level of implicit racial bias among anesthesia providers at the four selected facilities demonstrated a general preference for European Americans, with bias levels between slight and moderate. One of the aims of this study was to assess racial bias among anesthesia providers by title. SRNAs displayed higher levels of racial bias against African Americans than the CRNAs by nearly double. In addition to a variety of personal factors, this variance can also be attributed to the difference in levels of education. The youngest age group assessed (20-29) displayed slightly higher levels of racial bias than their older counterparts. Ages over 40 displayed the least amount of racial bias and did not score a level up to the category of slight. A variety of factors that were not assessed could contribute toward this variance, such as years of experience, the number of bias workshops completed, and areas of expertise.

When examining the demographics of anesthesia providers who participated in this study, there was a stark difference in the quantity of each race represented. Of 46 participants, 31 identified as White only three identified as Black, one as Hispanic, and one as Multiracial. Despite not being an equal number of participants per race, the percentages represented may align closer to a realistic percentage of anesthesia providers employed by the healthcare system. Participants who identified as White scored a level of racial bias toward between slight and moderate that exactly matched the overall score. Conversely, participants who identified as Black scored a level of racial bias between slight and no preference; this was very different from the overall score. The IAT assessed participant bias against European Americans or Black individuals; Participants who identified as white displayed bias against African Americans, and participants who identified as black displayed bias against European Americans. The Hispanic

and multiracial participants displayed bias against Black individuals at levels of moderate and slight, respectively.

.Strengths and Limitations

A significant limitation in the design of this project is its reliance on self-reporting. It relied on participants either uploading their results or placing printed copies in drop boxes when the survey was completed. This extra step may have created an additional burden, reducing the response rate. Many individuals reported not being "technologically savvy." The drop boxes were meant to bridge access gaps for individuals unsure of how to take screenshots and upload them to secure server links using the QR codes or emails. The drop box process was cumbersome, requiring participants to print test results, write demographic information on result sheets, and then drop them at the worksite location. As a result, it generated no drop box usage and was not a useful means of encouraging participation.

Assessment through Harvard's online IAT server proved to be a limitation. Despite detailed emails sent to providers illustrating which links to click to take the appropriate surveys correlating to our study, many providers reported that they could not access the appropriate surveys. The server has a built-in landing page which is generated prior to accessing survey links. It provides information on Harvard's method of assessment, but many providers reported this page "prevented access" to tests. Additionally, many providers reported the tests to be "difficult to navigate" and "extremely long." One anesthesia provider reported they abandoned their assessment and participation in this project due to the unexpected duration. The survey duration changed based on the technological skills of the participant and the device used to access the online site. On average, each survey takes about 10 minutes to complete.

The low response rate is another limitation of this project. There are 410 anesthesia providers who received the email containing the request for participation and instructions on how to participate. Of those providers, 2 out of 60 MDAs participated (3.33%), 26 out of 318 CRNAs participated (8.18%), and 18 out of 32 SRNAs (56.25%) participated. Despite efforts, there was an 11.22% response rate out of 410 anesthesia providers. There were no incentives offered to increase participation, and feedback was received stating the anesthesia providers were receiving many requests to participate in surveys during this same time and were experiencing "survey fatigue".

To alleviate participation challenges, CRNA advocate Paula GomezOspina, along with Gina Stavrakas, director of Anesthesia Services for the Central Division, sent emails to encourage anesthesia providers to complete the IAT tests. They also reported in-person communication among CRNAs and MDAs encouraging participation and attended meetings created solely to address the completion of the surveys.

This project focused on the sensitive topic of racial bias. Topics on bias generated varied emotions from the anesthesia providers. A CRNA at one of the locations -which generated only 3 of 46 participants- stated they would not participate in this study due to it being "divisive" and promoting bias. Despite dialogue on project goals of promoting awareness and improving care, there was no middle ground to meet. Similar dialogue with other providers occurred, culminating in vocal refusals to participate in this study due to distrust of the objectives.

Additionally, the drop boxes placed in anesthesia work rooms with identifying signs were moved, and identifying signs were discarded during the 7-week survey duration. Distrust of the project and its objectives by the anesthesia providers possibly signals a corporate culture of fear of potential punitive action based on the outcome. These attitudes certainly contributed to the

poor survey response rates.This project provided the first systematic inquiry into implicit bias within the healthcare system's anesthesia providers. By doing so, an avenue for future changes was created to better optimize patient perception of care, and health outcomes.

Implications in Practice.

Research has demonstrated the detrimental effect racial bias has on healthcare and how it negatively shapes healthcare communication and patient perception of care (Sim et al., 2021) Implicit racial bias is unconscious and creates alterations in patient-provider relations in an unintentional manner. Raising awareness of both its existence and effects among providers can contribute to better satisfaction with provider interactions and improved patient outcomes. Specific and measurable goals can be set with new baseline data specific to the health system's anesthesia providers. Significant opportunities can be created to reduce this level of bias, such as interactive workshops and immersive seminars that teach specific habits to overcome subconscious racial bias. Efforts can be evaluated by the clinical and translational science framework. Which utilizes five steps to increase success: research, translation to humans, translation to patients, translation to practice and translation to communities (Hagiwara et al., 2020). SRNAs displayed a level of bias higher than the overall average; these seminars can be directly incorporated into their education .

Recommendations

The goal of this project was to raise awareness of existing levels of racial bias among anesthesia providers within one healthcare system through establishing a baseline that can serve as a starting point to quality improvement. Because of the low response rate, this project should

be done on a larger scale, addressing the limitations that were discovered while conducting this project. A racial bias module could be created and provided to all anesthesia providers. Levels of bias can be reassessed upon conclusion of educational modules to assess for a measurable effect. One possible measure of success may be improved patient satisfaction. It is important to continue to generate conversations raising awareness of implicit racial bias and strive for better patient outcomes and reduced healthcare disparities.

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APPENDIX A: Wake Forest IRB Approval Letter

WAKE FOREST
UNIVERSITY
HEALTH SCIENCES

Office of Research
INSTITUTIONAL REVIEW BOARD

MEMORANDUM

To: Exie Earnhardt
Atrium/Carolinas Healthcare System

From: Brian Moore, Chair
Institutional Review Board

Date: 7/5/2022

Subject: Not Human Subjects Research: IRB00086381
Utilizing the Harvard Implicit Association Test to evaluate the level of implicit bias among Anesthesia Providers based on age, weight, and race.

The Wake Forest University School of Medicine Institutional Review Board has reviewed your protocol and determined that it does not meet the federal definition of research involving human subject research as outlined in the federal regulations 45 CFR 46. 45 CFR 46.102(f) defines human subjects as "a living individual about whom an investigator (whether professional or student) conducting research obtains (1) data through intervention or interaction with the individual, or (2) identifiable private information."

The information you are receiving is not individually identifiable. In recent guidance published by the Office of Human Research Protections (OHRP) on the Guidance on Research Involving Coded Private Information or Biological Specimens, OHRP emphasizes the importance on what is being obtained by the investigator and states "if investigators are not obtaining either data through intervention or interaction with living individuals, or identifiable private information, then the research activity does not involve human subjects."

Note that only the Wake Forest University School of Medicine IRB can make the determination for its investigators that a research study does not meet the federal definition of human subject research. Investigators do not have the authority to make an independent determination that a study does not meet the federal requirements for human subject research. Each project requires a separate review and determination by the Board. The Board must be informed of any changes to this project, so that the Board can determine whether it continues to not meet the federal requirements for human subject research. If you have any questions or concerns about this information, please feel free to contact our office at 716-4542.

The Wake Forest School of Medicine IRB is duly constituted, has written procedures for initial and continuing review of clinical trials; prepares written minutes of convened meetings, and retains records pertaining to the review and approval process; all in compliance with requirements of FDA regulations 21 CFR Parts 50 and 56, HHS regulations 45 CFR 46, and International

Medical Center Boulevard, Winston-Salem, NC 27157-1023 (336) 716-4542 / fax (336) 716-4480

APPENDIX B: The University of North Carolina at Charlotte IRB Approval Letter

To:	Shanita George University of North Carolina at Charlotte
From:	Office of Research Protections and Integrity
Date:	27-Jul-2022
RE:	Determination that Activity is not Research and does not require IRB Approval
Study #:	IRB-23-0056
Study Title:	Utilizing the Harvard Implicit Association Test to evaluate the level of implicit bias among Anesthesia Providers based on age, weight, and race.

This submission was reviewed by the Office of Research Protections and Integrity, which has determined that this submission does not constitute research as defined under federal regulations 45 CFR 46.102(l) and 21 CFR 56.102(c) and/or (l) and does not require IRB approval.

Study Description:
This is a quality improvement project being conducted as part of the DNP in Nurse Anesthesia program. The project topic is a practice issue selected by the Anesthesia Quality and Safety Committee at Atrium Health aimed at improving the quality and outcome of care within the Atrium facility(s) identified for the project. Therefore, establishing a baseline level of implicit bias related to race, weight, and age among current anesthesia providers that practice at the four different Atrium Health sites, will provide insight into the current practice environment.

Please be aware that approval may still be required from other relevant authorities or "gatekeepers" (e.g., school principals, facility directors, custodians of records), even though IRB approval is not required.

If your study protocol changes in such a way that this determination will no longer apply, you should contact the above IRB before making the changes.

APPENDIX C: Server Hosting Implicit Association Test

https://implicit.harvard.edu/implicit/takeatest.html

APPENDIX D: Email Sent to Participants Denoting Instructions

We are writing to you as Student Registered Nurse Anesthetists at Carolinas Medical Center and the University of North Carolina at Charlotte's Nurse Anesthesia Program. Jointly, we are working on a doctoral research project entitled "Implicit Bias among the Anesthesia Providers."

We invite you to participate in our study to establish the proportion of Atrium Health anesthesia providers, including SRNAs, CRNAs, and MDAs, who hold implicit bias toward patient race, weight, and age. Our goal is to improve awareness of implicit bias among anesthesia providers. We believe establishing this baseline can create a foundation for future work to reduce anesthesia provider bias levels.

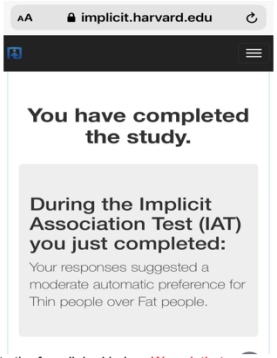
Thank you for your assistance!
Mel Okuta SRNA, CMC/UNCC Nurse Anesthesia Program
Shanita George SRNA, CMC/UNCC Nurse Anesthesia Program
Ngozichi Ogbonnaya SRNA, CMC/UNCC Nurse Anesthesia Program

Procedures:

This study involves **anonymous online surveys** created by a team at Harvard University to assess levels of implicit bias. Illustrated below are steps to accessing each survey. Each survey takes 5-10 minutes and can be completed on your mobile device. We will not obtain any identifiable information.

- Select the link below.
- Select the hyperlink "Project Implicit Social Attitudes," marked with a red star in the image below.
- Select one of the three hyperlinks entitled either "Race IAT", "Weight IAT" or "Age IAT", marked with a red star in the next image.

https://implicit.harvard.edu/implicit/



Once each survey is complete, take a screenshot of the results and upload them to the form linked below. We ask that you complete all three if possible.
https://www.surveymonkey.com/r/8WHRCNN

Results are anonymous. SurveyMonkey collects no personal data, input is truly anonymous. We request information on your title (SRNA, CRNA, or MDA), age, and race. Provision of this information is optional but highly encouraged; it will be de-identified.

Suppose you are unable to upload results to the link above. Print them out and place your results in the black collection boxes pictured below, located in the anesthesia break rooms at CMC Main, CMC Mercy, Atrium Health Pineville, and Atrium Health ODS. Write information of your title (SRNA, CRNA, or MDA), age, and race on each sheet. This information will remain anonymous, undergo de-identification, and be securely locked in each box.

Additionally, a QR code repeating procedure instructions, and the same links above, will be placed alongside the collection box in each breakroom.

The results of this study will be analyzed, aggregated, and provided back. Thank you so much for your assistance!

Contacts and Questions:
Please contact **napiatbias@gmail.com** with any questions you may have. You may also contact Dianne.Earnhardt@atriumhealth.org
Participation is optional and entirely voluntary.

Thank you for your participation,