ADA CE Program ARTICLE 1

COVER STORY

Disparities in dental care associated with disability and race and ethnicity

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ABSTRACT

Background. Both racial and ethnic and disability-related disparities in dental care exist, yet little is known about the cumulative effect of these 2 characteristics. The purpose of this study was to determine how the combination of disability and race and ethnicity is associated with dental examinations, delays in receiving needed care, and inability to obtain needed care among noninstitutionalized working-age adults in the United States.

Methods. The authors conducted cross-sectional analyses of Medical Expenditure Panel Survey data pooled across the years 2002 to 2012, yielding a sample of 208,548. Multivariable logistic regression analyses were used to examine the association of disability (including physical, sensory, and cognitive limitations) and race and ethnicity with each of the dependent variables.

Results. Compared with non-Hispanic whites, other racial and ethnic groups were less likely to receive annual dental examinations. There were significant disparities for people with disabilities in receipt of examinations, delays in obtaining needed care, and being unable to obtain needed care. The combination of disability status and membership in an underserved racial or ethnic group was associated with a greater magnitude of disparity in all 3 areas, especially for American Indian, Alaska Native, and multiracial people with disabilities.

Conclusions. Community-dwelling adults with disabilities in underserved racial and ethnic groups have higher levels of delayed and unmet needs for dental care and lower receipt of routine dental examinations.

Practical Implications. As the United States population ages and grows more diverse, the population of people with disabilities in underserved racial and ethnic groups will expand. Dentists need to be aware of, and be prepared to address, the needs of these people.

Key Words. Dental care use; people with disabilities; race; ethnicity.

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Good oral health is an integral part of a healthy life, yet recent estimates suggest nearly one-quarter of adults aged 20 to 64 years in the United States have untreated dental caries.[1] Black and Hispanic adults consistently have more untreated caries than do non-Hispanic white adults.[1,2] Timely dental care is essential for decreasing disparities in oral health. Untreated oral health problems can result in pain, difficulty eating, speech problems, and reduced self-esteem and quality of life.[2] Increasing evidence also suggests links between poor oral health and other health problems, including cardiovascular disease and adverse pregnancy outcomes.[2-8]

A substantial body of research indicates there are racial and ethnic disparities in receipt of dental care in the United States. These disparities affect people in underserved racial and ethnic groups across the life span[9-12] and have persisted over time.[13] Racial and ethnic disparities are associated with socioeconomic characteristics, including income, education, and dental insurance.[14] Investigators in some studies have found that racial and ethnic disparities in dental care are no longer apparent after controlling for these characteristics,[15,16] whereas investigators in other studies have found that disparities remain even when taking such differences between groups into account.[10,14,17]

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Investigators also have documented oral health care disparities for people with disabilities. Data from population-based surveys indicate that community-dwelling adults with disabilities are less likely to have visited a dentist within the past year.[18] Furthermore, people with disabilities are significantly more likely to report cost as a barrier to dental care, even when controlling for income differences between people with and those without disabilities.[19] In these surveys, participation is limited to noninstitutionalized respondents, and disability is defined broadly via activity or functional limitations encompassing a range of physical, sensory, and cognitive restrictions. Investigators in another body of research, specific to people with intellectual and developmental disabilities, have assessed the relationship between place of residence and receipt of routine dental care. Results of these studies have shown relatively high receipt of routine care for people living in institutional settings but significantly less frequent care among those living with family or on their own.[20-22]

Given that underserved racial and ethnic groups and community-dwelling adults with disabilities each experience disparities in obtaining dental care, the combination of the 2 could result in especially poor receipt of routine care and high levels of unmet need. However, there has been little consideration of the potential additive effect of disability and race and ethnicity in relation to dental care. The purpose of the present study was to determine how functional disability in combination with membership in an underserved racial or ethnic group is associated with receiving dental examinations, experiencing delays in receiving needed dental care, and being unable to obtain needed dental care in a community-based population. We hypothesized that the magnitude of disparities associated with both having a disability and being in an underserved racial or ethnic group would be greater than the disparities associated with being in either category alone.

TABLE 1

Characteristics of adults aged 18 to 64 years, 2002-2012 Medical Expenditure Panel Survey.

CHARACTERISTIC	NO DISABILITY, N (%)*	DISABILITY, N (%)	TOTAL, N (%)
Race and Ethnicity†			
White	78,336 (65.19)	22,656 (72.37)	100,992 (66.57)
Black	27,947 (11.66)	7,527 (12.19)	35,474 (11.76)
AHPI‡	11,578 (5.70)	1,195 (2.57)	12,773 (5.09)
AIAN§	795 (0.51)	342 (0.86)	1,137 (0.58)
Multiracial	1,878 (1.06)	874 (2.14)	2,752 (1.27)
Hispanic	48,614 (15.88)	6,806 (9.87)	55,420 (14.73)
Mean Age (Standard Error), y	38.77 (0.08)	47.01 (0.12)	40.35 (0.08)
Female	89,066 (50.32)	22,583 (53.38)	111,649 (50.91)
Family Income¶			
≥ 400%	55,757 (43.71)	9,816 (33.29)	65,573 (41.71)
200% to < 400%	52,005 (31.21)	10,720 (29.17)	62,725 (30.82)
125% to < 200%	26,536 (11.73)	6,368 (13.85)	32,904 (12.14)
100% to < 125%	8,961 (3.32)	2,556 (5.01)	11,517 (3.64)
< 100%	25,889 (10.03)	9,940 (18.68)	35,829 (11.69)
Employed	124,510 (78.05)	20,650 (59.13)	145,160 (74.42)
Education			
Bachelor's degree or higher	38,630 (29.28)	6,229 (19.96)	44,859 (27.49)
Other degree	15,512 (10.24)	3,835 (11.20)	19,347 (10.42)
GED# credential or HS** diploma	76,818 (45.78)	20,320 (52.83)	97,138 (47.14)
No GED credential or HS diploma	38,188 (14.70)	9,016 (16.01)	47,204 (14.95)
With Dental Insurance	74,828 (51.61)	13,594 (41.00)	88,422 (49.57)
Total	169,148 (80.81)	39,400 (19.19)	208,548 (100.00)

* Unweighted number and survey weighted percentage, except as marked otherwise.
† Except for Hispanic, all race and ethnicity categories are ethnically non-Hispanic.
‡ AHPI: Asian, Native Hawaiian, Pacific Islander.
§ AIAN: American Indian, Alaska Native.
¶ Family income as a percentage of the federal poverty guideline.
# GED: General Educational Development.
** HS: High school.

METHODS

Data source. We analyzed data from the Household Component of the Medical Expenditure Panel Survey (MEPS). The MEPS is conducted by the Agency for Healthcare Research and Quality and provides nationally representative data on the use of various forms of health care among noninstitutionalized people. The MEPS uses an overlapping panel design with a new panel selected each year from the previous year's National Health Interview Survey sample.[23,24] Racial and ethnic minorities, as well as low-income respondents, are oversampled to increase the precision of estimates for these groups.[23] Data are gathered through 5 in-person interviews over 2 years. The Agency for Healthcare Research and Quality creates full-year consolidated files weighted to provide annualized US population estimates. Since 2002, data files have had a

ABBREVIATION KEY. **AHPI:** Asian, Native Hawaiian, Pacific Islander. **AIAN:** American Indian, Alaska Native. **GED:** General Educational Development. **HS:** High school. **MEPS:** Medical Expenditure Panel Survey. **NA:** Not applicable.

TABLE 2

Weighted percentages of people with less than 1 dental examination per year, delays in getting needed dental care, and inability to obtain needed dental care.

CHARACTERISTICS	WEIGHTED PERCENTAGE (95% CONFIDENCE INTERVAL)		
	No Disability	Disability	Total
Less Than 1 Dental Examination per Year			
White	30.39 (29.70-31.09)	45.27 (44.19-46.35)	33.49 (32.76-34.23)
Black	39.78 (38.62-40.94)	52.26 (50.46-54.06)	42.26 (41.13-43.40)
AHPI*	34.94 (33.20-36.73)	39.60 (35.80-43.52)	35.39 (33.72-37.10)
AIAN†	44.84 (39.99-49.79)	56.68 (50.20-62.94)	48.22 (44.04-52.42)
Multiracial	37.86 (34.45-41.40)	51.46 (46.53-56.37)	42.26 (39.18-46.41)
Hispanic	48.67 (47.12-50.23)	50.48 (48.35-52.60)	48.91 (47.41-50.40)
Total	34.80 (34.16-35.45)	46.72 (45.85-47.59)	37.09 (36.46-37.72)
Delays in Obtaining Needed Dental Care			
White	3.59 (3.39-3.81)	9.82 (9.24-10.43)	4.89 (4.65-5.14)
Black	4.03 (3.63-4.47)	10.00 (9.12-10.96)	5.22 (4.81-5.66)
AHPI	2.43 (2.03-2.90)	6.72 (4.91-9.14)	2.85 (2.42-3.34)
AIAN	5.36 (3.75-7.60)	15.46 (11.17-21.01)	8.24 (6.43-10.50)
Multiracial	4.59 (3.61-5.82)	14.00 (10.76-18.02)	7.63 (6.29-9.24)
Hispanic	2.83 (2.51-3.20)	7.83 (6.81-8.99)	3.47 (3.12-3.86)
Total	3.48 (3.32-3.64)	9.71 (9.23-10.20)	4.67 (4.48-4.87)
Inability to Obtain Needed Dental Care			
White	3.58 (3.38-3.80)	11.41 (10.79-12.06)	5.22 (4.96-5.49)
Black	4.98 (4.55-5.45)	12.93 (11.97-13.95)	6.56 (6.11-7.03)
AHPI	2.38 (1.96-2.89)	7.48 (5.48-10.11)	2.87 (2.40-3.44)
AIAN	4.79 (3.20-7.12)	14.20 (9.58-20.53)	7.47 (5.55-10.00)
Multiracial	5.28 (4.16-6.67)	16.46 (12.97-20.67)	8.89 (7.39-10.66)
Hispanic	4.76 (4.32-5.23)	12.51 (11.31-13.81)	5.75 (5.32-6.23)
Total	3.89 (3.72-4.06)	11.73 (11.20-12.28)	5.39 (5.18-5.61)

* AHPI: Asian, Native Hawaiian, Pacific Islander.
† AIAN: American Indian, Alaska Native.

consistent variance structure,[25] and most variables have remained constant across years, facilitating pooling of multiple years of data. We combined full-year files from 2002 to 2012 to provide adequate sample size for analyzing smaller racial and ethnic groups. We adjusted the data weighting by dividing the person weight by the number of years, as recommended by the Agency for Healthcare Research and Quality.[25] There were some modifications to the education and race variables in 2012 necessitating minor recoding of these variables to match the categories available in the prior years.[26] A check of frequencies by year allowed us to confirm that race and ethnicity and education distributions in 2012 were consistent with patterns seen in the period from 2002 to 2011.

Sample. We focused our analyses on working-age adults (aged 18-64 years). Of the overall 383,907 MEPS respondents for 2002 to 2012, we identified 215,353 adults aged 18 to 64 years. After we excluded 6,805 observations with missing data on variables of interest, our final analytic sample included 208,548 respondents.

Measures. ***Dependent variables.*** Dental examination frequency was based on a survey question assessing how often panelists received dental examinations. Response options included twice a year or more, once a year, less than once a year, or never. We coded the variable dichotomously to indicate whether people received less than 1 dental examination per year (as opposed to receiving at least 1 dental examination a year). We also analyzed delays in obtaining needed dental care in the past 12 months (yes or no) and inability to obtain needed dental care in the past 12 months (yes or no).

Primary independent variables. We created a dichotomous variable to note presence or absence of disability as indicated by limitations in physical functions, vision, hearing, or cognition. We based this definition of disability on the concept of basic action difficulties described by Altman and Bernstein[27] as previously applied in studies with MEPS data.[28,29] We identified basic action difficulties as affirmative responses to 1 or more MEPS survey questions about limitations in physical functions such as walking, standing, bending, lifting, reaching, or grasping; difficulty seeing (while wearing glasses, if used); difficulty hearing (with a hearing aid, if used); and cognitive limitations such as confusion, memory loss, or difficulty making decisions.

Race and ethnicity were grouped into a single variable with the following mutually exclusive categories: non-Hispanic white, non-Hispanic black, non-Hispanic Asian, Native Hawaiian, Pacific Islander (AHPI), non-Hispanic American Indian, Alaska Native (AIAN), non-Hispanic multiracial; or Hispanic of any race. We also created a variable combining disability status and race and ethnicity to examine effects for each disability by race and ethnicity subgroup in comparison with nondisabled whites. The 12 categories of the combined

variable were white with no disability (reference), white with disability, black with no disability, black with disability, AHPI with no disability, AHPI with disability, AIAN with no disability, AIAN with disability, multiracial with no disability, multiracial with disability, Hispanic with no disability, and Hispanic with disability.

Covariates. We included the following sociodemographic variables in our analyses: age in years, sex, family income as a percentage of the federal poverty guideline (≥ 400%, 200% to < 400%, 125% to < 200%, 100% to < 125% and < 100%), employment status (employed or not employed), and education (bachelor's degree or higher, other degree, General Educational Development [GED] credential or high school [HS] diploma, or no GED/HS). We also included a variable indicating presence of dental insurance (yes or no).

Statistical analysis. We began by performing survey-weighted logistic regression analyses examining the individual effects of race and ethnicity and of disability for each outcome variable, both with and without controlling for covariates. People with no disabilities and non-Hispanic whites served as the reference groups for the disability and race and ethnicity variables, respectively. Next, we conducted logistic regression analyses with the variable combining disability status and race and ethnicity to examine possible additive effects for each disability by race and ethnicity subgroup in comparison with nondisabled whites. Again, we performed the analysis both with and without adjusting for covariates. We used software (Stata, Version 12.1, StataCorp) with Taylor series linearization for accurate estimation of variance within the complex survey design of MEPS. A *P* value less than .05 served as the cutoff for determining statistical significance.

TABLE 3

Unadjusted effects of race and ethnicity and disability on dental examinations, care delays, and inability to obtain care.

CHARACTERISTICS	LESS THAN 1 DENTAL EXAMINATION PER YEAR			DELAYS IN OBTAINING NEEDED DENTAL CARE			INABILITY TO OBTAIN NEEDED DENTAL CARE		
	OR*	95% CI†	*P* Value	OR	95% CI	*P* Value	OR	95% CI	*P* Value
Race and Ethnicity‡									
White	Ref.§	NA¶	NA	Ref.	NA	NA	Ref.	NA	NA
Black	1.45	1.38-1.53	< .001	1.07	0.98-1.17	.151	1.28	1.17-1.39	< .001
AHPI#	1.09	1.01-1.18	.039	0.57	0.48-0.67	< .001	0.54	0.44-0.65	< .001
AIAN**	1.85	1.56-2.19	< .001	1.75	1.34-2.28	< .001	1.47	1.07-2.02	.018
Multiracial	1.45	1.28-1.65	< .001	1.61	1.30-1.99	< .001	1.77	1.44-2.18	< .001
Hispanic	1.90	1.78-2.03	< .001	0.70	0.62-0.79	< .001	1.11	1.01-1.22	.038
Disability									
No	Ref.	NA	NA	Ref.	NA	NA	Ref.	NA	NA
Yes	1.64	1.59-1.70	< .001	2.98	2.82-3.16	< .001	3.29	3.11-3.47	< .001

* OR: Odds ratio.
† CI: Confidence interval.
‡ Except for Hispanic, all race and ethnicity categories are ethnically non-Hispanic.
§ Ref.: Reference category.
¶ NA: Not applicable.
# AHPI: Asian, Native Hawaiian, Pacific Islander.
** AIAN: American Indian, Alaska Native.

RESULTS

Table 1 shows the demographic and socioeconomic characteristics of our analytic sample. Most of the sample was nondisabled, was non-Hispanic white, had a family income above the federal poverty guideline, and had at least a GED credential or HS diploma. People with disabilities tended to be older and generally had lower socioeconomic status than did those without disabilities. Table 2 shows the proportions of people with and without disabilities in each racial and ethnic group who had received less than 1 dental examination per year, were delayed in receiving needed dental care, or were unable to receive needed dental care.

In our initial unadjusted regression analyses, all racial and ethnic groups had significantly greater odds of receiving less than 1 dental examination per year than did non-Hispanic whites (Table 3). AIANs had significantly greater odds of experiencing a delay in obtaining needed dental care, as did multiracial people. However, blacks did not differ significantly from whites, and AHPIs and Hispanics both had significantly lower odds of delayed care. AHPIs also had lower odds of being unable to obtain needed care, but all other racial and ethnic groups had significantly higher odds of going without needed dental care (Table 3). Compared with people without disabilities, people with disabilities had significantly greater odds of receiving less than 1 dental examination per year, being delayed in obtaining needed dental care, and being unable to obtain needed dental care (Table 3).

After we controlled for covariates, black and multiracial groups no longer differed significantly from whites in receipt of dental examinations, but all other racial and ethnic groups still had significantly higher adjusted odds ratios (AORs) for receiving less than 1 examination per year (Table 4). Blacks, AHPIs, and Hispanics had significantly lower AORs for being delayed in obtaining needed dental care or unable to obtain needed dental care. AIANs had a slightly higher AOR for delayed dental care but no longer differed significantly from

TABLE 4

Adjusted individual and combined effects of race and ethnicity and disability on dental examinations, care delays, and inability to obtain care.

CHARACTERISTIC	LESS THAN 1 DENTAL EXAMINATION PER YEAR			DELAYS IN OBTAINING NEEDED DENTAL CARE			INABILITY TO OBTAIN NEEDED DENTAL CARE		
	AOR*	95% CI†	*P* Value	AOR	95% CI	*P* Value	AOR	95% CI	*P* Value
Race and Ethnicity‡									
White	Ref.§	NA¶	NA	Ref.	NA	NA	Ref.	NA	NA
Black	1.02	0.96-1.06	.413	0.88	0.80-0.96	.005	0.89	0.82-0.97	.010
AHPI#	1.28	1.19-1.39	< .001	0.65	0.55-0.77	< .001	0.62	0.51-0.76	< .001
AIAN**	1.27	1.10-1.47	.001	1.32	1.01-1.74	.044	0.92	0.66-1.29	.630
Multiracial	1.12	0.99-1.27	.082	1.23	0.99-1.52	.057	1.21	0.99-1.48	.063
Hispanic	1.09	1.03-1.16	.005	0.60	0.53-0.69	< .001	0.76	0.69-0.85	< .001
Disability									
No	Ref.	NA	NA	Ref.	NA	NA	Ref.	NA	NA
Yes	1.41	1.36-1.46	< .001	2.68	2.52-2.85	< .001	2.77	2.61-2.94	< .001
Race and Ethnicity and Disability									
White, nondisabled	Ref.	NA	NA	Ref.	NA	NA	Ref.	NA	NA
White, with disability	1.52	1.46-1.59	< .001	2.68	2.48-2.89	< .001	2.83	2.64-3.04	< .001
Black, nondisabled	1.05	1.00-1.11	.066	0.91	0.81-1.03	.122	0.96	0.86-1.06	.424
Black, with disability	1.40	1.30-1.51	< .001	2.21	1.96-2.49	< .001	2.27	2.02-2.54	< .001
AHPI, nondisabled	1.36	1.25-1.48	< .001	0.65	0.54-0.78	< .001	0.63	0.51-0.77	< .001
AHPI, with disability	1.29	1.09-1.53	.003	1.73	1.25-2.39	.001	1.73	1.24-2.42	.001
AIAN, nondisabled	1.34	1.11-1.61	.002	1.25	0.86-1.83	.246	0.93	0.62-1.40	.736
AIAN, with disability	1.66	1.33-1.95	< .001	3.75	2.57-4.67	< .001	2.57	1.63-4.05	< .001
Multiracial, nondisabled	1.14	0.98-1.32	.091	1.16	0.90-1.83	.256	1.20	0.92-1.57	.172
Multiracial, with disability	1.61	1.33-1.95	< .001	3.45	2.54-4.67	< .001	3.43	2.58-4.55	< .001
Hispanic, nondisabled	1.15	1.08-1.23	< .001	0.59	0.51-0.68	< .001	0.76	0.67-0.86	< .001
Hispanic, with disability	1.22	1.11-1.34	< .001	1.73	1.47-2.04	< .001	2.21	1.93-2.52	< .001

* AOR: Adjusted odds ratio: adjusted for age, sex, family income, employment status, education, and dental insurance.
† CI: Confidence interval.
‡ Except for Hispanic, all race and ethnicity categories are ethnically non-Hispanic.
§ Ref.: Reference category.
¶ NA: Not applicable.
# AHPI: Asian, Native Hawaiian, Pacific Islander.
** AIAN: American Indian, Alaska Native.

whites with regard to being unable to obtain needed care. In the adjusted analyses, multiracial people did not differ significantly from whites on either being delayed or unable to obtain care. However, people with disabilities continued to have significantly elevated AORs for receiving less than 1 dental examination per year, experiencing delays in obtaining needed dental care, and being unable to obtain needed dental care (Table 4).

When we examined the combination of race and ethnicity and disability in unadjusted models, all groups had significantly elevated odds of receiving less than 1 dental examination per year compared with the reference group of nondisabled whites. In each racial and ethnic group, the magnitude of the odds ratio (OR) was greater for people with disabilities than for people without disabilities. Figure 1 shows the unadjusted ORs for each race and ethnicity by disability subgroup in a forest plot. Controlling for covariates decreased the magnitude of most ORs, although all but 2 differences remained significant (Table 4); the nondisabled black and multiracial groups no longer differed significantly from nondisabled whites.

Figure 2 provides a visual display of the unadjusted combined effect of disability and race and ethnicity with regard to delayed and unmet needs for dental care. The AIAN and multiracial groups without disabilities had slightly higher odds of delayed care relative to their nondisabled white counterparts, but nondisabled blacks did not differ significantly from the nondisabled white reference group, and AHPIs and Hispanics without disabilities had significantly lower odds of experiencing delayed care. However, people with disabilities in each racial/ethnic group had significantly elevated odds of reporting delays in obtaining dental care. ORs were especially high for the AIAN and multiracial groups with disabilities. These patterns mostly remained consistent

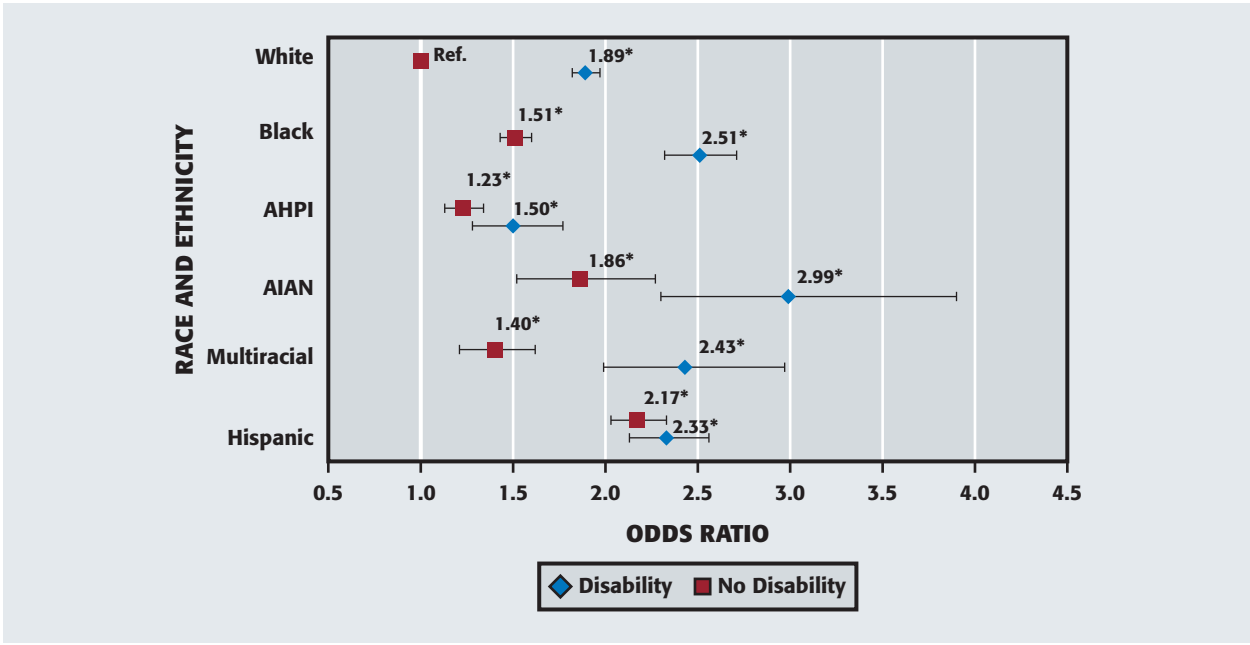

Figure 1. Unadjusted odds ratios (indicated by diamond or square symbols) and 95% confidence intervals (indicated by whiskers extending from the symbols) of having less than 1 dental examination per year. *Odds ratios that are significantly different from the reference group (Ref.). AHPI: Asian, Native Hawaiian, Pacific Islander. AIAN: American Indian, Alaska Native.

when we adjusted for covariates, although the nondisabled AIAN and multiracial groups no longer differed significantly from the reference group (Table 4).

Unmet needs for dental care showed a somewhat different pattern among racial and ethnic groups without disabilities (Figure 2). Blacks, multiracial people, and Hispanics had elevated odds of unmet needs, whereas AHPIs had significantly lower odds of unmet needs, and AIANs did not differ significantly from the reference group. However, people with disabilities in every racial and ethnic group had significantly, and often substantially, elevated odds of unmet needs for dental care. When we controlled for covariates, blacks and multiracial people without disabilities no longer differed significantly from the reference group, and Hispanics without disabilities had a lower AOR for unmet dental care needs. All disability groups still had significantly elevated odds of not being able to obtain needed dental care (Table 4).

DISCUSSION

Our analyses allowed us to confirm the existence of both racial and ethnic disparities and disability-related disparities in receipt of dental care within a nationally representative noninstitutionalized sample. We also found evidence of greater disparities for people with disabilities in underserved racial and ethnic groups. Thus, there appears to be a compounding effect of belonging to more than 1 marginalized population.

Disabilities included in our sample were physical, vision, hearing, and cognitive limitations. Much of the dental literature on disability has focused on children and adults with intellectual disabilities, including those living in congregate care settings.[30-33] However, intellectual disability is relatively rare, constituting 1% to 3% of the US population,[34] whereas the total prevalence of disability is approximately 19%.[35] Dentists should be aware of the range of disability types they may encounter and of appropriate approaches to meeting the needs of diverse people with disabilities.[36]

Our study included only adults living in community households; therefore, our sample does not necessarily represent the full range of disability, particularly with regard to the extent of cognitive and behavioral disability. People with more severe disabilities may face even greater barriers to dental care. However, prior research results indicate that people with intellectual disabilities living in institutional settings are more likely to obtain routine dental care than are people with intellectual disabilities living with family members or independently.[20-22] Our sample of community-dwelling adults therefore may have encompassed the disability groups most at risk for unmet dental care needs.

Although some investigators in the dental literature have analyzed race and ethnicity as separate variables, we followed precedents in which race and ethnicity are analyzed as a single variable with mutually exclusive

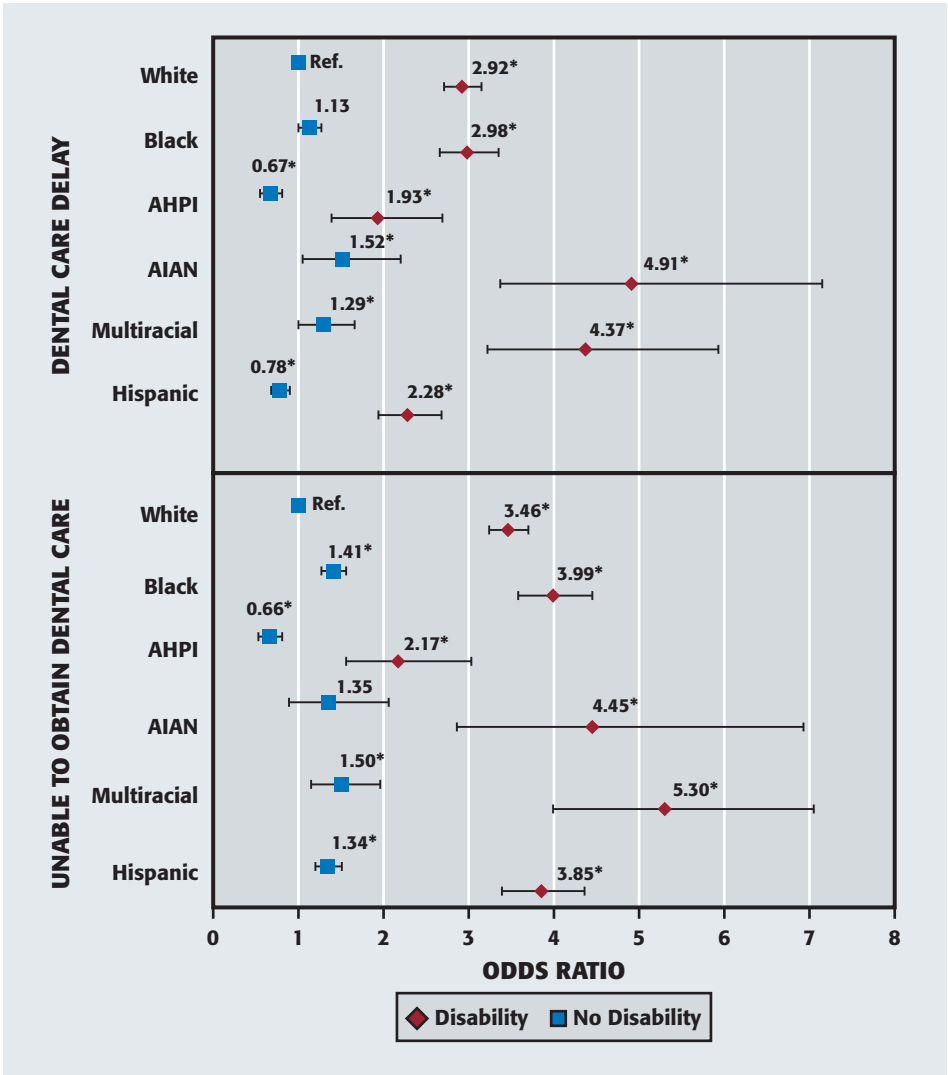

Figure 2. Unadjusted odds ratios (indicated by diamond or square symbols) and 95% confidence intervals (indicated by whiskers extending from the symbols) of experiencing delays in obtaining needed dental care and of being unable to obtain needed dental care. *Odds ratios that are significantly different from the reference group (Ref.). AHPI: Asian, Native Hawaiian, Pacific Islander. AIAN: American Indian, Alaska Native.

categories.[10,17,37] There is evidence that survey respondents do not think of race and ethnicity as separate constructs and may be confused by separate race and ethnicity questions on surveys. Confusion is particularly apparent among Hispanics and Latinos, many of whom select some other race for their racial category.[38] For this reason, the US Census Bureau tested a strategy of asking about race and ethnicity in a single question in experimental versions of the 2010 Census. In their evaluation report, the US Census Bureau concluded that combining race and Hispanic origin into 1 item helped Hispanics to "better to find themselves among the race and ethnic categories" and reduced item nonresponse.[38] Further testing of a combined race and ethnicity question in the 2020 Census was recommended. Thus, we anticipate a continued and increasing practice of analyzing race and ethnicity as a single variable.

We found that the magnitude of disparities was greatest for AIANs and multiracial people with disabilities. Limited access to dental and other health care is a substantial issue for AIANs, both in urban settings and on reservations.[39,40] Long travel distances to limited dental care may present particularly daunting obstacles for AIANs with disabilities, especially if the few clinics available are not disability accessible.

Although AHPIs were more likely than whites to have less than 1 dental examination per year, they were significantly less likely to report delayed or unmet needs for dental care. This finding is consistent with results of prior research based on other nationally representative survey data, which showed that most AHPI groups have relatively low delayed or unmet dental care needs, despite being less likely to have visited a dentist in the past year.[41] AHPIs may have fewer oral health problems requiring care or may have different perceptions of oral health and the need for dental care.[41]

For people with and without disabilities combined, blacks and Hispanics both had significantly elevated odds of unmet dental care needs in unadjusted analyses but significantly lower odds than whites in adjusted analyses. In other words, controlling for demographic and socioeconomic differences and presence of dental insurance reversed the overall effects of race and ethnicity for these groups. This finding is consistent with research findings indicating greater receipt of

preventive screenings among African American men than among white men when social context is taken into account.[16] However, in analyses stratified by disability, it was clear that people with disabilities in these racial and ethnic groups experienced significant disparities even after controlling for other correlates of dental care.

The fact that disability-related disparities persisted after taking other factors into account suggests that barriers beyond demographic and socioeconomic characteristics influence use of dental care. Yuen and colleagues[42] found that physical barriers within dental clinics present a substantial barrier to dental care for people with spinal cord injury. Nearly 30% of their study participants reported dental offices, examination rooms, and dental chairs that were inaccessible to wheelchair users. People who had encountered such barriers were substantially more likely to forgo annual dental visits.[42] Results from other studies indicate a lack of trained dental professionals willing to treat people with disabilities.[36,43] For example, many practitioners do not feel adequately prepared to treat patients who need assistance transferring to a dental chair, have uncontrolled movements, or are limited in their ability to follow instructions or remain calm during treatment.[43] Nonetheless, the Americans with Disabilities Act and state laws require dentists to provide services and make reasonable accommodations for patients with disabilities.[36] Ongoing training is needed to build disability awareness and skills among currently practicing dental professionals and dental students.

Pooling multiple years of data allowed us to analyze the combined effect of disability and race and ethnicity, although sample sizes were still relatively small for some population groups (AIAN and multiracial). Moreover, we did not have sufficient sample size to examine subgroup disparities within broad racial and ethnic categories. Prior research results not stratified by disability status have shown significant oral health differences between Puerto Ricans, Cuban Americans, and Mexican Americans.[44] Investigators also have found differences in dental care between Chinese, Filipino, Japanese, Korean, South Asian, and Vietnamese children.[45] Similar differences also may be present among AHPI and Hispanic adults with disabilities. In addition, we did not have a sufficient sample size to analyze different types of disability (for example, physical, hearing, vision, cognitive) separately within each racial and ethnic group. Research results from 2014 have indicated differences in dental examinations by disability type when controlling for race and ethnicity,[29] but additive effects of disability type and race and ethnicity have not yet been examined.

CONCLUSIONS

The United States is become increasingly diverse, such that non-Hispanic whites are expected to be in the minority by 2050.[46] Furthermore, disability appears likely to continue increasing as obesity rates increase and the population ages.[47] Given these trends, we can expect the population of people with disabilities in underserved racial and ethnic groups to increase over the coming decades. Dentists need to be aware of the dental care needs of these populations and be prepared to address them. Attention to the oral health of people with disabilities, particularly those in underserved racial and ethnic groups, is especially important to reduce the burden of poor oral health and minimize negative effects on overall health and function. ■

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