

# UC Irvine

## UC Irvine Previously Published Works

### Title

Cultural factors and oral health-related quality of life among dentate adults: Hispanic community health study/study of Latinos

### Permalink

<https://escholarship.org/uc/item/5fw1v2gc>

### Journal

Ethnicity and Health, 25(3)

### ISSN

1355-7858

### Authors

Silveira, Marushka L  
Dye, Bruce A  
Iafolla, Timothy J  
[et al.](#)

### Publication Date

2020-04-02

### DOI

10.1080/13557858.2018.1427219

Peer reviewed



Published in final edited form as:

*Ethn Health*. 2020 April ; 25(3): 420–435. doi:10.1080/13557858.2018.1427219.

## Cultural Factors and Oral Health-related Quality of Life Among Dentate Adults: Hispanic Community Health Study/Study of Latinos

Marushka L. Silveira, BDS, MPH, PhD<sup>1</sup>, Bruce A. Dye, DDS, MPH<sup>1</sup>, Timothy J. Iafolla, DMD, MPH<sup>1</sup>, Margo R. Adesanya, DDS, MPH<sup>1</sup>, Shahdokht Boroumand, DMD, MPH<sup>1</sup>, Marston E. Youngblood, MA, MPH<sup>2</sup>, Christian R. Salazar, PhD, MPH<sup>3</sup>, Tracy L. Finlayson, PhD<sup>4</sup>, Tasneem Khambaty, PhD<sup>5</sup>, Shirley M Beaver, RDH, MS, PhD<sup>6</sup>, A. Isabel Garcia, DDS MPH<sup>7</sup>

<sup>1</sup>National Institute of Dental and Craniofacial Research, National Institutes of Health, Building 31, Room 5B55, 31 Center Dr, Bethesda, MD – 20892

<sup>2</sup>University of North Carolina at Chapel Hill, Collaborative Studies Coordinating Center, 123 West Franklin Street, Suite 450, Chapel Hill, NC – 27516

<sup>3</sup>Department of Epidemiology and Health Promotion, New York University College of Dentistry, 433 1<sup>st</sup> Ave, 7<sup>th</sup> floor, New York, NY 10010

<sup>4</sup>San Diego State University, Graduate School of Public Health, 5500 Campanile Drive, San Diego, CA – 92182-4162

<sup>5</sup>University of Maryland, Baltimore County (UMBC), Department of Psychology, 1000 Hilltop Circle, Math/Psychology 326, Baltimore, MD 21250

<sup>6</sup>University of Illinois at Chicago, College of Dentistry, Department of Periodontics, 801 S. Paulina street, Chicago, IL – 60077

<sup>7</sup>University of Florida, College of Dentistry, Health Science Center, Room D4-6B, 1395 Center Drive, Gainesville, FL – 32610

### Abstract

**Objective:** Research on the relationships between acculturation, ethnic identity, and oral health-related quality of life (OHRQOL) among the U.S. Hispanic/Latino population is sparse. The aim of this study is to examine the association between acculturation, ethnic identity, and OHRQOL among 13,172 adults in the 2008–2011 Hispanic Community Health Study/Study of Latinos (HCHS/SOL).

**Design:** Participants self-reported their acculturation (immigrant generation, birthplace, residence in the U.S., language, and social acculturation), ethnic identity (sense of belonging and pride), and

---

Corresponding Author: Bruce A. Dye, DDS, MPH, Office of Science Policy and Analysis, National Institute of Dental and Craniofacial Research National Institutes of Health, 31 Center Drive Suite 5B55 Bethesda, MD 20892-2190. Voice: 301-496-7765, [bruce.dye@nih.gov](mailto:bruce.dye@nih.gov).

Email addresses: Marushka L. Silveira: [marushka.silveira@nih.gov](mailto:marushka.silveira@nih.gov), Bruce A. Dye: [bruce.dye@nih.gov](mailto:bruce.dye@nih.gov), Timothy J. Iafolla: [iafollat@nidcr.nih.gov](mailto:iafollat@nidcr.nih.gov), Margo R. Adesanya: [margoadesanya@gmail.com](mailto:margoadesanya@gmail.com), Shahdokht Boroumand: [boroumands@nidcr.nih.gov](mailto:boroumands@nidcr.nih.gov), Marston E. Youngblood: [youngbl1@email.unc.edu](mailto:youngbl1@email.unc.edu), Christian R. Salazar: [crs201@nyu.edu](mailto:crs201@nyu.edu), Tracy L. Finlayson: [tfinlays@mail.sdsu.edu](mailto:tfinlays@mail.sdsu.edu), Tasneem Khambaty: [khambaty@umbc.edu](mailto:khambaty@umbc.edu), Shirley M Beaver: [sbeaver@foxcollege.edu](mailto:sbeaver@foxcollege.edu), A. Isabel Garcia: [aigarcia@dental.ufl.edu](mailto:aigarcia@dental.ufl.edu)

four OHRQOL measures. Key socio-demographic, behavioral, and oral health outcomes were tested as potential confounders.

**Results:** Overall, 57% of individuals experienced poor OHRQOL in at least one of the domains examined. In multivariable analyses, some elements of higher acculturation were associated with greater food restriction and difficulty doing usual jobs/attending school, but not associated with pain or difficulty chewing, tasting, or swallowing. While sense of belonging to one's ethnic group was not associated with poor OHRQOL, low sense of pride was associated with food restriction. Socio-behavioral characteristics were significant effect modifiers.

**Conclusion:** This study contributes to the understanding of the role of Hispanic/Latino's cultural factors in OHRQOL perception and can inform targeted strategies to improve OHRQOL in this diverse population.

### Keywords

acculturation; ethnic identity; oral health; quality of life; OHRQOL; Hispanic/Latino

---

### Introduction

Since Cohen and Jago (1976) first advocated the development of socio-dental indicators (Cohen and Jago 1976), interest in examining oral health-related quality of life (OHRQOL) has been growing (Locker and Allen 2007). Several OHRQOL instruments have been developed ranging from measurement of patient-reported oral functional and psychosocial problems to subjective well-being relating to oral health (Locker and Allen 2007) with the Oral Health Impact Profile (OHIP) (Slade and Spencer 1994) and the General Oral Health Assessment Index (GOHAI) (Atchison and Dolan 1990) being the most widely used.

Racial/ethnic minorities in the United States (U.S.), such as Hispanics/Latinos generally experience poor health-related quality of life relative to non-racial/ethnic minorities (Zack 2013). However, Hispanic/Latinos are an increasingly diverse group of individuals of differing national origins, with important variations in health status across heritage groups (Escarce, Morales, and Rumbaut 2006). A recent study of U.S. community-dwelling older adults found that Hispanic ethnicity was significantly associated with higher composite OHIP scores (worse OHRQOL) compared with non-Hispanic Whites (Huang and Park 2014). Hispanics/Latinos also experience higher rates of dental caries, periodontal disease (Sanders et al. 2014, Eke, Dye, et al. 2012) and tooth loss (Beck et al. 2014). However, the OHRQOL literature in this population is limited, especially within heritage groups.

Cultural factors such as acculturation and ethnic identity can influence well-being and quality of life, and are important predictors of self-reported (perceived) health (Lara et al. 2005, Ai et al. 2014, Smith and Silva 2011, Kiang et al. 2006, Utsey et al. 2002). While acculturation is the relation of an individual in an ethnic or minority group to the host society, ethnic identity focuses on how an individual relates to his/her own group (Phinney 1990). Measures of acculturation range from proxy variables (such as language, immigration status, and length of residence) to instruments developed specifically for different ethnic groups (Thomson and Hoffman-Goetz 2009) such as the Short Acculturation Scale for

Hispanics (SASH) (Marin et al. 1987) or the Acculturation Rating Scale for Mexican Americans (ARSMA) (Cuellar, Arnold, and Maldonado 1995, Cuellar, Harris, and Jasso 1980). Ethnic identity as a ‘state’ measure (i.e. a person’s identification at a given time) commonly includes various combinations of self-identification, sense of belonging, attitudes toward one’s own group and towards outside groups, and social participation and cultural practices, however differing numbers of items have been used to assess each individual component (Phinney 1990).

Despite observed associations between cultural factors and quality of life, literature examining these associations with OHRQOL is sparse. A study of 911 Hispanic adults found that Spanish language preference (lower acculturation) was associated with poor OHRQOL (Riley et al. 2008). Findings for birthplace are mixed. Two studies (Sanders 2010, Riley et al. 2008) found that U.S. birthplace (higher acculturation) was associated with poor OHRQOL, whereas one study (Swoboda et al. 2006) of 733 low income older adults (1.5% Hispanic/Native American) found that U.S. birthplace was associated with higher GOHAI scores (better OHRQOL). Findings on length of residency in the U.S. are similarly conflicting, with one study (Swoboda et al. 2006) suggesting an association between greater number of years since immigrating and higher GOHAI scores, while the other (Quandt et al. 2007) found no association. In terms of ethnic identity, the only study (Riley et al. 2008) to our knowledge, on the OHRQOL parameter of self-reported tooth pain among 911 Hispanics living in South Florida, found no association for cultural identification.

Prior studies focused on small samples of Hispanic/Latino participants (Sanders 2010, Swoboda et al. 2006) or those with Mexican heritage (Quandt et al. 2007), migrant farmworkers (Quandt et al. 2007), or older adults (Swoboda et al. 2006). Although several studies document the existence of a Hispanic/Latino health paradox of equal or better health outcomes when compared with non-Hispanic Whites despite greater socio-economic disadvantage (Gallo et al. 2009), this paradox is limited to foreign-born Mexicans (Palloni and Arias 2004). Therefore, the heterogeneity of the associations between acculturation, ethnic identity, and OHRQOL may be masked in studies where different heritages inherent within the Hispanic population are overlooked, or where diverse Hispanics/Latinos are combined into a single group for analyses.

This study examined associations between 1) acculturation and OHRQOL, and 2) ethnic identity and OHRQOL. We hypothesized that higher acculturation and lower ethnic identity would be associated with worse OHRQOL. Given the potential variation in health status by Hispanic heritage, we further tested whether associations varied by Hispanic/Latino background and socio-behavioral characteristics.

## Methods

### Study Design and Population

The current study is a cross-sectional analysis of baseline data (2008–2011) from the Hispanic Community Health Study/Study of Latinos (HCHS/SOL), a multicenter, population-based, prospective cohort study of 16,415 Hispanic/Latino adults in the U.S. Participants were recruited from four stable Hispanic/Latino communities (Bronx, Chicago,

Miami, and San Diego). Eligibility was restricted to individuals who self-identified as being Hispanic/Latino and were between 18 and 74 years of age. Older adults (aged 45–74 years) were oversampled. Those unable to travel to the field center or complete the questionnaires in English or Spanish, or those intending to move from the region within the next six months were excluded. The design and methodology have been previously published (Lavange et al. 2010, Sorlie et al. 2010).

At enrollment, bilingual interviewers administered baseline questionnaires. Dental examination excluding 3<sup>rd</sup> molars was conducted by a dental hygienist or dentist using a standard dental mirror and explorer. The current study was determined exempt from review by the National Institutes of Health Institutional Review Board (OHSRP#12580).

Given that Hispanics/Latinos are more likely to retain teeth compared to other U.S. racial/ethnic groups and dentate and edentulous individuals differ with respect to their dental disease, perceived oral health, treatment needs and satisfaction (Dye et al. 2015, Wu et al. 2011), this study was restricted to dentate participants with data for the variables of interest (n=13,172).

### **Acculturation**

Information was collected on immigrant generation, birthplace, and years of residence in the U.S. Additionally, participants were administered the SASH (Marin et al. 1987). Language acculturation was measured via the language subscale, an average of six questions regarding the language used for reading/speaking, thinking, currently speaking at home, speaking with friends, used as a child, and watching or listening to media. Responses ranged from ‘only Spanish’ to ‘only English.’ Social acculturation was measured via the social subscale, an average of four questions on the ethnicity of close friends, attendees at social gatherings, visitors, and choice of children’s friends. Responses ranged from ‘all Hispanic/Latino’ to ‘all non-Hispanic/non-Latino.’ Average scores of 2.99 were used to differentiate low (1–2.99) and high acculturation (>2.99) (range: 1–5) (Marin G 1995). The SASH is observed to be internally consistent (Cronbach’s alpha=0.92), and correlates with acculturation markers such as generation (r=0.65), length of residence in the U.S. (r=0.7), self-reported acculturation (r=0.76), and age of immigration (r=-0.69).

### **Ethnic Identity**

Ethnic identity was assessed via two questions on participants’ sense of belonging and pride in their ethnic group. These items are commonly used as measures of ethnic identity and constitute positive attitudes towards one’s ethnic group (Phinney 1990). Specifically, participants were asked to rate their agreement on a 4-point Likert-type scale, ranging from “strongly disagree” (1.0) to “strongly agree” (4.0). Sense of belonging and pride were each re-categorized as high (agree/strongly agree) versus low (disagree/strongly disagree).

### **Oral Health–related Quality of Life**

Participants were asked four OHRQOL questions derived from the OHIP (Slade and Spencer 1994). Food restriction was assessed via the question “How often do you limit the kinds or amounts of food you eat because of problems with your teeth?” Responses ranged

from “always” to “never”. Information on oro-facial pain was assessed via questions regarding pain in the teeth, face, jaw joint, or other (non-toothache) pain in the past 12 months (yes, no). Information was also collected on difficulty chewing, tasting, or swallowing in the past 12 months (yes, no). Finally, participants were asked how often they experienced difficulty doing usual jobs or attending school because of problems with teeth, mouth or dentures in the past month (responses ranged from “always” to “never”). Food restriction and difficulty doing usual jobs/attending school were recoded as yes (always, very often, often, or sometimes) or no (seldom or never).

### Covariates

Participants self-reported their age, gender, marital status, level of educational attainment, current employment status, annual household income, current health insurance coverage, and self-identification within a Hispanic/Latino heritage group. Information on smoking and alcohol consumption included past and current use. Body mass index was calculated from measured height and weight.

Clinical dental outcomes included a count of natural teeth (functional dentition), the number of decayed teeth, and periodontal disease level determined by the Centers for Disease Control and Prevention and American Academy of Periodontology definition (Eke, Page, et al. 2012). Participants self-reported the time since their last visit to a dentist (including dental hygienists and dental specialists).

### Statistical analyses

Weighted distributions of individuals’ characteristics, including acculturation and ethnic identity, are presented. The prevalence of OHRQOL according to individuals’ characteristics is presented in a supplemental table.

Multivariable logistic regression models examined associations between acculturation, ethnic identity and OHRQOL via forward selection. Confounding was assessed by evaluating changes in the beta coefficients for acculturation and ethnic identity when each covariate was included in the models. Changes of 10% or greater were used as indicators of confounding and covariates significantly associated with OHRQOL at  $P<0.05$  were retained. Findings were unchanged with adjustment for clinical dental outcomes, and therefore excluded from the models. Odds ratios (ORs) and 95% confidence intervals (CIs) are presented. All p-values are two-sided. To be conservative in interpretation, logistic regression results were considered statistically significant if 95% CIs did not include “1”.

Moderation by Hispanic/Latino background and socio-behavioral characteristics was assessed by including interaction terms. Stratified results are presented for the significant interactions ( $P<0.05$ ). Analyses were conducted using SAS Survey procedures to account for the complex survey design including clustering and the unequal probability of selection (SAS<sup>®</sup> 9.3 software). Appropriate estimates (e.g. weighted proportions and odds ratios (ORs)) and their corresponding standard errors and 95% confidence intervals (CIs) were calculated by specifying strata, cluster, and sampling weight variables in the SURVEYFREQ and SURVEYLOGISTIC procedures (Lavange et al. 2010).

## Results

Overall, 57% of individuals experienced poor OHRQOL in at least one of the domains examined (Data not shown). Forty-five percent reported having oro-facial pain in the past 12 months, 21% reported restricting food intake or experiencing difficulty chewing in the past 12 months. Less than 2% reported difficulty doing usual activities because of oral health-related problems in the past month.

Forty-one percent self-identified as being of Mexican background, while 17% identified themselves as Cuban, 15% as Puerto Rican, 12% as South or Central American, 10% as Dominican and 4% as belonging to more than one or other Hispanic/Latino background (Table 1). Most individuals (88%) had a functional dentition (20 or more natural teeth present), 38% had moderate or severe periodontal disease, and 31% had untreated decay.

Females, those of low socioeconomic status, current cigarette smokers, and those with poor clinical dental outcomes were more likely to report poor OHRQOL across most domains examined (Supplemental Table).

Almost three-fourths of the individuals were first generation in the U.S (75%) and born outside of the U.S. (76%), but had lived in the U.S. for 10 years or more (74%) (Table 2). Individuals had low language (73%) and social (82%) acculturation as measured via the SASH. Individuals reported high sense of belonging (81.5%) and pride (95%) in their ethnic group.

### Acculturation and OHRQOL

Individuals who were in the U.S. for the second or higher generation were 30% more likely (OR=1.3; 95% CI: 1.1, 1.6) to report food restriction compared with those who were first generation, after adjusting for socio-behavioral characteristics. This association was not significant after adjusting for Hispanic/Latino background. Similarly, the associations for U.S. birthplace, 10 or more years of residence in the U.S., and high language with food restriction were not significant after adjusting for Hispanic/Latino background and socio-behavioral characteristics. High social acculturation was associated with a two-fold higher likelihood (OR=2.1, 95% CI: 1.4, 3.1) of difficulty doing usual jobs/attending school in adjusted models.

### Ethnic Identity and OHRQOL

Sense of belonging to one's ethnic group was not associated with OHRQOL in adjusted models. However, individuals with low sense of pride in their ethnic group were 50% more likely (OR=1.5, 95% CI: 1.2, 2.0) to report food restriction compared to those with high sense of pride.

### Moderation by Socio-behavioral Characteristics

**Acculturation and OHRQOL**—Marital status moderated the associations between immigrant generation, U.S. birthplace and food restriction ( $P=0.03$ ) (Table 3). Among married individuals, being second generation or higher (OR=1.4; 95% CI: 1.1, 1.9) and born in the U.S. (OR=1.6; 95% CI: 1.2, 2.1) were each associated with greater food restriction



compared with being first generation and born outside the U.S., respectively. Generation and U.S. birthplace were not associated with food restriction among those who were never married or previously married.

The association between years of residence in the U.S. and difficulty chewing, tasting, or swallowing varied according to cigarette smoking ( $P=0.02$ ). Among never smokers, those residing in the U.S. 10 years or more were 30% less likely (OR=0.7; 95% CI: 0.6, 0.9) to report difficulty chewing, tasting, or swallowing than those residing for less than 10 years after adjusting for socio-behavioral characteristics. Associations were not significant among former or current smokers.

Finally, level of educational attainment moderated the association between immigrant generation and difficulty doing usual jobs/attending school ( $P=0.04$ ). In adjusted models, individuals with at most high school education who were second generation or higher in the U.S. were more than three times (OR=3.2; 95% CI: 1.4, 7.3) as likely to report difficulty doing usual jobs/attending school compared with those who were first generation. In contrast, there were no significant associations among those with less than or greater than high school education.

**Ethnic Identity and OHRQOL**—Hispanic/Latino heritage background ( $P=0.04$ ) significantly modified the association between sense of belonging and difficulty chewing, tasting, or swallowing (Table 4). In adjusted models, individuals of Cuban background with low sense of belonging to their ethnic group were 50% less likely (OR=0.5, 95% CI: 0.3, 0.8) to report difficulty chewing, tasting, or swallowing compared to those with high sense of belonging. These associations were not significant among those of other Hispanic/Latino backgrounds.

## Discussion

In this diverse population of Hispanic/Latino adults, over half of the individuals experienced poor OHRQOL. Associations between cultural factors and OHRQOL were inconsistent across the four OHRQOL domains. Some elements of higher acculturation were associated with greater food restriction and difficulty doing usual jobs/attending school, but not associated with pain or difficulty chewing, tasting, or swallowing. While sense of belonging to one's ethnic group was not associated with poor OHRQOL, low sense of pride was associated with only one OHRQOL domain (food restriction). These findings are consistent with our hypotheses that high acculturation and low ethnic identity would be associated with worse OHRQOL.

Interestingly, associations between higher acculturation and greater food restriction as well as lower ethnic identity and greater food restriction were not significant after adjusting for Hispanic/Latino background, suggesting that one or more aspects of an individual's Hispanic/Latino background influenced these associations. For example, literature supports being married as beneficial for health via the economic well-being and social support it offers (Ross, Mirowsky, and Goldstein 1990) and married individuals report greater happiness and life satisfaction (Mastekaasa 1994). However, we found that married



individuals who were of higher generations or born in the U.S. were more likely to experience food restriction. Individuals of Mexican heritage in this study were more likely to be currently married than those from other Hispanic/Latino backgrounds (Sanders et al. 2014). Studies among Mexican Americans support an association between higher acculturation and marital conflicts possibly due to differences in cultural expectations between spouses as individuals become more acculturated (Flores et al. 2004, Helms et al. 2014).

The OHIP domains in this study are based on Locker's conceptual model of oral health (Slade and Spencer 1994). Dimensions in this model are hierarchically ordered such that the impact of each dimension is gradually more disruptive to one's life. For example, oral disease or impairment may lead to functional limitations, which in turn could lead to physical pain, followed by physical and social disability and handicap. Social disability and handicap are thus highest in the hierarchy and can be considered as having the most severe impact on daily life. Higher social acculturation was significantly associated with greater difficulty doing usual jobs/attending school (social disability) in this study even after adjusting for Hispanic/Latino background. Associations between other elements of higher acculturation and social disability were suggestive of a positive association, but were not significant when adjusted for Hispanic/Latino background. Additionally, age and income moderated these associations; however, stratifying by these covariates was not possible due to the low prevalence of social disability (1.8%).

The relationship between acculturation and OHRQOL is not straightforward due to multiple pathways driving the underlying mechanisms. One potential pathway is via higher socioeconomic status resulting in better access to oral healthcare services and better OHRQOL. Individuals with at most high school education who were second generation or higher in the U.S. were more likely to report difficulty doing usual jobs/attending school because of problems with oral health. Although findings for those with greater than high school education did not reach statistical significance, they were suggestive of a protective effect of being second or higher generation in the U.S., thereby warranting additional exploration of this association across different educational levels. Another pathway possibly driving the association between acculturation and OHRQOL is via adverse lifestyle behaviors e.g. smoking, a known risk factor for periodontal disease. Longer period of residence in the U.S. was associated with greater difficulty chewing, tasting, or swallowing among current smokers, while a protective effect was seen for never smokers. Findings support this pathway but suggest a need to further test the multiple mechanisms driving the associations between acculturation and OHRQOL.

Findings of a significant association between low sense of pride and greater food restriction after adjusting for Hispanic/Latino background highlight the importance of strong ethnic identity in conferring a protective effect on OHRQOL across all Hispanic/Latino backgrounds. Additionally, Hispanic/Latino background modified the association between ethnic identity and functional limitation. Low sense of belonging was protective against difficulty chewing, tasting, or swallowing among Cubans but not significant for other Hispanic/Latino backgrounds. Cubans in this study were older and more educated (Beck et

al. 2014), possibly driving associations between low ethnic identity and physical disability and further supporting socio-behavioral mechanisms.

The assessment of several cultural factors and the overall consistency of findings across these measures constitutes an important strength of this study. We used a validated acculturation scale combined with proxy measures such as immigrant generation, U.S. birthplace, and years of residence in the U.S. Although proxies are quick and convenient, they tend to measure superficial attributes, and may be of limited usefulness in measuring deep acculturative change such as attitudes and behaviors (Thomson and Hoffman-Goetz 2009). Acculturation scales capture changes over time and the SASH functions as a quick, resource-efficient tool to measure language and social acculturation. However, as a unidimensional instrument describing changes on a continuum ranging from unacculturated to acculturated, the SASH fails to account for biculturality (Thomson and Hoffman-Goetz 2009). Additionally, although 'ethnic identity' is sometimes used synonymously with acculturation, these two inter-related components of culture should be distinguished (Phinney 1990). Given that a single measure does not capture the multidimensional range of the degree of acculturation and ethnic identity, the use of multiple measures in this study addresses some of the weaknesses observed with individual measures. Nevertheless, findings need to be interpreted within the context of several limitations. Associations between cultural factors and overall OHRQOL could not be tested due to the lack of a comprehensive scale. However, it may not be possible to have such a scale for this population because of the wide variation with respect to countries of origin (>20) each representing different cultural practices, knowledge, and beliefs. Information was not collected on the psychological domains (e.g. psychological pain, self-consciousness, depression, and embarrassment because of oral health problems). However, given the observed variation in the OHRQOL prevalence and associations between cultural factors and OHRQOL across the domains examined, a scale may not have been able to capture differences found using separate OHRQOL measures. Furthermore, findings may not be generalizable to edentulous individuals due to exclusion of these individuals. Finally, the study included Hispanics/Latinos in stable communities with social infrastructure and organization that enables community support and feedback. Therefore, the applicability of these findings to Hispanics/Latinos living outside stable communities (e.g. migrant populations) is unknown.

## Conclusions

In summary, socio-behavioral characteristics unique to the Hispanic/Latino backgrounds in this community moderated the associations between cultural factors and OHRQOL. As the Hispanic/Latino community steadily grows in size, it is important to recognize the public health implications of these relationships. In addition to understanding disease burden from a patient's point of view, measuring quality of life has the practical advantage of identifying groups with poor perceived health and guiding interventions to improve their situations and prevent adverse consequences (Zack et al. 2004). Findings can inform targeted strategies such as culturally-competent dental workforce, community-based oral health promotion programs, and patient-centered healthcare approaches to improve OHRQOL in this diverse minority group.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## References

- Ai AL, Aisenberg E, Weiss SI, and Salazar D 2014 “Racial/Ethnic identity and subjective physical and mental health of Latino Americans: an asset within?” *Am J Community Psychol* 53 (1–2):173–84. doi: 10.1007/s10464-014-9635-5. [PubMed: 24464428]
- Atchison KA, and Dolan TA 1990 “Development of the Geriatric Oral Health Assessment Index.” *J Dent Educ* 54 (11):680–7. [PubMed: 2229624]
- Beck JD, Youngblood M Jr., Atkinson JC, Mauriello S, Kaste LM, Badner VM, Beaver S, Becerra K, and Singer R 2014 “The prevalence of caries and tooth loss among participants in the Hispanic Community Health Study/Study of Latinos.” *J Am Dent Assoc* 145 (6):531–40. doi: 10.14219/jada.2014.25. [PubMed: 24878707]
- Cohen LK, and Jago JD 1976 “Toward the formulation of sociodental indicators.” *Int J Health Serv* 6 (4):681–98. [PubMed: 971976]
- Cuellar Israel, Arnold Bill, and Maldonado Roberto 1995 “Acculturation rating scale for Mexican Americans-II: A revision of the original ARSMA scale.” *Hispanic journal of behavioral sciences* 17 (3):275–304.
- Cuellar Israel, Harris Lorwen C, and Jasso Ricardo 1980 “An acculturation scale for Mexican American normal and clinical populations.” *Hispanic Journal of Behavioral Sciences*.
- Dye B, Thornton-Evans G, Li X, and Iafolla T 2015 “Dental caries and tooth loss in adults in the United States, 2011–2012.” *NCHS Data Brief* (197):197. [PubMed: 25973996]
- Eke PI, Dye BA, Wei L, Thornton-Evans GO, and Genco RJ 2012 “Prevalence of periodontitis in adults in the United States: 2009 and 2010.” *J Dent Res* 91 (10):914–20. doi: 10.1177/0022034512457373. [PubMed: 22935673]
- Eke PI, Page RC, Wei L, Thornton-Evans G, and Genco RJ 2012 “Update of the case definitions for population-based surveillance of periodontitis.” *J Periodontol* 83 (12):1449–54. doi: 10.1902/jop.2012.110664. [PubMed: 22420873]
- Escarce JJ, Morales LS, and Rumbaut RG 2006 “The Health Status and Health Behaviors of Hispanics” In National Research Council (US) Panel on Hispanics in the United States, edited by Tienda Mand Mitchell FWashington DC: National Academies Press (US).
- Flores E, Tschann JM, Marin BV, and Pantoja P 2004 “Marital conflict and acculturation among Mexican American husbands and wives.” *Cultur Divers Ethnic Minor Psychol* 10 (1):39–52. doi: 10.1037/1099-9809.10.1.39. [PubMed: 14992629]
- Gallo LC, Penedo FJ, Espinosa K de los Monteros, and Arguelles W 2009 “Resiliency in the face of disadvantage: do Hispanic cultural characteristics protect health outcomes?” *J Pers* 77 (6):1707–46. doi: 10.1111/j.1467-6494.2009.00598.x. [PubMed: 19796063]
- Helms HM, Supple AJ, Su J, Rodriguez Y, Cavanaugh AM, and Hengstebeck ND 2014 “Economic pressure, cultural adaptation stress, and marital quality among Mexican-origin couples.” *J Fam Psychol* 28 (1):77–87. doi: 10.1037/a0035738. [PubMed: 24512286]
- Huang DL, and Park M 2014 “Socioeconomic and racial/ethnic oral health disparities among US older adults: oral health quality of life and dentition.” *J Public Health Dent*. doi: 10.1111/jphd.12072.
- Kiang L, Yip T, Gonzales-Backen M, Witkow M, and Fuligni AJ 2006 “Ethnic identity and the daily psychological well-being of adolescents from Mexican and Chinese backgrounds.” *Child Dev* 77 (5):1338–50. doi: 10.1111/j.1467-8624.2006.00938.x. [PubMed: 16999802]
- Lara M, Gamboa C, Kahramanian MI, Morales LS, and Bautista DE 2005 “Acculturation and Latino health in the United States: a review of the literature and its sociopolitical context.” *Annu Rev Public Health* 26:367–97. doi: 10.1146/annurev.publhealth.26.021304.144615. [PubMed: 15760294]
- Lavage LM, Kalsbeek WD, Sorlie PD, Aviles-Santa LM, Kaplan RC, Barnhart J, Liu K, Giachello A, Lee DJ, Ryan J, Criqui MH, and Elder JP 2010 “Sample design and cohort selection in the

- Hispanic Community Health Study/Study of Latinos." *Ann Epidemiol* 20 (8):642–9. doi: 10.1016/j.annepidem.2010.05.006. [PubMed: 20609344]
- Locker D, and Allen F 2007 "What do measures of 'oral health-related quality of life' measure?" *Community Dent Oral Epidemiol* 35 (6):401–11. doi: 10.1111/j.1600-0528.2007.00418.x. [PubMed: 18039281]
- Marin G, Sabogal F, Marin BV, Otero-Sabogal G, Perez-Stable EJ 1995 The Short Acculturation Scale for Hispanics (SASH) 2015 (4/9). Accessed 1995.
- Marin Gerardo, Sabogal Fabio, Barbara Vanoss Marin Regina Otero-Sabogal, and Perez-Stable Eliseo J 1987 "Development of a short acculturation scale for Hispanics." *Hispanic Journal of Behavioral Sciences* 9 (2):183–205.
- Mastekaasa Arne 1994 "Marital status, distress, and well-being: An international comparison." *Journal of Comparative Family Studies*:183–205.
- Palloni A, and Arias E 2004 "Paradox lost: explaining the Hispanic adult mortality advantage." *Demography* 41 (3):385–415. [PubMed: 15461007]
- Phinney JS 1990 "Ethnic identity in adolescents and adults: review of research." *Psychol Bull* 108 (3):499–514. [PubMed: 2270238]
- Quandt SA, Hiott AE, Grzywacz JG, Davis SW, and Arcury TA 2007 "Oral health and quality of life of migrant and seasonal farmworkers in North Carolina." *J Agric Saf Health* 13 (1):45–55. [PubMed: 17370913]
- Riley JL 3rd, Gibson E, Zsembik BA, Duncan RP, Gilbert GH, and Heft MW 2008 "Acculturation and orofacial pain among Hispanic adults." *J Pain* 9 (8):750–8. doi: 10.1016/j.jpain.2008.03.007. [PubMed: 18456564]
- Catherine E, John Mirowsky, and Karen Goldsteen 1990 "The impact of the family on health: The decade in review." *Journal of Marriage and the Family* 52 (4):1059–1078.
- Sanders AE 2010 "A Latino advantage in oral health-related quality of life is modified by nativity status." *Soc Sci Med* 71 (1):205–11. doi: 10.1016/j.socscimed.2010.03.031. [PubMed: 20434250]
- Sanders AE, Campbell SM, Mauriello SM, Beck JD, Jimenez MC, Kaste LM, Singer RH, Beaver SM, Finlayson TL, and Badner VM 2014 "Heterogeneity in periodontitis prevalence in the Hispanic Community Health Study/Study of Latinos." *Ann Epidemiol* 24 (6):455–62. doi: 10.1016/j.annepidem.2014.02.018. [PubMed: 24731697]
- Slade GD, and Spencer AJ 1994 "Development and evaluation of the Oral Health Impact Profile." *Community Dent Health* 11 (1):3–11. [PubMed: 8193981]
- Smith TB, and Silva L 2011 "Ethnic identity and personal well-being of people of color: a meta-analysis." In *J Couns Psychol*, 42–60. United States.
- Sorlie PD, Aviles-Santa LM, Wassertheil-Smoller S, Kaplan RC, Daviglius ML, Giachello AL, Schneiderman N, Raji L, Talavera G, Allison M, Lavange L, Chambless LE, and Heiss G 2010 "Design and implementation of the Hispanic Community Health Study/Study of Latinos." *Ann Epidemiol* 20 (8):629–41. doi: 10.1016/j.annepidem.2010.03.015. [PubMed: 20609343]
- Swoboda J, Kiyak HA, Persson RE, Persson GR, Yamaguchi DK, MacEntee MI, and Wyatt CC 2006 "Predictors of oral health quality of life in older adults." *Spec Care Dentist* 26 (4):137–44. [PubMed: 16927735]
- Thomson MD, and Hoffman-Goetz L 2009 "Defining and measuring acculturation: a systematic review of public health studies with Hispanic populations in the United States." *Soc Sci Med* 69 (7):983–91. doi: 10.1016/j.socscimed.2009.05.011. [PubMed: 19525050]
- Utsey SO, Chae MH, Brown CF, and Kelly D 2002 "Effect of ethnic group membership on ethnic identity, race-related stress, and quality of life." *Cultur Divers Ethnic Minor Psychol* 8 (4):366–77. [PubMed: 12416322]
- Wu B, Liang J, Plassman BL, Remle RC, and Bai L 2011 "Oral health among white, black, and Mexican-American elders: an examination of edentulism and dental caries." *J Public Health Dent* 71 (4):308–17. doi: 10.1111/j.1752-7325.2011.00273.x. [PubMed: 22320289]
- Zack MM 2013 "Health-related quality of life - United States, 2006 and 2010." *MMWR Surveill Summ* 62 Suppl 3:105–11.

Zack MM, Moriarty DG, Stroup DF, Ford ES, and Mokdad AH 2004 "Worsening trends in adult health-related quality of life and self-rated health-United States, 1993–2001." *Public Health Rep* 119 (5):493–505. doi: 10.1016/j.phr.2004.07.007. [PubMed: 15313113]

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

**Table 1.**

Distribution of Participants' Characteristics, Hispanic Community Health Survey/Study of Latinos, 2008–2011

	Total Population		
	n	%	SE
<b>Total</b>	13172	100.0	N/A
<b>Socio-demographic Characteristics</b>			
Age (years)			
18–24	1287	16.3	0.6
25–34	1799	23.4	0.7
35–44	2515	22.3	0.6
45–54	4095	19.6	0.5
55–64	2615	11.9	0.4
65+	861	6.5	0.3
Gender			
Female	7771	51.2	0.7
Male	5401	48.8	0.7
Marital status			
Never married	3513	33.6	0.7
Married <sup>a</sup>	7062	51.0	0.9
Separated/divorced/ widowed	2597	15.4	0.5
Educational attainment			
Less than high school	4695	29.9	0.8
At most high school	3454	28.7	0.6
Greater than high school	5023	41.4	0.9
Annual household income			
Less than \$10,000	1947	13.6	0.5
\$10,001-\$20,000	4264	31.5	0.8
\$20,001-\$40,000	4542	33.9	0.7
\$40,001-\$75,000	1832	14.8	0.6
More than \$75,000	587	6.1	0.7
Current employment			
Not currently employed <sup>b</sup>	6061	45.6	0.8
Employed part-time	2316	17.8	0.5
Employed full-time	4795	36.6	0.7
Current health insurance			
Yes	6648	50.1	1.0
No	6524	49.9	1.0
Hispanic/Latino background			
Dominican	1170	9.7	0.7
Central/South American	2229	12.1	0.7
Cuban	1628	17.3	1.5

	Total Population		
	n	%	SE
Mexican	5650	41.3	1.7
Puerto Rican	2092	15.4	0.8
More than one/other	398	4.2	0.3
<b>Health Behaviors</b>			
Cigarette smoking			
Never	8167	62.7	0.7
Former	2620	17.1	0.5
Current	2385	20.2	0.6
Alcohol consumption			
Never	2421	16.7	0.7
Former	4311	30.0	0.8
Current	6440	53.3	0.9
Time since last dental visit			
1 year	6687	49.5	0.8
>1 year	6472	50.5	0.8
<b>Clinical Dental Outcomes</b>			
Decayed teeth <sup>c</sup>			
None	8904	69.5	0.8
1–2	2931	22.0	0.6
3+	1139	8.5	0.4
Periodontal Disease <sup>d</sup>			
Normal	5307	51.6	0.8
Mild	1224	10.2	0.5
Moderate	4140	29.9	0.7
Severe	1388	8.2	0.3
Functional dentition <sup>c</sup>			
1–19 natural teeth	2080	12.0	0.5
20+ natural teeth	10894	88.0	0.5

n: unweighted sample size, %: population weighted estimate, SE: weighted standard error

<sup>a</sup>Includes living with a partner

<sup>b</sup>Includes retired

<sup>c</sup>Assessed via the decayed and missing components of the Decayed Missing, Filled Teeth Index

<sup>d</sup>Classified according to the Centers for Disease Control and Prevention and American Academy of Periodontology definition



**Table 2.**

Multivariable odds ratios for oral health-related quality of life according to acculturation and ethnic identity, Hispanic Community Health Survey/Study of Latinos, 2008–2011

	Total Population			Food restriction			Oro-facial pain			Difficulty chewing, tasting, or swallowing			Difficulty doing usual jobs/attending school		
	n	%	SE	Adjusted <sup>d</sup>	OR	95% CI	Adjusted <sup>b</sup>	OR	95% CI	Adjusted <sup>c</sup>	OR	95% CI	Adjusted <sup>c</sup>	OR	95% CI
<b>Acculturation</b>															
Immigrant generation															
First	10603	74.7	0.9	referent			referent						referent		
Second or higher	2569	25.3	0.9	1.3	1.1	1.0	1.3	1.1	1.0	1.2	1.1	0.9	1.3	1.0	0.9
U.S. birthplace															
No	10793	76.2	0.8	referent			referent						referent		
Yes	2379	23.8	0.8	1.4	1.2	1.0	1.4	1.1	0.9	1.2	1.0	0.9	1.3	1.0	0.8
Years of residence in U.S.															
<10	2884	26.1	0.9	referent			referent						referent		
10	10288	73.9	0.9	1.3	1.1	0.9	1.3	1.1	0.9	1.2	0.9	0.8	1.1	0.9	0.8
Language acculturation															
Low	10362	72.7	0.9	referent			referent						referent		
High	2810	27.3	0.9	1.3	1.1	1.0	1.4	1.2	1.0	1.2	1.0	0.8	1.2	1.0	0.8
Social acculturation															
Low	11092	81.8	0.6	referent			referent						referent		
High	2080	18.2	0.6	1.2	1.0	1.0	1.3	1.1	1.0	1.3	0.9	0.7	1.0	0.8	0.7
<b>Ethnic Identity</b>															
Sense of belonging															
High	10884	81.5	0.7	referent			referent						referent		

	Total Population			Food restriction			Oro-facial pain			Difficulty chewing, tasting, or swallowing			Difficulty doing usual jobs/attending school													
	n	%	SE	Adjusted <sup>d</sup>		OR	Adjusted <sup>b</sup>		OR	Adjusted <sup>c</sup>		OR	Adjusted <sup>c</sup>		OR											
				CI	95%		CI	95%		CI	95%		CI	95%		CI	95%									
Low	2288	18.5	0.7	1.2	1.0	1.4	1.1	1.0	0.9	1.2	1.0	1.0	1.0	0.9	1.2	1.0	0.6	1.5	0.9	0.5	1.4					
Sense of pride																										
High	12527	95.0	0.3			referent			referent			referent			referent						referent					
Low	645	5.0	0.3	1.6	1.2	2.2	1.5	1.1	2.0	1.3	1.0	1.6	1.2	1.0	1.6	1.0	0.7	1.4	1.0	0.7	1.4	1.0	0.7	1.7	0.8	3.7

Language and social acculturation measured using the Short Acculturation Scale for Hispanics (SASH) and categorized as high (>2.99) vs. low (1–2.99)

n: unweighted sample size, %: population weighted estimate, SE: standard error

Odds ratios (OR)s and 95% confidence intervals (CI)s calculated from logistic regression models

Statistically significant findings ( $P<0.05$ ) are noted in bolded text

<sup>a</sup>Adjusted for age, gender, marital status, education, income, cigarette smoking

<sup>b</sup>Adjusted for age, gender, marital status, education, income, employment status, health insurance, cigarette smoking, alcohol consumption

<sup>c</sup>Adjusted for age, gender, education, income, cigarette smoking

<sup>d</sup>Fully-adjusted: Additionally adjusted for Hispanic/Latino background

**Table 3.**

Multivariable Odds Ratios for Oral Health-related Quality of Life According to Acculturation Stratified by Significant Effect Modifiers, Hispanic Community Health Survey/Study of Latinos, 2008–2011

	Food restriction			Oro-facial pain			Difficulty chewing, tasting, or swallowing			Difficulty doing usual jobs/attending school									
	Adjusted <sup>a</sup>	OR	95% CI	Adjusted <sup>b</sup>	OR	95% CI	Adjusted <sup>c</sup>	OR	95% CI	Adjusted <sup>c</sup>	OR	95% CI	Adjusted <sup>d</sup>	OR	95% CI				
<b>Immigrant generation</b>																			
First																			
Second or higher			referent			referent									referent				
<b>Marital status</b>																			
Never married	1.1	0.9	1.5	0.9	0.7	1.2													
Married <sup>d</sup>	<b>1.6</b>	<b>1.2</b>	<b>2.2</b>	<b>1.4</b>	<b>1.1</b>	<b>1.9</b>			Not significant						Not significant				
Separated/divorced/widowed	1.3	0.9	2.0	1.0	0.7	1.6													
<b>Educational attainment</b>																			
Less than high school												1.4	0.7	2.9	1.8	0.8	3.8		
At most high school									Not significant			3.5	1.7	7.3	3.2	1.4	7.3		
Greater than high school												0.8	0.4	1.7	0.6	0.3	1.3		
<b>U.S. birthplace</b>																			
No																		referent	
Yes									referent									referent	
<b>Marital status</b>																			
Never married	1.2	0.9	1.5	1.0	0.7	1.3													
Married <sup>d</sup>	1.7	1.3	2.3	1.6	1.2	2.1			Not significant									Not significant	
Separated/divorced/widowed	1.4	0.9	2.1	1.1	0.7	1.7													
<b>Hispanic/Latino background</b>																			
Dominican												1.8	0.9		3.8				
Central/South American												1.2	0.5		2.5				
Cuban												1.4	0.7		2.6			Not significant	
Mexican												0.9	0.7		1.2				
Puerto Rican												1.0	0.7		1.4				
More than one/other												0.9	0.4		1.9				
<b>Years of residence in TLS</b>																			
<10																			referent
>10																			referent

	Food restriction				Oro-facial pain				Difficulty chewing, tasting, or swallowing				Difficulty doing usual jobs/attending school							
	Adjusted <sup>a</sup>	OR	95% CI	OR	95% CI	Adjusted <sup>b</sup>	OR	95% CI	Adjusted <sup>c</sup>	OR	95% CI	Adjusted <sup>d</sup>	OR	95% CI	Adjusted <sup>c</sup>	OR	95% CI	Adjusted <sup>d</sup>	OR	95% CI
<b>Hispanic/Latino background</b>																				
Dominican				1.4	1.0	2.1														
Central/South American				0.8	0.6	1.0														
Cuban			Not significant																	Not significant
Mexican				1.3	1.0	1.6														
Puerto Rican				1.0	0.8	1.2														
More than one/other				1.1	0.6	1.9														
<b>Cigarette smoking</b>																				
Never				0.6	0.2	1.4														
Former			Not significant																	
Current			Not significant						0.8	0.6	0.9	0.7	0.6	0.9						
<b>Language acculturation</b>																				
Low																				
High			referent																	referent
<b>Age (years)</b>																				
18–24	1.9	1.4	2.6	1.7	1.2	2.3														
25–34	1.0	0.7	1.5	0.8	0.5	1.2														
35–44	1.5	1.0	2.2	1.3	0.8	2.0														Not significant
45–54	1.5	1.1	2.0	1.4	1.0	2.0														
55–64	1.3	0.8	2.2	1.1	0.7	1.8														
65+	0.8	0.4	1.9	0.6	0.2	1.5														
<b>Social acculturation</b>																				
Low																				
High			Not significant																	
																				referent
																				Not significant

**Table 4.**

Multivariable Odds Ratios for Oral Health-related Quality of Life According to Ethnic Identity Stratified by Significant Effect Modifiers, Hispanic Community Health Survey/Study of Latinos, 2008–2011

	Food restriction			Oro-facial pain			Difficulty chewing, tasting, or swallowing			Difficulty doing usual jobs/attending school					
	Adjusted <sup>a</sup> OR	95% CI	OR	Adjusted <sup>b</sup> OR	95% CI	OR	Adjusted <sup>c</sup> OR	95% CI	OR	Adjusted <sup>c</sup> OR	95% CI	OR	Adjusted <sup>d</sup> OR	95% CI	OR
<b>Sense of belonging</b>															
High			referent			referent			referent			referent			referent
Low															
<b>Hispanic/Latino background</b>															
Dominican							1.4	0.9	2.4						
Central/ South American							0.9	0.6	1.3						
Cuban			Not significant			Not significant	0.5	0.3	0.8	N/A					Not significant
Mexican							1.1	0.8	1.4						
Puerto Rican							1.0	0.7	1.3						
More than one/other							0.8	0.4	1.8						
<b>Sense of pride</b>															
High			referent			referent						referent			referent
Low															
<b>Annual household income</b>															
Less than \$10,000							1.1	0.6	2.2	1.1	0.6	2.2			
\$10,001–\$20,000							1.8	1.0	3.2	1.8	1.0	3.1			
\$20,001–\$40,000			Not significant			Not significant	0.6	0.3	1.0	0.6	0.3	1.0			Not assessed
\$40,001–\$75,000							0.6	0.3	1.2	0.6	0.3	1.2			
More than \$75,000							0.9	0.2	4.6	0.8	0.1	4.5			

Language and social acculturation measured using the Short Acculturation Scale for Hispanics (SASH) and categorized as high (>2.99) vs. low (1–2.99)

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Stratified results are presented for the significant interactions ( $P < 0.05$ )

Odds ratios (OR)s and 95% confidence intervals (CI)s calculated from logistic regression models

Statistically significant findings ( $P < 0.05$ ) are noted in bolded text

<sup>a</sup> Adjusted for age, gender, marital status, education, income, cigarette smoking

<sup>b</sup> Adjusted for age, gender, marital status, education, income, employment status, health insurance, cigarette smoking, alcohol consumption

<sup>c</sup> Adjusted for age, gender, education, income, cigarette smoking

<sup>d</sup> Fully-adjusted: Additionally adjusted for Hispanic/Latino background