

Racism in Oral Healthcare Settings: Implications for Dental Care-Related Fear/Anxiety and
Utilization among Black/African American Women in Appalachia

Kalo C. Sokoto, Lisa Platt, Linda Alexander, Betsy Foxman,

John Shaffer, Mary L. Marazita, & Daniel W. McNeil

West Virginia University

University of Pittsburgh

University of Michigan

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Abstract

Objective: To explore the association of racism in oral healthcare settings and dental care-related fear/anxiety in dental utilization among Black/African American women in Appalachia.

Methods: We analyzed self-report measures of racism in oral healthcare settings, dental care-related anxiety and fear, recency of a dental visit, and demographic information from 268 pregnant women participating in the Center for Oral Health Research in Appalachia (COHRA) SMILE cohort. All participants self-identified as African American or Black and resided in Appalachia (i.e., either West Virginia or Pittsburgh, PA).

Results: Over one-third of the participants reported at least one instance of racism in oral healthcare settings, with “not being listened to” due to their race or color as the most frequent issue (24.4%). Clinically significant levels of dental care-related anxiety and fear were reported by 14.3% of the sample. A mediational model demonstrated that the experience of racism in oral healthcare settings was a significant predictor of dental fear/anxiety, and that dental fear/anxiety was a significant predictor of dental utilization. There was a significant relationship between racism in oral healthcare settings and dental utilization only when mediated by the presence of dental care-related fear and anxiety.

Conclusions: Together, experiences of racism in oral healthcare settings and dental care-related fear/anxiety are predictive of decreased dental utilization for African American/Black women living in Appalachia. This study provides insight into racism in oral healthcare settings as a social determinant of dental anxiety/fear and inequities in dental utilization.

Keywords: Racism; African Americans; Appalachia; Dental Fear; Dental Anxiety; Dental Utilization

Racism in Oral Healthcare Settings: Implications for Dental Care-Related Fear/Anxiety and Utilization among Black/African American Women in Appalachia

Racism is a public health threat and has been linked to health and healthcare inequities¹⁻⁴. It is the most often reported form of discrimination in US healthcare systems,³ and is linked to reduced healthcare utilization among other deleterious health outcomes²⁻⁴. Likewise, racial inequities exist in dental care utilization.^{1,2} Racism in oral healthcare settings can be manifested through provider- and staff-patient interactions.^{5,6} For example, African American/Black patients are disproportionately recommended for tooth extractions, provided with less pain management, issued fewer surgery referrals for oral cancer, given less time with providers, and are more likely to lack racial concordance with providers.⁷⁻⁸ Yet, little is known about racism in oral healthcare settings⁵ and how it might be related to dental fear/anxiety and ultimately racial inequities in utilization.⁹

Krieger's Ecosocial Theory of Health Inequity highlights social forces, such as racism, that impact public health¹⁰. Using this theory as a basis, this study focuses on the "dynamic pathway"¹⁰ as one of the four ways public health inequities manifest. Within this pathway, we focus in this study on "everyday racism"¹¹ as ongoing, chronic social interactions with providers and staff in oral healthcare settings. These experiences may constitute one aspect of the pathway that reduces the probability of utilization of oral healthcare in Black/African American and other minoritized communities; they may be involved mechanistically with other factors, such as dental care-related anxiety and fear.

Even with extensive documentation of overall barriers to dental care utilization, pathways involved in such utilization among Black/African American individuals have not been clarified.^{5,9} Dental care-related fear/anxiety is a well-established predictor of dental care

utilization in the general population.¹² Dental care-related fear/anxiety refers to the experience of negative anticipatory or procedural arousal related to a professional dental treatment¹².

Individuals who report greater levels of dental fear/anxiety have a pronounced likelihood of delaying or avoiding dental treatment.¹² There is limited research, however, on the prevalence, genesis, or manifestations of dental care-related fear/anxiety among those identifying as Black or African American.¹²

Further, there is a paucity of research on how racism and dental care-related anxiety/fear together influence dental care utilization for Black/African American patients. Yet these links are important as, psychologically, anxiety/fear and effects of racism have in common the anticipatory nature of danger, pain, or harm.¹³ Research has consistently linked generalized anxiety and experiences of racism among Black/African American samples^{14,15}. A study¹⁶ involving Black/African American dental patients identified unique triggers of dental fear/anxiety that are different from those typically observed in majority cultural groups. Many of the Black/African American patients reported poor-quality care and/or mistreatment, stemming from prior experiences with oral healthcare providers, as triggers for their current dental care-related fear/anxiety. In other words, past experiences with racism in oral healthcare settings was noted as one of the triggers of current dental fear/anxiety, which contributed to Black/African American patients seeking dental care less often or to stop utilizing services altogether. Another study found that participants who reported the emotional impact of experiencing racial discrimination in healthcare settings had a greater likelihood of underutilizing oral healthcare¹⁷. Racism in oral healthcare settings therefore may reduce utilization of professional dental services¹⁸ through a pathway that involves dental fear/anxiety.

Along with dental fear/anxiety and potentially racism, there are other known factors that predict underutilization of dental services, which are considered in the current study. Those living in geographic regions like Appalachia have poorer oral health relative to many other regions nationally¹⁹. Additionally, pregnant women may underutilize dental care due to dental fear/anxieties about harm to the fetus and the reluctance of providers to provide treatment during pregnancy.²⁰ As such, Black/African American women residing in Appalachia are at the intersection of multiple social determinants of oral health outcomes, including gender, rurality, and race.¹⁹ The intersectionality of various minoritized identities is of critical importance in oral health and healthcare^{21, 22}. Appalachia spans 13 states, including all of West Virginia²¹. It includes many rural and remote areas, but a number of cities, too.²³ Those who identify as Black or African American constitute ~10% of the population of Appalachia and are the largest racial minoritized group therein²⁴.

The present study aimed to address several critical gaps in the literature regarding the prevalence of racism in oral healthcare settings and its association with dental anxiety/fear, and oral healthcare utilization among Black/African American women in Appalachia. Using Krieger's theory¹⁰ as a basis, this study explores how everyday racism within oral healthcare settings may be associated with healthcare-seeking behavior (i.e., dental care utilization) via a pathway that involves dental care-related fear/anxiety. We estimate the frequency of dental fear/anxiety and racism occurring in dental settings, specifically for those who embody underprivileged intersecting identities (i.e., race, gender and residing in Appalachia). Using mediation analysis, we explore the association of dental fear/anxiety in the relationship between experiences of racism in oral healthcare settings and dental care utilization. We hypothesized that racism experienced during oral healthcare would positively relate to dental fear/anxiety and, that

dental care-related fear/anxiety would negatively relate to dental utilization in this sample of Black/African American women. We also hypothesized that dental fear/anxiety would mediate the relationship between racism in oral healthcare settings and dental care utilization.

Methods

Participants

The current study data ($n = 268$) is from the Center for Oral Health Research (COHRA) SMILE cohort. The COHRA longitudinal research project has been ongoing since 2002, focusing on the factors contributing to oral health inequities in Appalachia.²⁵ The COHRA SMILE cohort was initiated in 2018, and specifically recruited women who: (a) identify as Black or African American, (b) were in their 1st or 2nd trimester of pregnancy, (c) were 18 years and older, (d) reside in West Virginia or Pittsburgh, PA, (e) were healthy enough for an oral health screening, and (f) were willing to participate in follow-up visits.

Measures

Sociodemographic variables. Participants responded to questions about their educational level, household income, state of residence, and type of dental insurance, if any, selected from a larger sociodemographic questionnaire.²⁵

Oral healthcare utilization. Utilization was measured using a single item, “About how long ago was your LAST visit to a dentist or dentist hygienist, including all types of dentists, such as orthodontists or oral health surgeons?” with the response options (1 = 6 months or less, 2 = 7 months -1 year, 3 = 1 – 2 years, 4 = 2 – 3 years, 5 = 3 – 5 years, 6 = more than 5 years and 9 = Don’t know/Not Applicable). Participants also were asked if they ever had professional dental care of any type. These values were dichotomized into a variable indicating whether the

participant had oral healthcare in the last year [coded as 1] or not [coded as 0], including those who reported they have never utilized professional dental care.

Everyday Racial Discrimination in Dental Care Scale (ERDS-DC). The 7-item scale is a modified version of the original 9-item, Everyday Discrimination Scale²⁶. The original measure was informed by Essed's Theory of Everyday Racism, which was developed with a sample of Black/African American women¹¹. The ERDS-DC measures lifetime social interactions in oral healthcare settings, that produce inequity in oral health outcomes by race. Example items include "Received poorer services than other people" and "Felt like a dentist, hygienist, or dental assistant was not listening to what you were saying." Participants are asked to indicate the frequency of these events with a 4-point scale (0 = *Never*; 1 = *Once*; 2 = *Two or three times*; 3 = *Four or more times*); the possible range of the total score is 0-21. Higher scores indicate more frequent experiences of everyday racism. Previous studies reported good internal consistency, ranging between $\alpha = 0.88 - 0.94$.²⁶⁻²⁸ The scale has been previously validated.^{26,29,30} Internal consistency for the EDS-DC for the current sample was $\alpha = .88$.

Dental Fear Survey (DFS).³¹ The DFS is a 1-5, 20-item Likert-type self-report measure, with a possible range of 20-100, which assesses lifetime dental care-related fear/anxiety. In addition to three subscales (i.e., avoidance of dental care, fear of specific dental-oriented stimuli, and physiological arousal), there is an omnibus item (DFS #20) that assesses overall dental fear/anxiety (i.e., "All things considered, how fearful are you of having dental work done?"). Higher scores indicate greater dental care-related fear/anxiety. The psychometric properties of the DFS and its relation to the DFS item #20 are well established.^{12,31-34} Internal consistency for the total DFS scale for the current sample was $\alpha = .95$. For the purposes of this study, clinically

significant fear/anxiety was that which was reported as “much” (i.e., 4) or “very much” (i.e., 5) fear and anxiety on the omnibus DFS item #20.

Sample Recruitment and Data Collection

The study was approved by the Institutional Review Boards at West Virginia University, and the University of Pittsburgh; participants signed printed consent forms. Using a community engaged approach, potential participants were recruited through three types of non-probability sampling methods: (a) cluster sampling with relevant community organizations, (b) web-based sampling, and (c) snowball sampling. Participants were recruited between January 2018 and June 2021 for an in-person assessment visit, after a telephone or in-person screening interview to assess eligibility. The participants were involved in a comprehensive in-person biopsychosocial battery of assessments,²³ followed by a telephone interview. Assessment of racism during dental care was accomplished privately during the in-person assessment, with the participants using a computer tablet. Participants were compensated for both the in-person assessment and the telephone interview.

Statistical Analysis

Using the PROCESS macro for SPSS³⁵ we tested the hypothesis that racism in oral healthcare settings predicted dental utilization through dental fear/anxiety, using a logistic regression mediational model. Included as covariates were those with established influences on oral health behaviors and outcomes: (a) socioeconomic status, as reflected in educational level and household income; (b) dental insurance status (i.e., public insurance [coded as 1] versus private or no insurance [coded as 0]); and (c) state residence (i.e., West Virginia [coded as 1] versus Pittsburgh, PA [coded as 0]).

Results

Sociodemographic data are presented in Table 1. On average, the participants were 27.2 years old ($SD = 5.5$, range 18 - 43). Almost all (93.7%) had completed high school or further education, and 11.9% had a college degree or postgraduate education. About three-fourths ($n = 196$; 73.1%) resided in an urban setting (i.e., Pittsburgh) and one-quarter ($n = 72$; 26.9%) in smaller cities or rural areas of West Virginia. Most participants had some form of dental insurance ($n = 220$, 82.1%). About half of the sample ($n = 141$; 52.6%) had public dental insurance (e.g., Medicaid). Of the 268 participants, 109 (40.7%) reported having had a dental visit in the past six months, while another 57 (21.3%) had a dental visit within the last year, and 34 (12.7%) reported never having had professional dental care.

Over one-third ($n = 100$; 37.3%) of participants reported experiencing at least one instance of racism during dental care. Figure 1 displays the relative distribution across the seven forms of everyday racism assessed in the ERDS-DC. The average total score for the ERDS-DC scale was 1.7 ($SD = 3.3$).

Figure 2 displays the distribution of levels of dental care-related fear/anxiety, based on the omnibus DFS item. The mean DFS total score was 34.1 ($SD = 17.0$). Overall, 44% of the women from the sample endorsed dental care-related fear/anxiety. 14.5% of the women endorsed clinically significant levels of dental care-related fear/anxiety (i.e. those indicating *much* or *very much* dental fear/anxiety on DFS item #20).

First, the mediational model was tested without covariate adjustments. The experience of racism was a significant predictor of dental fear/anxiety, $B = .06$, $SE = .02$, 95% CI[.013, .105], $p = .0128$, and dental fear/anxiety was a significant predictor of oral healthcare utilization, log odds estimate = $-.26$, $SE = .10$, 95% CI[-.458, -.067], $p = .0085$. These results support the mediational hypothesis. More experiences of racism were associated with greater dental

anxiety/fear; higher levels of dental fear were associated with decreased use of dental services. Racism alone was not a significant predictor of utilization, log odds estimate = .022, SE = .04, 95% CI[-.0563, .1002], $p = .5827$. The indirect coefficient was significant, log odds estimate = -.016, SE = .010, 95% CI[-.0389, -.0013], supporting a mediation between racism and dental fear/anxiety on the outcome of oral healthcare utilization. Converting the logit value to an odds ratio for the indirect effect of racism on utilization, as mediated by dental fear/anxiety, yielded an OR of .984 [.9618, .9987], reflecting a small effect. This result suggests that racism indirectly decreases utilization.

The mediational analysis including covariates yielded similar results. Figure 3 displays the adjusted mediational model. The experience of racism was a significant predictor of dental fear/anxiety, $B = .07$, SE = .02, 95% CI[.019, .112], $p = .0057$, and dental fear/anxiety was a significant predictor of oral healthcare utilization, log odds estimate = -.30, SE = .11, 95% CI[-.5080, -.0895], $p = .0051$, supporting the mediational hypothesis. More experiences of racism leads to more dental fear/anxiety; dental fear/anxiety is associated with decreased dental utilization. Racism alone was not a significant predictor of utilization, log odds estimate = .0015, SE = .0422, 95% CI[-.0811, .0842], $p = .9709$. The indirect association was tested with 5,000 bootstrapping samples that were used to construct bias-corrected 95% confidence intervals. The indirect coefficient was significant, log odds estimate = -.0195, SE = .0117, 95% CI[-.0485, -.0030], again supporting a mediation between racism and dental fear/anxiety on the outcome of oral healthcare utilization. Converting the logit value to an odds ratio for the indirect effect of racism on utilization, as mediated by dental fear/anxiety, yielded an OR of .9807 [.9527, .9970], suggesting a small effect. Of the covariates, only the public dental insurance variable was significant, log odds estimate = .78, SE = .28, 95% CI[.2272, 1.3234], $p = .0056$.

Discussion

This study is one response to the call for anti-racist research in dentistry. Results supported the hypothesis that racism in oral healthcare settings, together with dental care-related anxiety and fear, predicts oral healthcare utilization. There are few studies on racism as a social determinant of oral health inequities in the US.^{5,8} Past research has assessed lifetime racism or racism in general healthcare settings with single or two item measures.^{15,16} In this study involving Black/African American pregnant women living in Appalachia, over one-third reported at least one prior incident of everyday racism in oral healthcare settings. Using a psychometrically-sound measure, this study highlights the nature of racism in these settings, with the most frequent occurrences of everyday racism being: (a) not listened to by dental providers, (b) being treated with less respect compared to others, and (c) receiving poorer service compared to others. These findings are consistent with the long-standing history of racism that plagues US healthcare systems. Additionally, though specific to racism in oral healthcare settings, results are like those found with racism reported by African American/Black women generally in US healthcare settings.³ Finally, these findings support the intersection of race and gender in experiences of racism with “not being listened to by dental providers” being the most reported form of racism and “being perceived a threat by dental providers” being the least form of racism in oral healthcare settings (which typically is associated with males). That is, in addition to common experiences of racism, there are some experiences unique to gender.^{10,11}

Additionally, 34 (12.7%) of the women in this sample reported never having professional dental care. This result may be related to previous findings^{10,11} that racism is collective and impacts the lives of Black and African American people both directly and indirectly. As such, knowledge of another person’s experience of racism in oral healthcare settings or personal

experiences of racism in other healthcare settings may be a factor impacting one's dental utilization, which may contribute to avoidance of dental care services, even when one has not directly had that experience.

In this analysis of Black/African American women living in Appalachia, the level of dental care-related anxiety and fear, with much or very much fear/anxiety, was comparable to the US as a whole in terms of clinically significant fears/anxieties (i.e., those indicating *much* or *very much* dental fear/anxiety on DFS item #20; 14.5% compared to ~15%).¹² Conversely, the overall dental care-related fear/anxiety score in this study was lower than that for White mothers in another COHRA sample³⁴ (i.e., $M = 43.4$, $SD = 20.8$; one-sample test, $t(267) = 8.93$, $p < .001$). Even so, dental care-related fear/anxiety was predictive of dental care utilization in this sample as in the general population. Additionally, the findings also support existing studies that link experiences of racism with dental care-related fear/anxiety. Of note, this is the first quantitative measure of dental care-related fear/anxiety among an exclusive sample of participants identifying as Black or African American.

The pregnant women in this study are at the intersection²⁰ of race, gender, and residency in Appalachia, and so may be particularly vulnerable to adverse oral health outcomes. It is noteworthy, then, that their dental utilization is similar to that of the overall population in the USA, and that their dental fear/anxiety is comparable as well, if not lower than samples of White pregnant women. Dental utilization in the past year was similar to that found nationally (62.0% in the current sample compared to 63.0% across the US).³⁵ Similarly, the small yet significant association of racism on dental care utilization could be attributed to the resilience of the participants in this sample^{10,11}. Extensive documentation exists on how Black/African American have historically identified strategies to cope with and resist the deleterious impact of racism.²¹

In this case, delaying or avoiding dental care may be an effect of racism in oral healthcare settings. Other possible coping responses include being assertive and changing providers, if possible. Findings from this study support the need for dentistry to pursue anti-racist care with Black/African American women, through education and policies that ensure Black and African American patients are listened to, provided good quality service, and treated with respect.

Since negative effects of avoidance of oral healthcare are well established, the association of experienced racism in oral healthcare settings on dental care-related anxiety and fear is noteworthy and troubling. Being a dental patient can be uncomfortable and unsettling, particularly by those who are fearful and/or anxious about dental treatment (e.g., being closed in, laying in a supine position that feels out of control, tolerating the intrusion of fingers and instruments into the oral cavity, dealing with invasion into one's personal space/intimacy zone, fear of pain, among others).¹² It is possible that for many people, any additional overlay of negativity may not only add but act synergistically with pre-existing dental anxiety and fear.

Limitations

All data in this study is self-report, with associated potential biases. The association of racism in oral healthcare settings, together with dental fear/anxiety on dental care utilization in the model was small, but statistically significant. Participants living in a region (i.e., Appalachia) with known disparities/inequities in oral health, and only pregnant women were included. This issue may limit the generalizability to other groups. Additionally, we had no information about the ethnic/racial identity of the participants' dental providers. Given that racial discordance between patient and provider may be associated with dental care-related fear/anxiety, there is the possibility concordance or discordance affected these results³⁸. Nevertheless, the current study has many strengths, notably including that a population group representing

intersectionality²¹ is the focus, with various identities that are minoritized and/or marginalized (i.e., women, being pregnant, identifying as Black or African American, and being from Appalachia).

Future Directions

Given considerable literature on the gendered nature of racism, studies exploring racism in oral healthcare settings among African American/Black men are essential. Additionally, research is needed with other minoritized population groups in other regions of the country. Qualitative interviews may be helpful to further investigate the vagaries of racism. As already noted, future studies exploring racism in dental settings ought to consider asking about participant's dental providers' racial/ethnic identity.

Conclusions

The psychological impact of racism in oral healthcare settings is a likely barrier to oral healthcare utilization. Findings from this study showed a significant relationship between racism in oral healthcare settings and oral healthcare utilization, when mediated by the presence of dental care-related fear and anxiety. This unique cohort of women provides insight on the nature of racism in dental settings, and into the intersectionality of race, gender, and residence in Appalachia. The number and percentage of women who have had experiences of racism in dentistry is concerning, and highlights the need to focus on this issue, to promote equity so that all oral healthcare experiences involve respect and compassion.

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References

1. American Association of Public Health Dentistry (2021). Anti-Racism in Dental Public Health: A Call to Action [White Paper]. Springfield, IL.
2. U.S. Department of Health and Human Services. *Oral Health in America: A Report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000.
3. Nong P, Raj M, Creary M, Kardia SLR, Platt JE. Patient-reported experiences of discrimination in the US Health care system. *JAMA Netw Open*. 2020 Dec 1;3(12):e2029650. doi: 10.1001/jamanetworkopen.2020.29650. PMID: 33320264; PMCID: PMC7739133.
4. Centers for Disease Control and Prevention [Internet]. Racism is a serious threat to the public's health. Office of Minority Health and Health Equity. [updated on 2021 Nov 4; Cited 2021 June 15]. Available from: <https://www.cdc.gov/healthequity/racism-disparities/index.html>
5. Borrell LN, Williams DR. Racism and oral health equity in the United States: Identifying its effects and providing future directions. *J Public Health Dent*. 2022 Jan 27. doi: 10.1111/jphd.12501. Epub ahead of print. PMID: 35088413.
6. Fisher-Owens SA, Isong IA, Soobader MJ, Gansky SA, Weintraub JA, Platt LJ, Newacheck PW. An examination of racial/ethnic disparities in children's oral health in the United States. *JPHD*. 2013 Mar;73(2):166-74.
7. Han C. Oral health disparities: racial, language and nativity effects. *SSM-population health*. 2019 Aug 1;8:100436.

8. Flores G, Lin H. Trends in racial/ethnic disparities in medical and oral health, access to care, and use of services in US children: has anything changed over the years? *Int J Equity Health*. 2013 Jan 22;12:10. doi: 10.1186/1475-9276-12-10. PMID: 23339566; PMCID: PMC3560223.
8. Bastos JL, Celeste RK, Paradies YC. Racial inequalities in oral health. *J Dent Res*. 2018 Jul;97(8):878-886. doi: 10.1177/0022034518768536. Epub 2018 Apr 10. PMID: 29634429.
9. Krieger N. Discrimination and health inequities. *Int J Health Serv*. 2014;44(4):643-710. doi: 10.2190/HS.44.4.b. PMID: 25626224.
10. Essed P. *Understanding everyday racism: An interdisciplinary theory* 1991. Sage Publications Inc; 1991.
11. McNeil DW, Randall CL. Dental fear and anxiety associated with oral health care: Conceptual and clinical issues. In: Mostofsky DI, Fortune F, editors. *Behavioral dentistry*. 2nd edition. Ames, IA: Wiley/Blackwell; 2014. p.[165-192].
12. Clark US, Miller ER, Hegde RR. Experiences of discrimination are associated with greater resting amygdala activity and functional connectivity. *Biol Psychiatry Cogn Neurosis Neuroimaging*. 2018 Apr;3(4):367-378. doi: 10.1016/j.bpsc.2017.11.011. Epub 2017 Dec 8. PMID: 29628069; PMCID: PMC5897058.
13. Pieterse AL, Todd NR, Neville HA, Carter RT. Perceived racism and mental health among Black American adults: a meta-analytic review. *J Couns Psychol*. 2012 Jan;59(1):1-9. doi: 10.1037/a0026208. Epub 2011 Nov 7. PMID: 22059427.
14. Cuevas AG, Mann FD, Williams DR, Krueger RF. Discrimination and anxiety: Using multiple polygenic scores to control for genetic liability. *Proceedings of the National Academy of Sciences*. 2021 Jan 5;118(1).

15. Siegel K, Schrimshaw EW, Kunzel C, Wolfson NH, Moon-Howard J, Moats HL, Mitchell DA. Types of dental fear as barriers to dental care among African American adults with oral health symptoms in Harlem. *J Health Care Poor Underserved*. 2012 Aug;23(3):1294-309. doi: 10.1353/hpu.2012.0088. PMID: 24212175; PMCID: PMC3859136.
16. Thakkar M, Ravelli M P, Tranby E P. Discrimination reduces utilization of routine dental care. Boston, MA: CareQuest Institute for Oral Health; November 2020. DOI: 10.35565/CQI.2020.2018
17. Sabbah W, Gireesh A, Chari M, Delgado-Angulo EK, Bernabé E. Racial discrimination and uptake of dental services among American adults. *Int J Environ Res Public Health*. 2019 May 4;16(9):1558.
18. McNeil DW, Crout RJ, Marazita ML. Oral health in Appalachia. In: Ludke RL, Obermiller PJ, editors. *Appalachian health and well-being*. Lexington: University Press of Kentucky; 2012. [p.275-294].
19. Vieira DR, de Oliveira AE, Lopes FF, Lopes e Maia Mde F. Dentists' knowledge of oral health during pregnancy: a review of the last 10 years' publications. *Community Dent Health*. 2015 Jun;32(2):77-82. PMID: 26263599.
20. Crenshaw K. Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stan. L. Rev.* 1990;43:1241.
21. Elaine Muirhead V, Milner A, Freeman R, Doughty J, Macdonald ME. What is intersectionality and why is it important in oral health research? *Community Dent Oral Epidemiol*. 2020 Dec;48(6):464-470. doi: 10.1111/cdoe.12573. Epub 2020 Aug 25. PMID: 32840901.

22. Appalachian Regional Commission [Internet]. Washington DC: cited 2022 Jan 13]. Available from: <https://www.arc.gov/appalachian-counties-served-by-arc/>
23. Appalachian Regional Commission [Internet]. Washington DC: cited 2022 Jan 13]. Available from: <https://www.arc.gov/appalachias-population/>
24. Polk DE, Weyant RJ, Crout RJ, McNeil DW, Tarter RE, Thomas JG, Marazita ML. Study protocol of the Center for Oral Health Research in Appalachia (COHRA) etiology study. *BMC Oral Health*. 2008 Jun 3;8:18. doi: 10.1186/1472-6831-8-18. PMID: 18522740; PMCID: PMC2443132.
25. Williams DR, Yan Yu, Jackson JS, Anderson NB. Racial differences in physical and mental health: Socio-economic status, stress and discrimination. *J Health Psychol*. 1997 Jul;2(3):335-51. doi: 10.1177/135910539700200305. PMID: 22013026.
26. Bird ST, Bogart LM. Perceived race-based and socio-economic status (SES)-based discrimination in interactions with health care providers. *Ethnicity & Disease*. 2001;11(3): 554–563.
27. Hausmann LR, Jeong K, Bost JE, Ibrahim SA. Perceived discrimination in health care and health status in a racially diverse sample. *Med Care*. 2008 Sep;46(9):905-14. doi: 10.1097/MLR.0b013e3181792562. PMID: 18725844; PMCID: PMC3424509.
28. Peek ME, Nunez-Smith M, Drum M, Lewis TT. Adapting the everyday discrimination scale to medical settings: reliability and validity testing in a sample of African American patients. *Ethn Dis*. 2011 Autumn;21(4):502-9. PMID: 22428358; PMCID: PMC3350778.
29. Krieger N, Smith K, Naishadham D, Hartman C, Barbeau EM. Experiences of discrimination: validity and reliability of a self-report measure for population health research

- on racism and health. *Soc Sci Med*. 2005 Oct;61(7):1576-96. doi: 10.1016/j.socscimed.2005.03.006. Epub 2005 Apr 21. PMID: 16005789.
30. Kleinknecht RA, Klepac RK, Alexander LD. Origins and characteristics of fear of dentistry. *J Am Dent Assoc*. 1973 Apr;86(4):842-8. doi: 10.14219/jada.archive.1973.0165. PMID: 4511174.
31. Kleinknecht RA, Bernstein DA. The assessment of dental fear. *Behav Ther*. 1978 Sep 1;9(4):626-34. [https://doi.org/10.1016/S0005-7894\(78\)80138-5](https://doi.org/10.1016/S0005-7894(78)80138-5)
32. McGlynn FD, McNeil DW, Gallagher SL, Vrana S. Factor structure, stability, and internal consistency of the Dental Fear Survey. *Behav Ass*. 1987; 9, 57–66.
33. Schuurs AH, Hoogstraten J. Appraisal of dental anxiety and fear questionnaires: a review. *Community Dent Oral Epidemiol*. 1993 Dec;21(6):329-39. doi: 10.1111/j.1600-0528.1993.tb01095.x. PMID: 8306609.
34. Hayes AF. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. 2nd ed. Guilford; 2017.
35. McNeil DW, Randall CL, Cohen LL, Crout RJ, Weyant RJ, Neiswanger K, Marazita ML. Transmission of dental fear from parent to adolescent in an Appalachian sample in the USA. *Int J Paediatr Dent*. 2019 Nov;29(6):720-727. doi: 10.1111/ipd.12564. Epub 2019 Sep 12. PMID: 31328316; PMCID: PMC6785362.
36. Centers for Disease Control and Prevention [Internet]. Oral and dental health. [updated on 2022 Feb 1; Cited 2022 Feb 13]. Available from:<https://www.cdc.gov/nchs/fastats/dental.htm>
37. Fryer CS, Passmore SR, Maietta RC, Petruzzelli J, Casper E, Brown NA, Butler J 3rd, Garza MA, Thomas SB, Quinn SC. The symbolic value and limitations of racial concordance in minority research engagement. *Qual Health Res*. 2016 May;26(6):830-41. doi:

10.1177/1049732315575708. Epub 2015 Mar 13. PMID: 25769299; PMCID: PMC4658313.

38. Benkert R, Peters RM. African American women's coping with health care prejudice.

Western J Nurs Res. 2005 Nov;27(7):863-89.

Table 1 – Sociodemographic Characteristics of Participants

<i>Sample Characteristics</i>	<i>N</i>	<i>%</i>
State Residence		
West Virginia (WV)	72	26.9%
Pittsburgh (PA)	196	73.1%
Household Income		
\$0	20	7.5%
\$1000 - \$24,999	99	36.9%
\$25,000 - \$49,000	60	22.4%
\$50,000 - \$74,999	19	7.1%
\$75,000 - \$99,999 or more	16	79.9%
Education		
No Diploma	17	6.3%
High school degree or GED completed	194	72.4%
Associate degree	26	9.7%
Bachelor's degree	19	7.1%
Graduate or Professional degree	12	4.5%

Dental Health Insurance

None	48	17.9%
Private or Other	79	29.5%
Public (Medicaid or Medical Assistance with dental benefits)	141	52.6%

Dental Care Utilization

In the last one year	166	62%
More than a year or never	102	38.1%

Note. There were 54 (20.1%) missing values due to “do not know” or “refused” for Household Income, Average age was 27.2 years old ($SD = 5.5$, range 18 - 43); $N = 268$.

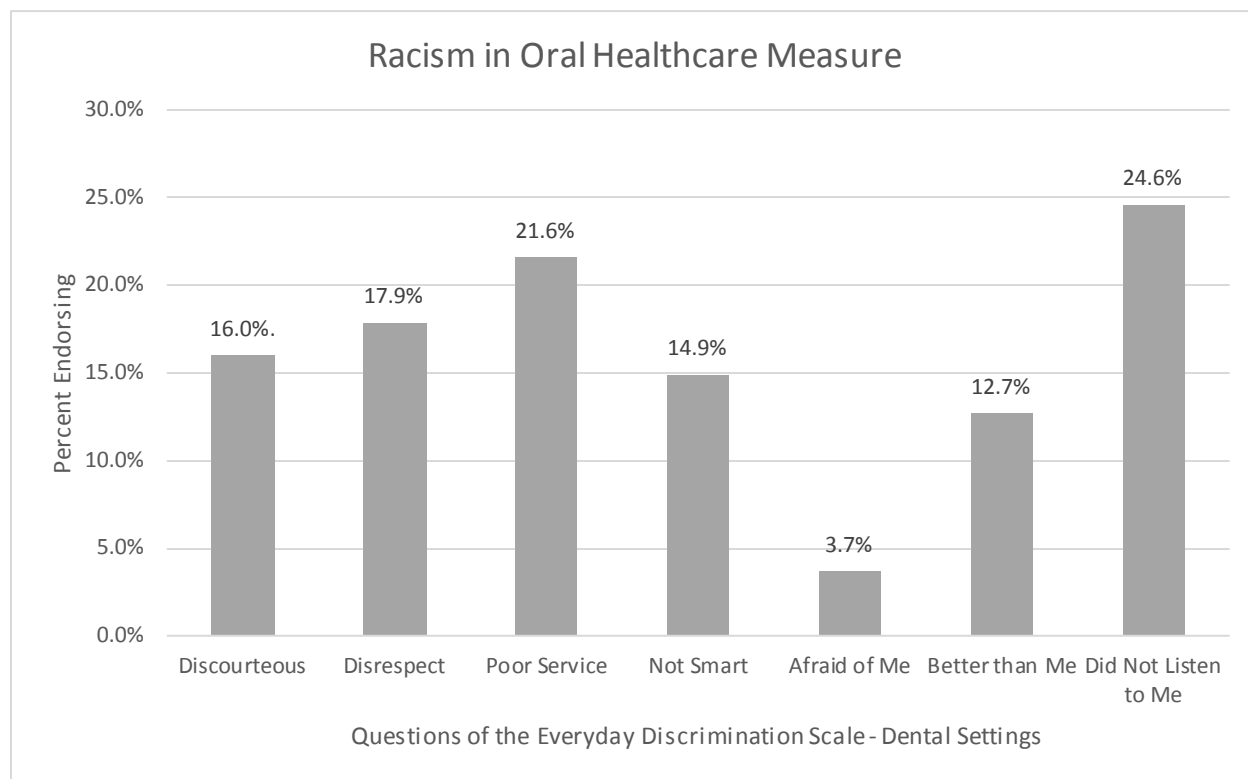


Figure 1. Percent of participants endorsing each of the seven types of everyday racism experienced in oral healthcare settings on the Everyday Discrimination Scale – Dental Settings²⁶. The specific items are: “Treated with less courtesy than other people; Treated with less respect than other people; Received poorer services than other people; Had a dentist, hygienist, or dental assistant act as if he or she thought you were not smart; Had a dentist, hygienist, or dental assistant act as if he or she was afraid of you; Had a dentist, hygienist, or dental assistant act as if he or she was better than you; and Felt like a dentist, hygienist, or dental assistant was not listening to what you were saying.” $N = 268$.

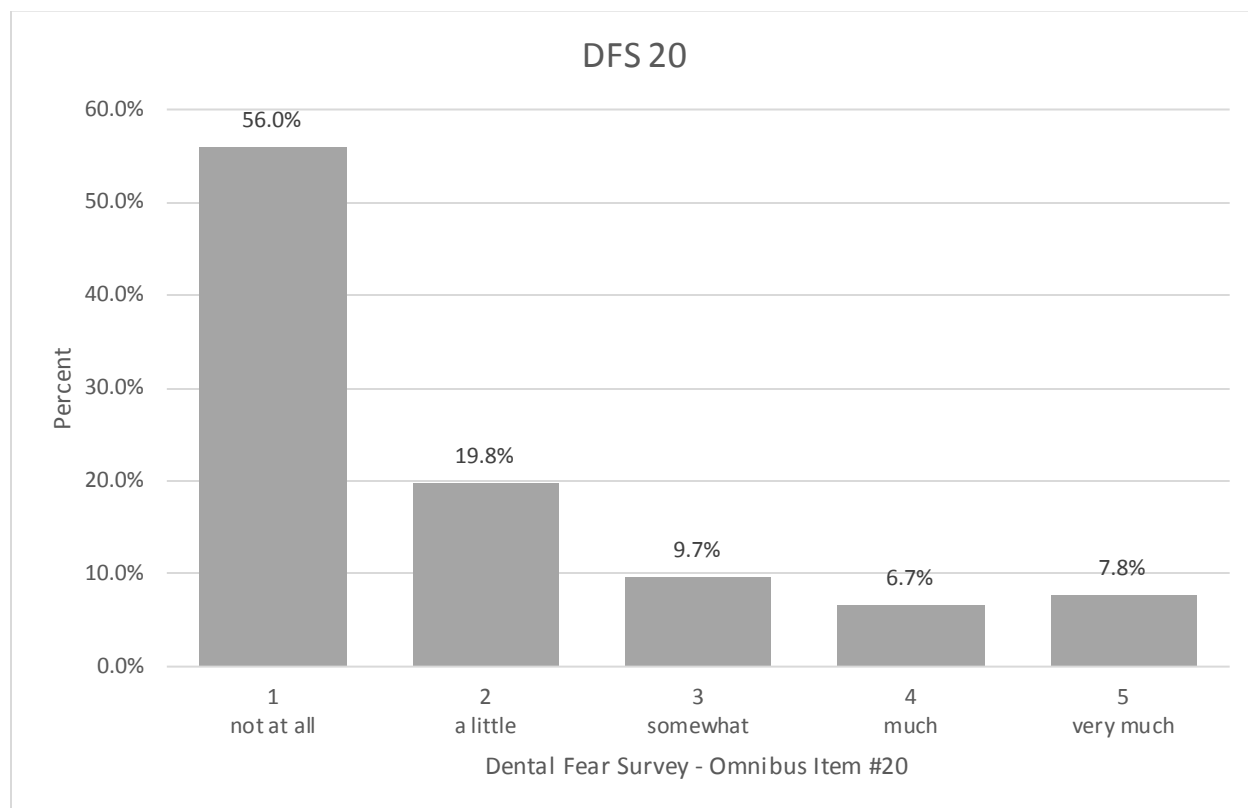


Figure 2. Distribution of participant scores in percentages across the five levels of dental care-related fear/anxiety on the Dental Fear Survey's omnibus item #20; $N = 268$.

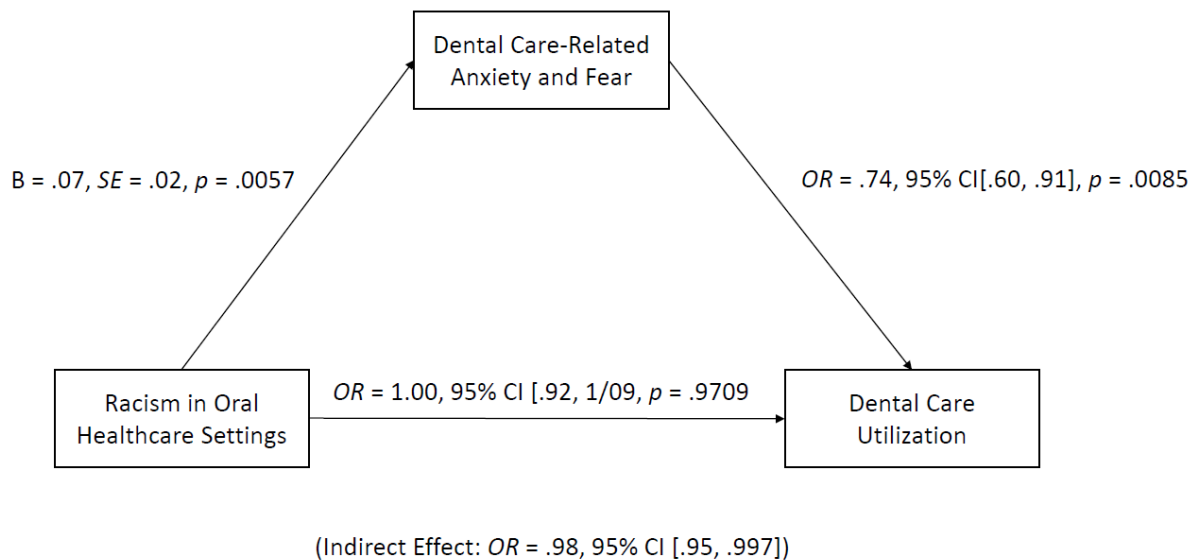


Figure 3. Mediation model of the effect of racism experienced in oral healthcare settings on oral healthcare utilization, through dental care-related anxiety and fear; $N = 268$.