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Caring for Patients with Obesity: An Intervention to Reduce Bias in Healthcare

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An Intervention to Reduce Bias in Healthcare

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Abstract

Background - Implicit and explicit biases held by medical staff towards obese patients reduce obese patients' outcomes, engagement with medical care, quality and even quantity of life. Studies agree an intervention is needed to reduce obesity bias in medicine, but limited research has been conducted regarding reducing provider bias, and only one study on weight bias has been done in this population.

Methods - Participants from Seattle University College of Nursing (SUCON) were recruited for an interrupted time-series study measuring implicit bias and explicit bias with validated tools before and after an educational intervention. The intervention was an asynchronous online narrated module intended to educate employees in the medical field on obesity. The module was based on a similar intervention used in the previous study targeting obesity bias in a similar population.

Results - 61 participants completed the pretest survey and viewed the intervention, 30 participants completed the post-test survey one week later and were paired with their pretest results. For the paired sample of 30, explicit bias improved by 2% , P-value of 0.0286. For implicit bias, the paired sample post-intervention had an 11% reduction of bias, P-value of 0.0014. Both P-values indicate statistical significance.

Conclusions - The intervention moderately improved explicit bias and significantly reduced implicit bias in a paired sample of participants. Continuing to utilize the educational module is an effective way to reduce bias in the population. Other methods of reducing bias should be compared to these results.

Keywords - Bias, Obesity, Nursing, ARNP, Healthcare, Asynchronous Learning, Biopower

Introduction

First defined as a disease by the American Medical association less than a decade ago, Obesity is characterized by the accumulation of excess adipose tissue, which adversely affects the health of the body (Meldrum et.al., 2017; Sherf-Dagen et.al, 2022). In 2018, over 42% of the population was obese, with some groups having an even higher prevalence. Despite the high rate of obesity, medical providers are overwhelmingly biased against their obese patients (Alberga et.al., 2019b; Phelan et.al., 2015; Puhl et.al., 2014; Sabin et.al., 2012; Tomiyama et.al., 2014). This bias, whether freely held explicit bias or internalized implicit bias, is manifested in the care, follow-up, outcomes and lifespans of these patients (Alberga et.al., 2019a; Lee & Pausé, 2016; Phelan et.al., 2015; Sherf-Dagen et.al, 2022; Tanneberger & Ciupitu-Plath, 2017; Tomiyama et.al., 2018; Young, 2007).

Few studies have targeted the issue of obesity bias in medicine - one previous study developed a module to reduce bias that had modest success (Sherf-Dagan, et.al, 2022). For this interrupted time-series study researchers utilized that module, paired with more sensitive measurement tools, to recreate and improve on that success.

Theoretical Framework, Purpose and Aims

Theoretical Framework

The theoretical framework that researchers considered and referred to throughout the project is Biopower. Coined by Michel Foucault in the 1970s and developed by Giorgio Agamben in the 1990s, biopower is defined as "power as it concerns human life, specifically with regard to the human body or human populations" (Arnason, 2011, p.295). The concept of biopower has been applied to social bias before, philosopher Dr. Katia Genel writes that racism:

> ...implements a fragmentation of the biological field by making (inferior and superior) races appear... on the other hand, racism establishes a positive relation between the life of some and the death of others which is ... biological. Not merely the security of one race, the death of the other is the death of a pernicious race that will make the life of the race healthier and more pure. (2006)

Replace 'racism' with 'obesity' - one body type, fat, is inferior, BMI creates a biological basis for the inferiority, and doctors work as part of their society to eliminate the undesirable, diseased, obese body (Evans, 2009).

The medical field is uniquely situated to engage with and wield biopower. Where once power was focused on the right of rulers to punish and even kill their subjects, the more subtle concept of biopower focuses less on the "power to put to death, and increasingly more the right to intervene in order to make live" (Genel, 2006). While all levels of society participate in this intervention at some level, in the context of the above quote it is clear that those who make people live are medical providers. Power infuses all human interactions and is impossible to escape. Some critics have argued that there is nothing to be done to correct it, but that is true only if the goal is to eliminate power altogether, rather than harness it (Arnason, 2011, p.295). Due to the role of medical providers, and the public trust placed in nurses, their biopower is significant.

Purpose

This research intends to harness practitioners' biopower, that will always exist, to reduce harm at both the individual and population levels (Evans, 2009).

Aims

All people, including those who wield power due to their role as providers, have both explicit biases - beliefs and views they are aware of - and implicit biases - beliefs and views they hold but are unaware of (Sherf-Dagan et.al, 2022). This educational intervention aims to reduce both types of bias.

Literature Review

Obesity Bias in Medicine

Bias towards obese people is part of the education medical practitioners receive and of the workplace culture they are submersed in when they graduate. Graduate-level students across multiple medical disciplines report faculty role modeling discriminatory behavior or making negative comments about obese patients (Phelan et.al., 2015; Puhl et.al., 2014). So much so that, for some students, implicit and explicit bias measures toward obese patients were increased for the same cohort over their medical training (Phelan et.al., 2015).

New practitioners enter a profession where, in tests of implicit bias, providers roughly equal the general population in their prejudice against obese individuals, and routinely explicitly express frustration with their obese patients (Alberga et.al., 2019b; Sabin et.al., 2012). In one comparison study of obesity specialists' bias from 2001 to 2013, a group of providers that worked exclusively with this population was found to have significant bias, with implicit bias marginally declining during the surveyed period, and explicit bias increasing (Tomiyama et.al., 2014).

Effect of Obesity Bias on Patient Care

Weight bias in medicine results in poorer health outcomes (Phelan et.al., 2015; Tanneberger & Ciupitu-Plath, 2017; Tomiyama et.al., 2018). For anyone, a lack of engagement with primary care can lead to worsening health conditions and increased emergency room visits

(Young, 2007). Obese patients cite bias as a reason they avoid care, overwhelmingly reporting that "weight bias from primary care health professionals negatively influences engagement with primary health care services" (Alberga et.al., 2019a).

When obese patients do seek care, studies report a range of failures, including but not limited to reductions in routine/evidence-based cancer screening of obese women, improper treatment of asthma in obese patients, reduced vaccination of obese elderly patients, less time spent with obese patients in primary care visits and nurses reporting improper care of obese patients (Lee & Pausé, 2016; Tanneberger & Citu-Plath, 2017; Tomiyama et.al., 2018). This reduction in primary care engagement and the poorer care received when health care is sought out results in an increased risk of mortality for obese patients. This risk is not explained by common risk factors, and in fact exceeds the correlation between mortality and other marginalized identities (Aune, et.al., 2016; Sutin et.al., 2015). Despite the centrality of the principle of nonmaleficence in medicine - 'first, do no harm' - anti-fat bias is clearly harming obese patients.

Effect of Obesity Bias on Obese People

The harm of anti-fat bias extends far beyond medical care. Experiencing weight bias and microaggressions based on size has a profound mental effect on those perceived to be 'fat' (Munro, 2018, Schafer & Ferraro, 2011, Tomiyama et.al., 2018). Microaggressions are commonplace remarks or behaviors that communicate hostility toward/ the otherness of a marginalized population or person (Munro, 2018). Studies have shown that the experience of weight-based bias by people who see themselves as overweight may, contradictorily, reduce their motivation for exercise and perceived control over diet choices, while increasing their caloric consumption (Pearl et.al., 2014, Major et.al., 2014). People who have a greater internalization of

the bias they experience also exhibit higher rates of depression and anxiety, which are conditions further associated with weight gain (Hilbert et. al., 2013; Jantaratnotai, 2016) The experience of disgust targeted toward their body size causes psychological harm, and increases the likelihood of retaining a larger body size.

Existing Interventions for Reducing Bias in Medicine

Researchers repeatedly agree that an intervention is needed to tackle the issue of weight bias in medicine (Phelan et. al. 2014; Phelan et.al., 2015; Puhl, et.al., 2014; Tanneberger & Ciuptu-Plath 2017). While several tools for measuring bias have been developed, bias-reducing interventions for health care are in their infancy across all types of discrimination, from prejudice against LGBTQIA, race, gender, and obesity. In fact, only one intervention that targets the reduction of obesity bias in the medical setting has been published to date (Sherf-Dagan, 2022). When determining strategies for reducing obesity bias amongst health professionals, this study, as well as existing interventions with medical practitioners for other types of bias serve as the primary guidance available. These existing interventions to reduce bias in medicine focus on either emotional engagement or more formal, classroom-style learning.

Emotional engagement with issues of bias has been explored through pictorial and written vignettes from the lives of oppressed groups and direct engagement between outgroup members and their doctors (Chapman, et.al., 2018; Lightfoot et.al., 2015; Salas et.al., 2019). Pictorial and written vignettes had a modest effect that became stronger for participants of privilege and participants who were involved at all points of study (Chapman, et.al., 2018). The effect of dialog between physicians and patients who are the target of bias was assessed qualitatively, with the members of the group experiencing bias concluding this conversation as "an essential first step toward designing system change interventions to enhance equity in

healthcare quality and outcomes" (Lightfoot et.al., 2015) Such a dialog for obese patients was the topic of research at SUCON by Dr. Andrea Eickelmann in 2021. Dr. Eickelmann surveyed individuals in Washington state who identified as fat regarding their experiences with medical care and identified specific areas where bias was experienced - equipment sizing, physical exam techniques and verbiage used by providers (Eickelmann, 2021).

More traditional bias interventions for healthcare providers have included a combination of workshops, individual reflection sessions and focus groups, presentations of data around implicit bias, self-assessment, case study review and facilitated discussion (American Academy of Family Physicians, 2020, Girod et.al., 2016; Sherman et.al., 2019). The studies used a variety of measures, both qualitative assessments and quantitative implicit and explicit bias measures to evaluate their success (Girod et.al., 2016; Sherman et.al., 2019). While these formats were shown to yield a modest improvement of bias for the most privileged participants - older, white, cis, men - the effect is somewhat limited (Girod et.al., 2016; Sherman et.al., 2019).

The only published intervention targeted to reduce weight bias among medical personnel was a module recently developed for a private medical chain in Israel to "to reduce weight bias among medical centers employees" (Sherf-Dagan, 2022). Researchers implemented a brief educational module that participants reviewed on their own and assessed participant explicit and implicit bias before and after viewing the intervention. The module was composed of four components "a) Knowledge about obesity, including obesity definition and prevalence, risk factors, and treatment options; b) Weight bias, stigma, and discrimination definitions and impact; c) Strategies to reduce weight bias, stigma, and discrimination in the healthcare setting; d) A short quiz" (Sherf-Dagan, 2022). Researchers found a statistically significant reduction in the explicit anti-obesity bias of participants, but not their implicit bias.

Setting and Population

Due to the ongoing Covid-19 pandemic, the setting of the intervention was entirely online. In selecting between synchronous and asynchronous modalities, the researchers elected to utilize an asynchronous format, to provide the lowest barrier to participation. However, studies released in the last two years evaluating online education in a post-Covid world are finding that students report an increased level of social presence and learning satisfaction via synchronous video education (Grech, 2021). If the barrier to participation in the educational module is removed - for example if it became a required lecture for a course - comparison of the results of synchronous video presentation to the results of this study's pre-recorded asynchronous module would be of merit.

The population eligible to participate in the intervention was the faculty and students at Seattle University's College of Nursing. Specific demographic data is not directly available from Seattle University. The best alternative is statewide ARNP demographics from the Center for Health Workforce Studies at the University of Washington. They report that in 2020 the state's ARNP population by age was 44 on average, with 32% over age 55 (Stubbs & Skillman, 2020). In an eligible population of students and faculty, with significantly more students, a lower average age is expected. The Center for Health Workforce Studies at the University of Washington also reports that 11% of ARNPs in Washington are male, a statistic that this survey population should closely match (Stubbs & Skillman, 2020).

No specific data is available on rates of obesity within nurses in Washington. In a national study from 2008, 54% of 760 respondents were overweight or obese, a 20% higher rate than that of the general population, which was 34% in 2008 (Freedman, 2011; Miller et.al., 2008). We also must consider that the rate of obesity is lower in Washington state than nationally

- 42% vs 28% of adults in 2020, or 14% less. Since 2008 the increase of obesity in the general population has been 8%. If rates of obesity in the nursing population increased at approximately the same rate as the general population, the national obesity rate for nurses would be 62% in 2020. If the population of WA nurses also matches the decrease from the national average, -14%, the expected obesity rate for the participant population of a Washington-based nursing college is approximately 48%.

Methods

IRB

The project was determined to be exempt from Human Subjects Review by the Institutional Review Board at Seattle University.

Design

The study is an interrupted time-series study. Participants' implicit and explicit bias towards obese people was measured before and after an interventional educational module. The intervention was closely modeled after a module targeting obesity bias developed by researchers in Israel for a large health care network there in 2021. Permission was sought and granted from Dr. Shiri Sherf-Dagan, who provided a copy of their module and text. Both documents were in Hebrew. The text was translated into English using Google Translate, and the translation was verified by a native speaker. Researchers then created a module in English utilizing the translated text. Some information was edited to be relevant to an American audience, for example utilizing obesity prevalence data from the US, via the CDC, to replace European data from the World Health Organization. The module - an interactive PowerPoint with voice-over narration and a comprehension quiz - was hosted on the researcher's server at the address www.obesitybias.net.

Participants, Recruitment, Stakeholders

Qualified participants were any current or former student or faculty at Seattle University's College of Nursing. Eligible participants were invited to participate via emails to SUCON listservs containing a brief introduction and a link to the Qualtrics survey. Once the survey was completed, participants were given a link to the intervention module. The intervention module was available for two weeks, and 61 individuals participated. Post-intervention, SUCON listservs were used to email all eligible participants and request that those who completed the intervention complete a second Qualtrics survey. The follow up survey was available for one week, and 30 individuals participated.

The agency contact and primary stakeholder for this intervention was Dr. Bonnie Bowie, Dean of Graduate Education at SUCON. Dr. Bowie granted the researchers access to SUCON email listservs to recruit participants. Other stakeholders include Dr. Andrea Eickelman, whose research for her DNP project in 2021 inspired this work, and the obese community members Dr. Eickelman surveyed for her project. As the target group for this educational tool, SUCON students and faculty are also considered stakeholders for this work.

Data Collection

Due to the ongoing Covid-19 pandemic, the intervention was entirely remote. Disclosures, consents, and surveys were hosted on a password protected Qualtrics account provided by Seattle University. The intervention, an interactive powerpoint, collected no identifying information and was hosted on a separate website maintained by the researcher.

Before accessing the intervention module, participants were directed to Qualtrics. They completed a consent form, provided non-identifying demographic information, created a unique identifier to allow researchers to pair their before and after results, and completed validated assessments of their explicit and implicit weight bias. They then were given the link to the

intervention module and completed the intervention on their own. At the end of the intervention window all eligible participants were contacted again, with a second link to Qualtrics and a request that those who participated complete a second consent, provide their unique identifier, and complete a post-intervention reassessment of their implicit and explicit bias.

Explicit bias was measured before and after the intervention using the Nutrition, Exercise and Weight Management Attitudes Scale, or NEW, which was imported to Qualtrics. This Thurstone scale tool was specifically designed to measure the bias of medical students toward obese patients, and was validated favorably both by the developing researchers, who compared it against two preexisting tools, and by researchers conducting a meta-analysis of 40 tools for explicit weight bias measurement (Ip et.al., 2013; Lacroix et.al., 2017).

Implicit bias was measured before and after the intervention using the Implicit Association Test (IAT) hosted by Harvard University's Project Implicit. From the Qualtrics survey, participants were directed to the Project Implicit website, and asked to report their results in Qualtrics. Measurement of implicit bias is complex, with at least four pre and post- test tools for its measurement commonly used in research: the Implicit Relational Assessment Procedure (IRAP), the Implicit Association Test (Iat), the evaluative-priming task, and the Affect Misattribution Procedure (AMP). In the only study where these tools were used to assess anti-fat bias, the IRAP and IAT were found to be superior at detecting higher levels of bias than explicit measures (Roddy et.al., 2010). However, none of the implicit bias measures are perfect, as they each may "overestimate consequential biases, sometimes considerably so" (Blanton & Jaccard, 2017). Further, each implicit bias assessment may be muddied as they measure four variables rather than one - positive and negative attitudes towards a control group and positive and negative attitudes towards a group experiencing bias (Blanton & Jaccard, 2017). Practically, as

the IAT is readily available online, for ease of use it was selected to measure the effect of the intervention.

Results

Demographics

74 qualified individuals accessed the pre intervention questionnaire. 61 completed the questionnaire and indicated they had viewed the module. Following the intervention window, 42 individuals accessed the post-test evaluation. Of those, 11 did not complete the questionnaire and 1 one was unable to be matched to a pretest result using their unique identifier. 30 results were paired. A pre-test sample of 61 and post-test sample of 30 were produced, with an attrition rate of 51%. Table 1 lists the participant demographics of each group.

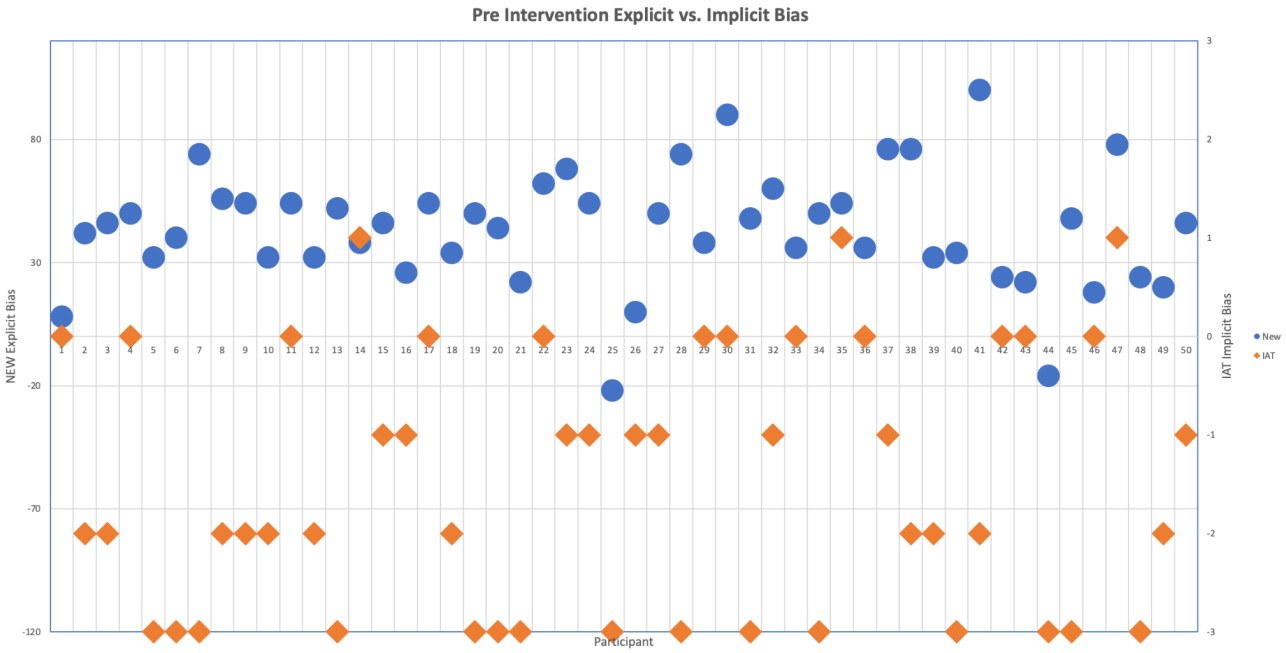
Table 1: Demographic Table

Demographic Characteristics of Participants

Sample Characteristics	Pretest N= 61		Paired Post-Test N= 30	
	N	*%*	*N*	*%*
Age				
Not Identified	1	2%	1	3%
18-25	5	8%	3	10%
26-35	27	44%	14	47%
36-45	18	30%	7	23%
46-55	7	11%	3	10%
56-65	1	2%	1	3%
65+	2	3%	1	3%
Weight				
Not Identified	1	2%	1	3%
Underweight	1	2%	0	0%
Normal Weight	34	56%	15	50%
Overweight	11	18%	7	23%
Obese	11	18%	6	20%
Extremely Obese	3	5%	1	3%
Gender				
Not Identified	1	2%	1	3%
Nonbinary, Agender, or Other	4	7%	2	7%
Female	48	79%	24	80%
Male	8	13%	3	10%

Explicit vs. Implicit Bias Expression

Chart 1: Pre-Intervention Explicit vs. Implicit Bias



This graph illustrates the stated (explicit) bias and internal (implicit) bias of the 50 participants pre-intervention who completed both measurements. Negative measurements indicate more bias, positive measurements indicate less bias. For all participants except one, or 98% of respondents, measured implicit bias was greater than measured explicit bias.

Pre and post-intervention Implicit Bias Comparison

Table 3: IAT Paired T Table

Population	n	Mean	SD	t-cal	t-crit	df	p	Decision
Pre-Intervention	23	-1.545	1.68	-3.38	1.72	22	0.0014	Accept
Post-Intervention		-0.8636	1.55					

The IAT Scale measures reaction times to four types of associations and is scored on a scale from -3 to +3. The mean score of the paired sample prior to the intervention was -1.545. The mean score of the paired sample following the intervention was -0.8636. P-value 0.0014, predictive power 95%.

Pre and post-intervention Explicit Bias Comparison

Table 2: NEW Paired T Table

Population	n	Mean	SD	t-cal	t-crit	df	p	Decision
Pre-Intervention	30	35.73	463.37	-1.98	1.70	29	0.0286	Accept
Post-Intervention		43.47	860.95					

The NEW evaluation is a Thurstone scale evaluation scored from -180 to +180. The mean score of the paired sample prior to intervention was 35.73. The mean score of the paired sample following the intervention was 43.47. P-value 0.0286, predictive power 61%.

Discussion

The participant population of the study met the overall demographic expectations. Pretest bias measures found high rates of bias against obese people in the population. The intervention had a statistically significant result on both implicit and explicit bias against obese people in the paired sample.

The demographics of both the larger pretest group and smaller paired group aligned closely with the expected population. As expected in a collegiate environment, participant age was skewed lower than the state median of 44, with 52% of the pretest group and 57% of the paired post-test group reporting their age as less than 35. Gender closely matched the distribution seen in the profession, 11%, with the pretest population reporting 13% male and the paired population 10% male. While researchers had the least clarity around the expected proportion of obese participants, the sample was near to the estimated 48%, with 41% of pretest participants and 48% of post-test participants identifying as overweight.

The individuals who completed both pre and post evaluation were proportionately younger and heavier than the individuals who completed the post-test. 7% more respondents were obese and 5% more respondents were younger than 35. Regarding obesity, it is possible

that given the impact of weight on the medical experience of obese people discussed above in the literature review, participants who work in health care and experience obesity bias themselves were particularly invested in the project. In respect to age, a combination of increased awareness and activism in young people, and a potential interpersonal relationship between the researchers and their peers could both have contributed to the younger skew of the paired sample. It's also possible given the small sample size of the paired group (n=30) that these percentage changes are not significant. Future studies could gather data to examine these questions in more depth.

The pre-intervention population was found to have significant implicit bias and nearly no explicit bias. The participants' pretest IAT implicit bias testing found implicit bias against obese people, or a score less than zero, in 71% of participants. For the same pretest sample, NEW explicit bias testing found significant explicit bias against obese people, or a score less than zero, in only 3% of participants. These differences are observed across many paired explicit/implicit evaluations, and are known as explicit implicit evaluative discrepancies, or EIEDs (Shoda, McConnel & Rydell, 2014). Researchers believe this occurs "when differential positive and negative evaluations toward attitude objects reside in systems of knowledge governed by language and reasoning (i.e., explicit evaluations) and systems of knowledge that are association-based (i.e., implicit evaluations)" (Shoda, McConnel & Rydell, 2014). In other words, when evaluating explicit bias, participants have time to reject an initial association and evaluate a prompt based on their conscious or chosen values. This 'double check' of a gut reaction is deliberately not available to participants in implicit bias associations like the IAT. This finding was expected and demonstrates that obesity bias is present in SUCON students and faculty.

Regarding the intervention, when comparing results in the paired sample for the IAT, the mean increase was .681 points. The range of points for this tool is -3 to 3, with -3 representing

strongest bias against obese people, and 3 representing strongest bias in favor of obese people. In some instances, 0 might be considered the 'goal' value for an IAT measurement, indicating no bias whatsoever and creating a two-tailed T-test. For this intervention the measured values went from more negative (-1.545) to less negative (-0.8636), and a single-tailed T-test is appropriate for evaluating this data. The average increase of .681 represents a reduction in implicit bias of 11%. The paired t-test P-value is strongly significant at 0.0014, which, when combined with the small range of test values, has a predictive power of 95% (Buchner, 2022).

This intervention's result is much larger than that seen by Dr. Sherf-Dagan and team, likely due to a difference in measurement tools. The tool selected for the previous study was a short form fat-phobia scale, rather than an implicit association test (Sherf-Dagan et.al, 2022). The researchers had concluded "the tools used to assess outcomes in the present study may not have been sensitive enough to detect changes over time" (Sherf-Dagan et.al., 2022). The IAT is a validated means of assessing bias for groups. The tool's main weakness is its low temporal stability for individuals, however for groups averages remain stable (Payne et.al., 2017). For this reason, the data compared mean implicit bias scores pre and post- intervention for each group and did not examine individual participants granularly. The intervention yielded a significant decrease in implicit bias among participants.

For explicit bias, measured using the NEW Scale, the average increase was 7.74 points. The range of points for this tool is -180 to 180, with -180 indicating the strongest possible measurement of explicit bias, and 180 indicating the least amount of bias. The average increase of 7.74 represents a reduction in explicit bias of 2%. While the paired t-test P-value is significant at 0.0296, the predictive power given the small sample size and large range of test values is 61% (Buchner, 2022). While participants largely recorded positive NEW scores even prior to the

intervention, after viewing the module a small but significant increase in scores was measured. This result is similar to that of the Israeli study, which also saw a small but significant reduction in explicit bias in the study population post-intervention when compared not only to the population's baseline but also to a control group (Sherf-Dagan, 2022). While a 2% improvement may not be considered particularly impactful, researchers have determined that with educational interventions even a small improvement can be useful to the affected population - in this case obese people - and the intervention may still have merit, particularly when coupled with the stronger result for implicit bias (Newcomer et.al., p. 169, 2015).

Implications for Practice

The results demonstrated not only the presence of obesity bias and the need for an educational intervention to reduce it at SUCON, but also that this module was successful in bringing about statistically significant improvements. In the future at SU the same module can be reused for asynchronous viewing, so there is no cost in instructor hours to integrate this intervention into a course. The module could also be utilized going forward without pre- and post-testing, reducing participation time from the 60 minutes for this study to only 15 minutes. The module could also be reused at other institutions - either academic or medical - in similar pilot studies measuring the change in explicit and implicit bias before and after intervention. The module is simple, low cost, low time, and yields a significant benefit in both the explicit and implicit bias of its viewers.

There are, however, other modalities to explore that could yield stronger results. The module could be presented live with pre and post-test measurements to examine if synchronous participation increases learning. Alternate interventions could also be implemented, measured

and compared to these results, for example the simulation designed by Dr. Andrea Eickelman for her DNP project.

There is reason to believe that simulation would prove even more effective in reducing obesity bias, as a positive clinical experience with an obese patient has been shown to significantly reduce the anti-fat bias of medical providers (Meadows et.al., 2017). However, given the previously demonstrated negative effect of a biased experience on individuals identifying as 'fat', particularly from healthcare providers, an intervention focused on increased contact with biased practitioners could be harmful. This opens the door to simulation as a solution. High fidelity simulation has been shown to provide clinical experience, acquisition of knowledge and affective outcomes on the learners' attitudes and motivations (Junghee et.al., 2016). Implementing the already designed simulation and comparing the interventions' results would clarify which modality is most effective.

Limitations

The study had four main limitations - the sample size and attrition rate, the lack of a control group, the amount of time between evaluations, and the amount of time requested from participants.

Three of these limitations are particularly stark when compared to the study this intervention was modeled from. In Dr. Sherf-Dagan and her colleagues' research, an entire healthcare network of nearly 3000 participants was available to the researchers. Even with similar rates of attrition, they concluded their study with both a control and experimental group of over 200 participants (Sherf-Dagan et.al, 2022). The small sample size achieved in this study somewhat limits the predictive power of the results, although those results were statistically significant. Similarly, the size of the health care network used in the previous study allowed

researchers to set aside a control group. While this intervention was able to judge effectiveness by comparing to the participants' baseline, if the sample size had allowed for a control group, the results could have been validated further. The researchers were also able to measure their results both one week and one month following the intervention. Unfortunately, the timeline of the DNP project did not allow for a second measurement.

Finally, researchers heard anonymous feedback from more than one participant that the total time required for the project was excessive - approximately one hour total to complete both measurements and the intervention. Researchers tried to mitigate the time request through proactive communication in the first invitation to participate. However, given the participants' feedback, it is likely that the time requirement contributed to both a lower pretest population and the high rate of attrition from pretest to post-test.

Conclusion

Obesity bias in healthcare is a serious concern that significantly impacts patients and must be addressed. The study demonstrated that obesity bias is present not only in other healthcare institutions, but also at SUCON. Researchers proved that their interventional module is effective in reducing both implicit and explicit bias in the short term. Continuing to utilize this intervention is an important priority to reduce obesity bias in our institution. Expanding to other institutions and implementing and comparing other modalities are future goals to be explored. Most importantly, this intervention represents an effective first step, not a finish line.

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