

Oral Health and Quality of Life of Migrant and Seasonal Farmworkers in North Carolina

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ABSTRACT. *Oral health deficits can have a significant effect on workers' general health and their ability to carry out normal activities. Although farmworkers have been found to lack access to dental care, few studies have documented their oral health status or its impact on quality of life (QOL). This research (1) describes the oral health problems experienced and oral health care received by Latino farmworkers in North Carolina, and (2) explores the association between oral health and QOL. Data were collected using face-to-face interviews from a representative sample of 151 farmworkers; data included oral health-related QOL (OHIP-14) and general health-related QOL (SF-12 Health Survey). Workers reported a high number of unmet needs: 52% reported caries, and 33% reported missing teeth. Only 21% had received dental services in the past year, almost all in Mexico rather than the U.S. The dimensions of oral health-related QOL most impaired were psychological discomfort and physical pain caused by dental problems. Number of functional oral health problems was the strongest predictor of oral health-related QOL ($p < 0.001$) and physical health-related QOL ($p < 0.05$), but was unrelated to mental health-related QOL. These findings indicate that the high rate of unmet oral health needs is associated with poorer farmworker QOL. The consequences of suffering on-going dental pain for work performance, sleep, and nutritional status are unknown. Because national data indicate that fewer farmworkers are returning to their countries of origin, communities with large farmworker populations need to address their unmet needs for dental care.*

Keywords. *Farmworker, Dental, Health disparities, Immigrant, Quality of life.*

Worker safety and health have traditionally been linked to a wide variety of factors associated with job demands and the work environment. For some workers like migrant and seasonal farmworkers, the work environment is more broadly defined, as it includes living and health care facilities available in association with their employment. Oral health is such a component of health, linked to availability of care both in the country of origin and place of employment on the migrant stream, and having an impact on overall quality of life.

Migrant and seasonal farmworkers are a medically underserved population with little access to dental care (U.S. DHHS, 2005; Villarejo, 2003) and are likely part of the "silent epidemic" of oral health problems affecting vulnerable populations (U.S. DHHS, 2000). There are approximately 4.2 million farmworkers and their dependents in the U.S.,

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resident in 42 of the 50 states (HRSA, 1990). Eighty-four percent of migrant and seasonal farmworkers in the U.S. self-identify as Hispanic; 75% of all farmworkers were born in Mexico, 23% in the U.S., 2% in Central America, and 1% in other countries (Carroll et al., 2005). Delivery of dental and other health services is made difficult by their migratory lifestyle, language barriers, and concentration in rural areas with a low level of services (Arcury and Quandt, in press). Over 40% of migrant workers are “shuttle migrants,” who shuttle from their residence to do work in one area of the U.S. “Follow the crop” migrants move with the crops and account for 19% of the migrant farmworker population (Carroll et al., 2005). Those who do not migrate are considered “seasonal” farmworkers if they do not change residence to work; they face many of the same problems as migrant farmworkers due to rural residence and seasonal work availability.

Oral health is a significant component of overall health (U.S. DHHS, 2000). Because oral health affects the ability of individuals to carry out essential functions such as eating and speaking as well as to contribute fully to society, oral health affects quality of life (U.S. DHHS, 2000). A number of studies have indicated that having missing teeth is linked to a qualitatively poorer diet (Brodeur et al., 1993; Chauncey et al., 1984; Ranta et al., 1987; Sheiham et al., 2002; Walls and Steele, 2004). Oral health factors have also been identified as risks for systemic disease, particularly cardiovascular disease, probably due to inflammation related to tooth loss and periodontal disease (Hung et al., 2004, 2005; Joshipura and Ritchie, 2005). Because effective preventive measures and oral health treatments are available, oral health deficits and diseases affect primarily disadvantaged and socially marginalized populations with limited access to dental care (Peterson et al., 2005).

Limited research has been conducted on adult farmworkers’ dental status and dental care using representative samples. The California Agricultural Worker Health Survey examined 971 workers in 1999. Over 30% of workers had decayed, missing, or broken teeth, and over 10% had gingivitis (Villarejo et al., 2000). Half of the men and 44% of the women had never been to a dentist. A sample of 231 farmworkers in Colorado participated in a survey and dental assessment in 1986 (Entwistle and Swanson, 1989). Workers’ self-assessed needs included fillings (69%), extractions (57%), and teeth cleaning (88%). Examiners noted that 83% had periodontitis in at least one place. Twenty-nine percent of males and 8% of females had never been to a dentist, and 79% of the sample did not receive regular care, compared to 45% of the U.S. population (CDC, 2005). Other studies of farmworker oral health have used clinic samples or records (Lukes and Miller, 2002; Lukes and Simon, 2005) or have focused on children of farmworkers (Call et al., 1987; Chaffin et al., 2003; Nurko et al., 1998; Woolfolk et al., 1984).

While the existing research on adult farmworkers shows the high unmet needs for dental care that these workers experience, it has limitations. First, the existing research has been restricted to western areas with long traditions of having Latino farmworkers in residence, as well as Latino and Spanish-speaking residents in the general population (California and Colorado). It is therefore likely that these areas have greater service availability than areas with less experience with Latino farmworkers. The high rates of unmet needs in the West likely underestimate oral health problems in emerging Latino farmworker communities elsewhere in the U.S. Second, none of the research has attempted to assess the impact of these oral health deficits on farmworker quality of life. Lukes and Miller (2002) found that pain drove most treatment seeking and that the absence of pain was the primary reason for not seeking care on a regular basis. However, there have been no assessments of the prevalence of dental pain among farmworkers or the impact of pain on quality of life.

This article reports findings from a study of adult male farmworkers in North Carolina. Although North Carolina currently has the fifth largest farmworker population of any U.S. state and the farmworker population is overwhelmingly Latino (Larson, 2000), this population was largely African-American or Haitian until the 1990s. North Carolina itself (like much of the Southeast except Florida) had a small Hispanic population until the 1990s (Kochhar et al., 2005), and there is still a shortage of bilingual and culturally appropriate services. The study from which data were drawn focused on the relationship between oral health problems and farmworker quality of life (QOL). The goals were to (1) describe the oral health problems experienced and oral health care received by migrant farmworkers in North Carolina, and (2) explore the association between oral health and quality of life.

Methods

Data were collected in face-to-face interviews during June and July 2005 with 151 male farmworkers employed in Harnett, Johnston, and Sampson Counties, North Carolina. All interviewers were native Spanish speakers and former farmworkers. Participants were selected using a site-based sampling plan (Arcury and Quandt, 1999), which is a method for recruiting a representative sample in a population that is difficult to enumerate (Parrado et al., 2005; Faugier and Sargeant, 1997; Muhib et al., 2001). A list of farmworker camps in the study area was compiled with the assistance of the North Carolina Farmworkers Project (NCFP), a non-profit service organization. Interviewers visited the camps with members of the NCFP to explain that the survey would be conducted during the subsequent weeks. Upon later returning to the camps, interviewers obtained informed consent and recruited workers from 28 camps, enrolling 1 to 10 workers per camp, depending on total camp size. Upon completion of the interview, participants were given a non-monetary incentive (toothbrush, toothpaste, cap with study logo) valued at less than \$10.00. No names or other identifiers were recorded. Interviewers participated in a six-hour training session and completed practice interviews before being approved to conduct study interviews. Procedures for recruitment and data collection were approved by the Institutional Review Board of Wake Forest University School of Medicine.

All data collection instruments were interviewer-administered in Spanish. The interview included demographic and personal data (age, marital status, educational attainment, years resident in the U.S., years worked in agriculture, and location of permanent home), history of dental services received in the last year, current functional and cosmetic dental problems, and self-rated general and oral health.

For general health-related quality of life, participants also completed the 12-item Short-Form Health Survey (SF-12) (Ware et al., 1996), which has been cross-validated in a variety of populations and languages (Gandek et al., 1998). Two summary measures, the Physical Component Summary (PCS-12) and the Mental Component Summary (MCS-12) (Ware et al., 1996, 1998) were constructed. Regression weights and constants for scoring were derived from data from a sample of the general U.S. population; both scales were transformed to have a mean of 50, standard deviation of 10, and range of zero to 100 in the general the U.S. population (Ware et al., 1998). Higher scores reflect better QOL.

Oral health-related quality of life was assessed with the OHIP-14 (Slade, 1997), which combines seven domains of QOL. The Spanish version of the OHIP was produced by translation from the English version by a native Spanish speaker, followed by back translation and resolution of changes in meaning. Some further changes were made after

pretesting in the farmworker population to obtain the meaning closest to the original OHIP. The OHIP-14 contains 14 questions that each have a 5-point Likert-type scale (i.e., “very often” [code = 4], “fairly often” [code = 3], “occasionally” [code = 2], “hardly ever” [code = 1], or “never” [code = 0]) in which respondents are asked how frequently they have experienced the impact within the last 12 months. An overall score is computed by summing the responses to produce a total score ranging from 0 to 56, with higher scores indicating poorer oral health-related quality of life (Slade, 1997). Subscales for functional limitations, physical pain, psychological discomfort, physical disability, social disability, and handicap were calculated by summing responses to pairs of questions; scores range from 0 to 8 for each subscale.

Data Analysis

All data analysis was conducted using SPSS version 13.0 software (SPSS, Inc., Chicago, Ill.). Statistical analysis initially examined descriptive statistics for the demographic and personal variables, for the number of self-reported dental problems, and for the three quality of life measures (OHIP, PCS, and MCS). Two categorical demographic variables were recoded to reflect logical categories: educational attainment was recoded to primary, secondary, and greater than secondary; and marital status was recoded into a dichotomous variable “married or living as married” versus “not currently married.” Location of permanent home was a dichotomous variable, i.e., U.S. versus Mexico. Self-reported oral health problems were divided into functional (e.g., chewing) versus cosmetic (e.g., stained teeth) sums.

Bivariate relationships between the QOL measures and continuous predictor variables were then examined using Pearson correlations. For the categorical predictor variables (marital status, education, and location of permanent home), mean QOL scores were examined using ANOVA.

Three separate exploratory regression models were then performed to examine the association of demographic and personal measures and self-reported dental problems to QOL. In the first model, OHIP was regressed on the predictor variables to explore demographic differences in, and to determine if dental problems were associated with, oral health-related quality of life. In the remaining two models, PCS and MCS were regressed on the predictor variables, including OHIP, to determine if dental problems and oral health-related quality of life were associated with farmworkers physical and mental health-related quality of life.

Results

Workers ranged in age from 18 to 64 years, with a median age of 32 years (table 1). About a quarter of the sample was less than 25 years of age, and 17% were over 40 years. Over 78% were married or living as married. Over half the sample had only a primary education. All participants were born in Mexico, except for one person born in Puerto Rico. Forty-seven percent reported that this was their first year in the U.S.; about one quarter had been in the U.S. more than five years. About 16% reported that this was their first year working in agriculture. Over 41% had worked more than five years in agriculture. This sample represented a largely migrant worker population, as 92.7% reported that Mexico was their permanent home.

The most frequently reported current functional oral health problem was caries (52.3%), followed by sensitivity (40.4%) and problems with gums (39.7%) (table 2). Almost a third of the sample (32.5%) reported having missing teeth, and 30.0% reported fractured or broken teeth. Cosmetic problems were also common: 51.3% reported

Table 1. Description of sample; farmworkers in North Carolina, 2005 (N = 151).

		N	%
Age (years)	<25	36	24.0
	25-40	89	59.3
	>40	25	16.7
Marital status	Not currently married	33	21.9
	Married or living as married	118	78.1
Education	Primary	77	51.0
	Secondary	56	37.1
	Greater than secondary	18	11.9
Years in the U.S.	≤1	71	47.0
	1-5	44	29.1
	>5	36	23.8
Years worked in agriculture	≤1	24	15.9
	2-5	65	43.0
	>5	62	41.1
Location of permanent home	U.S.	11	7.3
	Mexico	139	92.7

staining or discoloration of teeth, and 28.5% had crooked teeth or needed braces. These problems remain largely untreated: only 31 (20.5%) farmworkers reported receiving dental services within the last year. Of those who received services, 12 (38.7%) had had fillings or other restorations and 6 (19.4%) had extractions. Two reported having received dental services in the U.S., and the remaining 29 received dental services in Mexico.

Table 2. Self-reported oral health problems, farmworkers in North Carolina, 2005 (N = 151).

Problem		N	%
Functional problems	Caries	79	52.3
	Sensitivity	61	40.4
	Problems with gums	60	39.7
	Missing teeth	52	34.7
	Broken/fractured teeth	49	32.5
	Broken/missing filling or restoration	43	28.5
	Teeth needing extractions	32	21.5
	Toothache	26	17.2
Denture problems	6	4.0	
Cosmetic problems	Staining/discoloration of teeth	77	51.3
	Crooked teeth/need braces	45	30.0
Number of functional problems reported	0	15	9.9
	1	33	21.9
	2	32	21.2
	3	20	13.2
	4	21	13.9
	5	16	10.6
	6	11	7.3
7	3	2.0	
Number of cosmetic problems reported	0	55	36.4
	1	68	45.0
	2	26	17.2

Table 3. OHIP subscales: means, standard deviations, and ranges (N = 151).

	Mean	SD	Range ^[a]
Functional limitations	0.21	0.72	0-4
Physical pain	0.78	1.54	0-8
Psychological discomfort	0.91	1.59	0-8
Physical disability	0.38	0.98	0-4
Psychological disability	0.40	0.98	0-5
Social disability	0.32	0.93	0-5
Handicap	0.19	0.66	0-4

[a] Potential range is 0-8; each subscale consists of two items scored 0-4.

Up to seven current functional problems were reported, with a median of two problems (table 2). Only 9.9% reported no current functional problems. No cosmetic problems were reported by 36.4% of workers; the median number of cosmetic problems reported was one problem. The distribution of functional and cosmetic problems was not related to farmworker age, educational attainment, length of time in the U.S., years worked in agriculture, or location of permanent home (data not shown).

Health-related quality of life, as indicated by the mean (\pm SD) of the SF-12, was 52.18 (\pm 4.70) for the physical component score (PCS) and 53.29 (\pm 7.85) for the mental component score (MCS). The average oral health-related quality of life (OHIP) score was 3.20 (\pm 5.55), reflecting a large number of persons with low scores (favorable QOL) and a smaller number with higher scores. The OHIP subscale with the highest mean (\pm SD) was psychological discomfort (being self-conscious or tense because of problems with teeth) (0.91 \pm 1.59), followed by physical pain (having painful aching or discomfort when eating) (0.78 \pm 1.54) (table 3). All other subscales averaged less than 0.40 (psychological disability, 0.40 \pm 0.98; physical disability, 0.38 \pm 0.98; social disability, 0.32 \pm 0.93; functional limitations, 0.21 \pm 0.72; and handicap, 0.19 \pm 0.66).

The OHIP total score was correlated with number of functional dental problems (Pearson correlation coefficient = 0.421; $p < 0.001$) and had a weak inverse correlation with age ($r = -0.124$; $p = 0.066$) (table 4). PCS scores were correlated with functional dental problems ($r = -0.279$; $p < 0.001$) and years in farmwork ($r = -0.171$; $p = 0.18$). The PCS had a weak association with age ($r = -0.113$; $p = 0.085$) and years lived in the U.S. ($r = -0.128$; $p = 0.060$). Poorer oral health-related quality of life was associated with poorer physical quality of life ($r = -0.199$; $p = 0.007$). The MCS was not associated with any of the predictors.

Based on the bivariate relationships, and confirmed by the exploratory multiple regressions, the number of explanatory variables was reduced, and a second set of regressions was performed predicting the quality of life measures. Only those predictor variables with $P < 0.10$ were included. These variables were age, years lived in the U.S.,

Table 4. Bivariate analysis: correlations of predictors of oral health-related (OHIP) and general physical health-related (PCS) quality of life, North Carolina, 2005 (N = 151).

	OHIP		PCS	
	r	p	r	p
Age	-0.124	0.066	-0.133	0.085
Years lived in the U.S.	-0.075	0.181	-0.128	0.060
Years in farmwork	0.021	0.398	-0.171	0.018
Alcohol consumption quantity and frequency	0.096	0.123	0.009	0.458
Number of functional dental problems	0.421	0.000	-0.279	0.000
OHIP	--	--	-0.199	0.007

Table 5. Simultaneous regression analyses predicting OHIP and physical health (PCS) quality of life (N = 150).

	OHIP		PCS	
	β	SE β	β	SE β
Functional dental problems	0.46***	0.22	-0.20*	0.23
Age in years	-0.20**	0.05	-0.03	0.05
Length of time in the U.S.	-0.05	0.10	-0.07	0.11
OHIP			-0.12	0.08
Years worked in agriculture			-0.09	0.11
R ²	0.207		0.077	
F	13.99		3.49	
P	<0.001		<0.01	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

and functional dental problems used to predict the OHIP, with the addition of the OHIP and years worked in agriculture for the PCS. No predictor variables met the established criteria for the MCS, so no further multiple regression predicting this variable was performed. Oral health quality of life was predicted by age ($\beta = -0.19$; $p < 0.01$) and number of functional dental problems ($\beta = 0.46$; $p < 0.001$) (table 5). Overall, 20.7% of the variance in oral health quality of life was explained by the model ($F = 13.99$; $p < 0.001$). The only significant predictor of physical health-related quality of life was number of functional dental problems ($\beta = -0.20$; $p < 0.05$); oral health-related quality of life was not associated with physical health-related quality of life after controlling for functional dental problems. Only 7.7% of the variance in physical health-related quality of life was explained by the final model ($F = 3.49$; $p < 0.01$).

Discussion

This is the first report of oral health conditions among farmworkers in the East Coast migrant stream. Although Poss and Meeks (1994) reported briefly on unmet needs among farmworkers in New York State in the context of overall health needs, our results present the first survey attempting to document these needs. While 52% reported functional problems because of caries, only 20% received dental services in the prior year. The high prevalence of reported unmet needs mirrors the two other existing surveys, one in Colorado almost two decades ago (Entwistle and Swanson, 1989) and the other in California more recently (Villarejo et al., 2000). Together, they suggest that little progress has been made in meeting the oral health needs in this vulnerable population. The present study adds to the literature by demonstrating that dental needs are unmet in an area where the Latino population is relatively new. Barriers to dental services among farmworkers documented elsewhere include communication difficulties, financial hardship, lack of insurance, employment in remote rural areas, and lack of transportation (Arcury and Quandt, in press; Lukes and Miller, 2002). Further research to understand the barriers to dental services for farmworkers on the East Coast is needed. Because access to dental care is a problem for many non-farmworker rural residents, particularly those with low incomes (Casey et al., 2004), research should determine whether farmworkers are better or worse off than other rural residents and identify factors that contribute to any disparity.

This article also adds to the literature by documenting oral health QOL in farmworkers. The OHIP QOL measure produced results that are expected when a health-related QOL for a specific health problem is administered in a general population, rather than a clinic sample. That is, a large number of individuals had relatively few

problems and, therefore, good quality of life. However, a small number of persons had serious problems, and had high OHIP scores reflecting poor oral health-related quality of life.

Our research goes beyond existing farmworker studies to consider the effects of dental problems on QOL. Functional, not cosmetic, problems affect QOL. The effects are strongest for oral-health related QOL and for physical health-related general QOL. There is no association between number of functional oral health problems reported and mental health-related QOL. In examining the OHIP subscales, it is notable that the subscales with the strongest associations to functional problems include being tense and self-conscious because of dental problems and experiencing pain. Previous work has found that pain served as the indicator to farmworkers that they needed to seek dental care (Lukes and Miller, 2002). The findings from the OHIP in the present study suggest that, while pain may drive farmworkers to seek treatment, the effects of dental problems are broader and include psychological distress. Studies in other populations have shown that dental health affects the ability to work and sleep (Adulyanon et al. 1996; Anderson and Thomas, 2003). It is reasonable to assume that workers experiencing pain may be less attentive to work and may sleep less, both leading to safety concerns. To the extent that dental problems impair ability to eat, there may be broader health effects due to poor nutritional status. Future health consequences are likely, as impaired dentition is a mediator in poor nutritional status and periodontal inflammation, both having a role in cardiovascular disease (Cabrera et al., 2005; Hung et al., 2004, 2005; Joshipura and Ritchie, 2005).

This study should be interpreted in light of its limitations. Participants were recruited only from eastern North Carolina. Although the generalizability of this study population cannot be confirmed, it is similar to national data (Carroll et al., 2005) with respect to ethnicity, language, and low educational status. The OHIP instrument has not been validated in Spanish. Nevertheless, it has been successfully translated into many other languages, and the pattern of associations with self-reported oral health problems and the SF-12 were as expected. Data were collected by self-report and were not confirmed by dental exams. However, perceived treatment needs and oral examination data were both collected by Entwistle and Swanson (1989), and they were in close agreement. This suggests that self-reported unmet needs can highlight general areas of oral health problems. Others have compared self-reports and clinical examinations and found high agreement in number of teeth, unsound fillings, and decayed teeth, as well as need for dental treatment (Roberts-Thomson and Allister, 1993; Robinson et al., 1998; Todd and Lader, 1998). While self-report data cannot replace clinical assessment for defining individual treatment needs, self-reports are of value in assessing community-level needs among adults. Although this study documents how few farmworkers have received care, the interviews did not explore why that is the case. However, other researchers have done so for the farmworker population across the country and have noted barriers such as language and insufficient staffing of clinics (Lombardi, 2001). Further research is needed to verify those findings in the study locale.

Limitations notwithstanding, this study has several strengths. It uses a site-based sampling strategy to obtain a representative sample (Arcury and Quandt, 1999). Such plans have increasingly been used in public health work with hard-to-find populations (Faugier and Sargeant, 1997; Muhib et al., 2001; Parrado et al., 2005) and resemble the plans used by the two existing surveys of oral health among farmworkers (Villarejo et al., 2000; Entwistle and Swanson, 1989). The instruments, SF-12 and OHIP-14, have been used in a variety of populations and in multiple languages. Finally, bilingual interviewers who were former farmworkers conducted the interviews. They achieved a high level of cooperation with the participants.

The most recent data from the National Agricultural Workers Survey show that workers today are migrating less and not returning to their country of origin (Carroll et al., 2005). Although a study of health care seeking in California found that workers preferred to obtain dental care in Mexico because of lower fees and perceived simpler procedures (CIRS, n.d.), the changes in migration mean that it cannot be assumed that dental care will be obtained elsewhere. With these unmet needs documented and implications suggested, policy and practice can be influenced. States and communities with large farmworker populations need to address the need for farmworker residents to obtain dental care.

Overall, this study points to the major unmet needs for dental care in the farmworker population and its negative effect on QOL. The effects on work performance are unknown. Poor oral health, with its contribution to later chronic disease and overall health, is likely to be a major contributor to health disparities experienced by the migrant and seasonal farmworker population in the U.S.

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