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Oral Health Perception in Veterans with self-identified disabilities: National Survey of Veterans, 2010

R. Constance Wiener, DMD, PhD

104A Robert C. Byrd Health Sciences Center Addition, PO Box 9448, Morgantown WV 26506-9448, Phone: 304-581-1960, Fax: 304-293-8561

Abstract

Background—This study examines the relationship of self-identified disability and oral health perception in a veteran population.

Methods—The National Survey of Veterans, 2010, data base was used to conduct a cross-sectional study of 8303 participants. Questionnaires were mailed to the veterans and the questions were developed to assess sociodemographic information, health perception and health status, among other areas of interest. The Andersen Behavioral Model was used as the framework for the study. The outcome of interest was perceived oral health and the main variable of interest was self-identified disability. The data were analyzed for descriptive, and bivariate analyses, and logistic regression.

Results—There were 1904 participants (21.2%) with self-identified disability. There were 2505 participants (41.0%) who indicated negative oral health perception. In logistic regression, individuals with self-identified disability had an unadjusted odds ratio of 1.63 (95% CI 1.44, 1.85) and an adjusted odds ratio of 1.69 (95% CI: 1.44, 1.99) for negative oral health perception as compared with participants who did not self-identify disability.

Conclusion—Oral health perception in a veteran population is affected by predisposing and enabling factors among which is self-identified disability.

Keywords

oral health perception; veteran oral health; veteran disability; NSV

Introduction

A negative perception of one's oral health has serious implications in the receipt of oral health care. Many dentists recognize the importance of social and psychological aspects in determining disease but focus on biological indices such as the decayed, missing, filled teeth index and community periodontal treatment needs index (Guerra et al., 2014). Oral health perception, or oral health quality of life, influences an individual's overall well-being and overall quality of life (Guerra et al., 2014). Assessing oral health perception is an important

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step in health care practices (Campos, et al., 2014). The literature has many recent studies relating oral health perceptions and children (Gomes, et al., 2014; Mattheus, 2014; de Paula, 2014; Agostini, et al., 2014), however the literature is lacking in the implications of oral health perception and the adult veteran population.

The Department of Veteran Affairs and the Department of Defense administrators and workers are acutely aware of many of the health concerns of veterans and publish results of veteran surveys, and means to access care online to help veterans understand the protocols to secure benefits. Dental benefits (in full or in part) are available to a veteran with:

- service-connected dental disabilities/conditions,
- a 38 USC Ch31 status (vocational rehabilitation program),
- VA care/scheduled for inpatient care and the dental condition will complicate the medical condition being treated,
- homeless status and has care under VHA Directive 2007-039, or
- a status of within 180 days of having served on active duty for 90 days during the Persian Gulf war era,
- connected compensable dental disability from combat wounds or service trauma,
- noncompensable dental conditions resulting from combat wounds or service trauma,
- dental condition determined to be associated with and worsened by a service-connected medical condition,
- former prisoner of war status,
- 100% service-connected disability/unemployable,
- a 100% paid rate(U.S. Department of Veterans Affairs, 2014). Accessing the information on eligibility may be particularly difficult for veterans who are disabled. A table with the distribution of approved disability types for 2010 is presented in Table 1.

The purpose of this study is to determine if there is a relationship between self-identified disability in veterans and a negative perception of oral health. The rationale is that there may be a disparity in oral health for veterans self-identifying as disabled despite efforts to provide needed care. An adapted version of the Andersen Behavioral Model of Health Services Use (Kilbourne, et al., 2007) is the basis for the study's framework. The Anderson Behavioral Model of Health Service Use is often used in research involving health disparities and needs for people who are vulnerable (Kilbourne, et al., 2007; Andersen, 1995). Andersen (1995) suggested predisposing factors, enabling factors and need influence behavior associated with health outcomes. In this study, the predisposing factor of self-identified disability will be examined in relationship with perception of oral health. The study hypothesis is that veterans who self-identify as disabled will have different adjusted odds ratio for perceived oral health as veterans who do not self-identify as disabled. ($H_{o\ study}$: $AOR_1 = AOR_2$; where AOR_1 is the perceived oral health adjusted odds ratio for

participants who self-identify as disabled and AOR_2 is the perceived oral health adjusted odds ratio for participants who do not self-identify as disabled).

Methods

Study Design and Participants

This study had a cross-sectional design of secondary, public-released data collected in the National Survey of Veterans (NVS), 2010. The NVS 2010 was conducted by Westat, a contractor to the Department of Veteran Affairs, to help plan for resource allocation for Veterans (Aponte, et al., 2010). Details of the survey and its design are presented elsewhere (Aponte, et al., 2010). In summary, NVS 2010 surveys were mailed to veterans using an address-based sampling approach as there are no complete sampling frames at the Department of Veteran Affairs or the Department of Defense (Aponte, et al., 2010). The U.S. Postal Service Computerized Deliver Sequence database was used for the sampling frame for the addresses (Aponte, et al., 2010). Each veteran's sampling weight was the product of the final screener household weight, multiple-address adjustment, and a ratio adjustment factor to control marginal totals by age, sex, race/ethnicity, and service era (Aponte, et al., 2010). There was a 66.7% NVS response rate (n=8710 veteran respondents). From that data source, participants with complete data on oral health perception and self-identification of disabilities were included (n=8393) for this study.

The study had West Virginia University Institutional Review Board acknowledgement (protocol 1412522420).

Main Outcome

The NVS oral health perception variable was developed from the question posed to the participants: "How would you rate the health of your teeth and gums? Would you say it is…" The potential responses were: "Excellent"; "Very good"; "good"; "fair"; or "poor". In the data analysis, the participants responding "Excellent"; "Very good"; or "good" were identified as having a positive oral health perception; and the participants responding "fair"; or "poor" were identified as having a negative oral health perception.

Main variable of interest

The variable of interest for this study was self-identified disability. The variable for self-identified disability was the yes or no response to the posed question: "Have you ever applied for VA disability compensation benefits?"

Other variables

The predisposing factors that were used in this study were: sex (male v. female); age (65 years and above v. less than 65 years); race/ethnicity (Black, Other v. White); education (less than high school, high school graduate, some college/technical school v. higher education graduate and above).

Enabling factors, according to the Anderson Behavioral Model, are those which may be changeable. The enabling factors considered to be associated with perceived oral health

status are: income (less than $20,000, $20000–$29999, $30000–$39999, $40000–$49999 v. $50000 and above); smoking status (current smoker, former smoker v. never smoker); marital status (no, including being widowed, divorced, separated or never married v. married, civil commitment, or civil union); internet access, at least occasionally (no v. yes); and dental visit within the previous 6 months (no v. yes).

Statistical analysis

Statistical analysis was completed using SAS 9.3® (Cary, NC). The a priori alpha was established as 0.05. The analyses used the survey's sample weights provided and included a sample description, univariate Rao Scott Chi Square, and unadjusted and adjusted logistic regression of self-identified disability on the perception of oral health. The variables included in the adjusted logistic regression were sex, age, race/ethnicity, education, income, smoking status, marital status, at least occasional internet access, and having a dental visit within the previous 6 months.

Results

Sample description

There were 91.8% of respondents who were male; 86.9% who were white; 11.3% who were black; and 40.2% who were 65 years and above. This sample's descriptions of sex and race were similar to the overall statistics from the Department of Veteran Affairs (2014) in which 90% of veterans were male; 82.7% were white; 12.1% were black; and 44.2% were 65 years and above. There were 5.1% of participants who had less than a high school education; 25.6% who reported being a high school graduate, and 30.3% reported having some college or technical education. In terms of income, 15.0% reported an income of less than $20000, and 49.1% reported an income of $50000 or above. There were 36.3% who reported being current smokers, 44.4% who reported being former smokers, and 19.2% who reported having never smoked. There were 70.7% who were currently married or had a civil commitment or civil union. There were 73.1% who had at least occasional access to the internet. The majority (56.6%) reported a dental visit within the previous 6 months. In terms of the variables of interest, there were 21.2% of participants who reported self-identified disability. Forty-one percent of participants reported negative perceived dental status (Figure 1). This sample's description of disability was similar to the overall statistics from the Department of Veteran Affairs (2014) in which there was 17.7% of veterans receiving disability compensation. Sample characteristics are presented in Table 2.

Bivariate and Logistic Regression results

In bivariate Rao-Scott Chi-Square analysis on perceived oral health, there were significant differences in positive and negative perceptions of oral health status in terms of sex, race, age, education, income, smoking status, marriage, at least occasional internet access, report of a dental visit within the previous 6 months, and with the key variable, self-identified disability. The results are presented in Table 3.

In unadjusted logistic regression on oral health perception, there was a significant relationship between self-identified disability and negative oral health perception. The odds

ratio was 1.63 (95% confidence interval: 1.44, 1.85; p-value <.0001). With the predisposing factors of sex, race/ethnicity, education, and age and the enabling factors of marriage, income, smoking, at least occasional internet access, and dental visit within the previous 6 months, the adjusted logistic regression remained significant. The adjusted odds ratio was 1.69 (95% confidence interval: 1.44, 1.99; p-value <.0001). The results are presented in Table 4.

Discussion

This study of U.S. veterans indicated a significant relationship of self-identified disability on negative oral health perception. The adjusted odds ratio for negative oral health perception (either fair or poor oral health) was 1.69 in veterans reporting self-identified disability as compared with veterans not reporting self-identified disability. The veterans reporting a negative oral health perception were 41% of the participants in the study. The predisposing factors (male sex, black race/ethnicity, and less education) were associated with negative oral health perception. The lack of enabling factors (lower income, smoking, no dental visit within the previous 6 months, and lack of internet access) were associated with negative oral health perception.

The literature is lacking in studies in which researchers have examined self-identified disability and oral health perception. Searches in Google Scholar and PubMed on the key words, “Veteran Affairs dental” and “oral health disabled veterans,” have had limited relevant results. Therefore, making study comparisons is difficult. However, in a study including *dependent* living geriatric veterans (n=132) (corresponding with this study’s self-identified disability) and oral/dental health (corresponding with this study’s oral health perception), there was a similar relationship of independent living and better oral health (Loesche, et al., 1995). Researchers of a study of 538 male patient users of the Department of Veteran Affairs services showed an association of self-perceived oral health and more medical problems (Jones, et al., 2001). The studies differed in the measures of self-perceived oral health; and, the condition of having more medical problems is not equivalent to self-identified disability.

This study’s findings were dissimilar to a study in which mental and physical summary scores of the Short Form-36 (corresponding with this study’s self-identified disability) were not related oral health quality of life (corresponding with this study’s oral health perception). In the former study, researchers of male veteran medical outpatient recipients (n=2425) were surveyed (Jones, et al., 2006). The majority (60%) of the patients indicated good, very good, or excellent oral health. The study differed from the current study in that, in the former, researchers used recipients of medical outpatient services, and limited their study to males. They used a different approach with an instrument that covered more domains (Jones, et al., 2004).

Researchers using National Health and Nutrition Examination Survey (1999–2004) data of non-institutionalized U.S. residents found 35.5% of Hispanics, 36.8% of Non-Hispanic Blacks, and 21.4% of Non-Hispanic Whites who reported poor oral health (Wu, et al., 2011). Researchers in another study using the same NHANES data found increases in

severity of oral health problems with trends toward disabilities in instrumental activities of daily living (adjusted odds ratio, 1.58), leisure and social activities (adjusted odds ratio, 1.70), lower extremity mobility (adjusted odds ratio, 1.31), and general physical activities (adjusted odds ratio, 1.63) (Yu, et al., 2011). Their results considered the oral health status outcomes of periodontal disease and edentulism. And in a study of women using National Health Interview Survey data (1994–1995), the researchers found that women with 3 or more functional limitations were more likely to report being unable to get dental care (Chevarley, et al., 2006).

In studies of war veterans in other countries, researchers reported greater prevalence of temporomandibular joint dysfunction, and muscle pain (masseter, temporal, pterygoid, digastric and sternocleidomastoid) in Isfahan veterans with post-traumatic stress disorder than in other groups (Mottaghi & Zamani, 2014); poorer oral hygiene, periodontal status, temporomandibular joint dysfunction, and muscle pain in Croatian war veterans with post-traumatic stress disorder than in age matched men (Muhvic-Urek, et al., 2007); and poor oral health, higher number of periodontal pockets, and differences in brushing and dental visits in Croatian soldiers than in peacetime groups (Surman, et al., 2008).

This study has several strengths. It uses a large, national data base with a stringent sampling design which makes it representative of the veteran population. The data are current. And the response rate was good (66.7%). The weaknesses of the study involve the self-reported nature of the questionnaire. It is possible that social desirability bias may have resulted in an under-representation of “yes” responses to the question about disability, and an over-representation of positive oral health perception. However, such responses would have weakened an even stronger association if they are present.

The public health implications of this research include the recognition that disability has an impact on multiple domains of life, including perceived oral health status. Veterans with disabilities are members of a vulnerable population and there is a need to improve the oral health status through improving the access to care, improving clinical education and skills in working with disabled veterans, monitoring services, and improving policies for increased access to care. Future research is needed in determining the knowledge and skills of dentists in working with disabled veterans, and interventions with disabled veterans to access oral health care.

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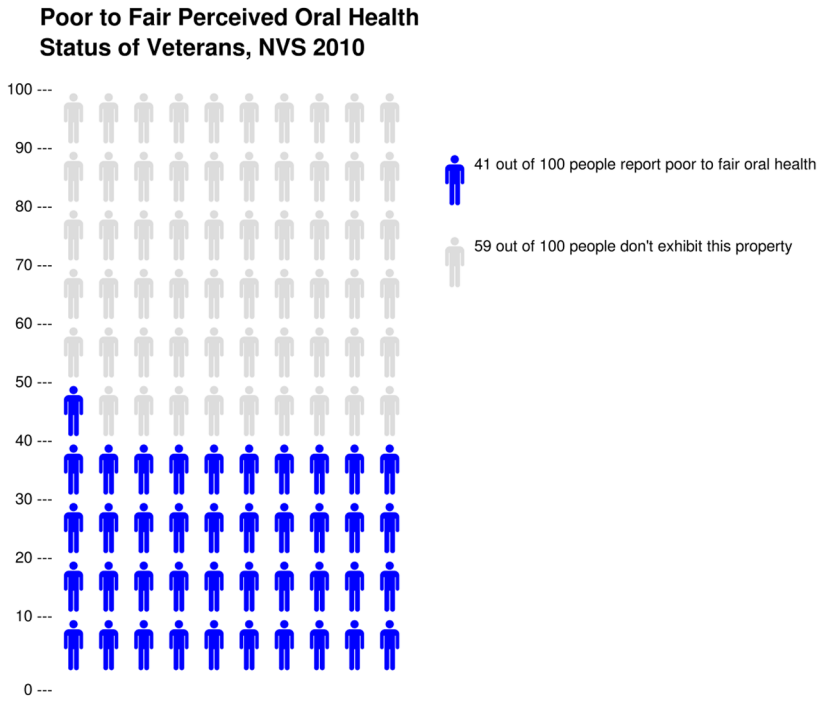

Figure 1.

Figure from University of Michigan Risk Science Center, Health and Communication/ Bioethics and Social Sciences at http://www.iconarray.com/

Table 1

2010 Disabled Veterans by Healthcare Priority Group

Group 1: Veterans with service-connected disabilities at 50% or above who are unemployable due to service-connected conditions	1,071,400
Group 2: Veterans with service-connected disabilities at 30%–40%	425,937
Group 3: Veterans former Prisoners of War awarded Purple Heart discharged for disability in line of duty with service-connected disabilities at 10–20% awarded special eligibility under Tile 38 awarded medal of honor	677,648
Group 4: Veterans receiving VA aid and attendance or housebound benefits determined to be catastrophically disabled	189,428

Data Source: Department of Veterans Affairs. VA Administration Office of Policy and Planning. Prepared by National Center for Veterans Analysis and Statistics. http://www.va.gov/vetdata/utilization.asp

Table 2

Sample Characteristics, Veteran Survey, 2010 (n=8393)

	Number	Population Estimate	wt%	SE
Sex				
Female	488	1,544,223	8.2	0.4
Male	7005	17,387,998	91.8	0.4
Missing (900)				
Race/ethnicity				
White	7415	17,971,450	86.9	0.6
Black	559	2,338,650	11.3	0.5
Other	152	380,330	1.8	0.2
Missing (267)				
Age				
18 to less than 65 years	4374	8,428,695	59.8	0.6
65 years and above	3842	12,531,790	40.2	0.6
Missing (167)				
Education				
Less than high school	465	1,072,911	5.1	0.2
High school graduate	2093	5,392,500	25.6	0.6
Some college/technical	2397	6,374,555	30.3	0.6
HE graduate & above	3300	8,216,339	29.0	0.6
Missing (138)				
Income				
Less than $20000	1048	3,003,193	15.0	0.5
$20000–$29999	1007	2,495,908	12.4	0.4
$30000–$39999	1079	2,647,536	13.2	0.4
$40000–$49999	816	2,060,266	10.3	0.7
$50000 and above	3871	9,844,993	49.1	0.7
Missing (572)				
Smoking Status				
Current smoker	2893	4,093,367	36.3	0.6
Former smoker	4028	9,463,074	44.4	0.6
Never smoker	1427	7,739,913	19.2	0.6
Missing (45)				
Married/Civil Commitment/Union				
Yes	6096	14,892,961	70.7	0.6
No	2171	6,161,972	29.3	0.6
Missing (126)				
Internet access, at least occasional				
Yes	5771	15,341,198	73.1	0.5
No	2440	5,640,430	26.9	0.5
Missing (182)				

	Number	Population Estimate	wt%	SE
Dental visit within 6 months				
Yes	4864	11,928,873	56.6	0.6
No	3505	9,141,207	41.0	0.6
Missing (24)				
Self-identified disability				
Yes	**1904**	**4,545,318**	**21.2**	**0.5**
No	**6489**	**16,880,877**	**78.8**	**0.5**
Missing (0)				
Perceived dental status				
Poor to fair	**3505**	**8,776,426**	**41.0**	**0.6**
Good/Very good/Excellent	**4888**	**12,649,769**	**59.0**	**0.6**
Missing (0)				

Abbreviations: wt%: weighted column percentage; SE: standard error; HE: Higher education beyond high school graduation. “No” in Married/Civil Commitment/Union includes widowed, divorced, separated, and never married.

Table 3

Perceived oral health status with disability application and other variables: Adults 18 and above, National Survey of Veterans, 2010 (n=8393)

	Positive perception of oral health status			Negative Perception of oral health status			
	n	wt%	SE	n	wt%	SE	p-value[1]
Sex							0.0008
Female	318	5.4	0.4	170	2.7	0.3	
Male	3959	52.2	0.7	3046	39.6	0.7	
Missing (900)							
Race/ethnicity							<.0001
White	4422	52.8	0.7	2993	34.1	0.6	
Black	241	5.3	0.4	318	6.0	0.4	
Other	86	1.1	0.1	66	0.7	0.1	
Missing (267)							
Age							0.0024
18 to less than 65	2596	36.3	0.7	1778	23.4	0.6	
65 and above	2206	22.9	0.5	1636	17.3	0.4	
Missing (167)							
Education							<.0001
Less than high school	142	1.6	0.1	323	3.5	0.2	
High school graduate	938	22.8	0.4	1155	13.8	0.4	
Some college/technical	1305	16.8	0.5	1092	13.5	0.4	
HE graduate & above	2436	29.0	0.6	3300	39.0	0.6	
Missing (138)							
Income							<.0001
Less than $20000	346	5.4	0.4	702	9.6	0.4	
$20000–$29999	461	5.6	0.3	546	6.9	0.3	
$30000–$39999	545	6.9	0.3	534	6.3	0.3	
$40000–$49999	468	6.1	0.3	348	4.2	0.3	
$50000 and above	2756	35.3	0.7	11’5	13.8	0.4	
Missing (572)							
Smoking Status							<.0001

	Positive perception of oral health status			Negative Perception of oral health status			
	n	**wt%**	**SE**	**n**	**wt%**	**SE**	**p-value[1]**
Current smoker	526	7.4	0.4	901	11.8	0.4	
Former smoker	2295	25.8	0.5	1733	18.7	0.5	
Never smoker	2043	25.9	0.6	850	10.4	0.4	
Missing (45)							
Married/Civil Commitment/Union							<.0001
Yes	2207	26.9	0.5	3798	43.9	0.6	
No	1126	16.4	0.5	1006	12.8	0.4	
Missing (126)							
Internet access, at least occasional							<.0001
Yes	3740	47.8	0.7	2031	25.4	0.6	
No	1054	11.5	0.4	1386	15.4	0.4	
Missing (182)							
Dental visit within 6 months							<.0001
Yes	3371	39.7	0.6	1493	16.9	0.5	
No	1443	19.5	0.6	1940	23.9	0.6	
Missing (24)							
Applied for disability							**<.0001**
Yes	**958**	**10.5**	**0.4**	**946**	**10.7**	**0.4**	
No	**3930**	**48.5**	**0.6**	**2559**	**30.3**	**0.6**	
Missing (0)							

[1] Rao-Scott Chi-Square test p-value

Abbreviations: wt%: weighted column percentage; SE: standard error; HE: Higher education beyond high school graduation

"No" in Married/Civil Commitment/Union includes widowed, divorced, separated, and never married.

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Table 4

Logistic regression of disability application on perceived oral health status, National Survey of Veterans, 2010

	Unadjusted OR (95%CI); p-value for negative oral health perception	Adjusted OR (95%CI); p-value for negative oral health perception
Self-Identified Disability		
Yes v. No	**1.63 (1.44, 1.85); <.0001**	**1.69 (1.44, 1.99); <.0001**
Predisposing factors		
Sex		
Male v. Female		1.32 (0.99, 1.78); 0.0617
Race/ethnicity		
Black v. White		1.35 (1.02, 1.80); 0.0377
Other v. White		1.28 (0.80, 2.05); 0.3063
Education		
<HS v. HE graduate		2.82 (2.10, 3.78); <.0001
HS graduate v. HE graduate		1.82 (1.53, 2.18); <.0001
<HE graduate v. HE graduate		1.60 (1.36, 1.88); <.0001
Age		
65 years and above v. 18 to less than 65		1.05 (0.92, 1.21); 0.4594
Enabling factors		
Married		
No v. yes		0.91 (0.77, 1.07); 0.2353
Internet access, at least occasional		
No v. yes		1.39 (1.19, 1.63); <.0001
Income		
Less than $20000 v. $50000 and above		2.20 (1.71, 2.84); <.0001
$20000–$29999 v. $50000 and above		1.84 (1.49, 2.27); <.0001
$30000–$39999 v. $50000 and above		1.55 (1.27, 1.88); <.0001
$40000–$49999 v. $50000 and above		1.35 (1.09, 1.67); 0.0067
Smoking		
Current v. never smoker		2.51 (2.04, 3.07); <.0001
Former smoker v. never smoker		1.56 (1.35, 1.80); <.0001
Dental visit within the previous 6 months		
No v. yes		1.85 (1.62, 2.12); <.0001

Abbreviations: OR= Odds ratio; AOR= Adjusted odds ratio; CI=confidence interval; <HS= less than high school graduate; HS= high school; <HE= some higher education beyond high school, but less than graduating; and HE= higher education beyond high school. “No” in Married/Civil Commitment/Union includes widowed, divorced, separated, and never married.