



ORIGINAL ARTICLE

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Receipt: 08/18/2016 **Revised:** 08/30/2016
Acceptance: 09/14/2016 **Online:** 09/14/2016

Factors associated with the use of dental health services in primary care in northeastern Mexico.

Abstract: In Mexico, as in many other Latin American countries, the use of dental health services (UDHS) has been scarcely studied, especially the one related with groups that are considered at risk in certain areas. The aim of this study was to evaluate the factors associated with UDHS in an at risk population in primary care. **Material and Methods:** Cross-sectional study, involving students (T), pregnant women (PW), workers (W) and older adults (OA) (n=368). Variables such as the use of dental health services and factors such as geographical, economic, and organizational barriers were measured. Descriptive statistics, Chi Square test and multivariate binary logistic regression analysis were used. **Results:** 40.2% (95% CI 30.2-50.2) of the W group had a history of UDHS in primary care, 20% (95% CI 11.8-28.2) of the PW group had spent more than a year without visiting the dentist and 33% (95% CI 23.7-43.9) had been treated at a private dental care service. Level of schooling, occupation, federal support from "Programa Oportunidades" and access to dental care services ($p < 0.01$) were factors associated with UDHS, independent of potential confounders. **Conclusion:** The health system should guarantee health care by offering comprehensive dental health services and removing organizational barriers to promote a more equitable access to dental care.

Keywords: *Accessibility to health services, Dental health services, Risk groups, México.*

DOI: 10.17126/joralres.2016.053.

Cite as: Cruz G, Núñez G, Salinas A, Ramos E & Sánchez R. Factors associated with the use of dental health services in primary care in northeastern Mexico. *J Oral Res* 2016; 5(6): 240-247.

INTRODUCTION.

Health systems are responsible for managing and providing primary health care, and particularly dental care, in most countries. Health services must be available to provide an organized social response to the needs of the population in order to achieve efficiency and equality.¹ The use of health care services is motivated by need. There are models that alone or combined explain that particular need. The market economy model explains dental health care, because the access and use of dental care services is regulated by market economy and involves many intervening factors.^{2,3}

Several factors associated with the use of dental health

services (UDHS) have been identified, such as "accessibility", which is the degree of fit between the characteristics of health care resources and the population in need of care.⁴ This may be hampered by geographical barriers such as perceived travel time and means of transport to reach the health center. There are also economic factors, such as the cost of transport and the perception of such spending, organizational barriers such as waiting time for care, the way patients are treated by the medical staff, availability of dentists, dental materials and the psychological barrier of not wanting to return to the dentist's practice.^{4,5} In addition, sociodemographic characteristics have been associated with dental health needs that affect

UDHS such as: age, sex, level of schooling, occupation, income and support from federal programs.⁴⁻⁸

In Mexico, dental health care service is available at public institutions where people find essentially basic preventive care and receive some simple treatments such as fillings and extractions, but no restorative treatments. In the field of private dental care, a wide range of services are available, but they are usually very expensive for patients. This affects the most economically vulnerable population in greater need of care^{8,9}. Thus, UDHS in primary care is one of the most complex and least recognized problems, and one that exposes social inequality.

Access and use of health services has been studied in Mexico and many other Latin American countries. However, there has been very little research on UDHS^{3,5}. Research in this field is essential to propose courses of action aimed at improving access to dental health services, not only for preventive care, but also for restorative treatments to respond to the needs of the population¹⁰.

The aim of this study was to evaluate the factors associated with UDHS in primary care by groups of epidemiological interest in dental health care in northeastern Mexico.

MATERIALS AND METHODS.

Study Design

A cross-sectional study was conducted in northeastern Mexico from September 2013 to January 2014.

Population and sample size

The study population consisted of four groups of interest regarding oral health. Four sample sizes were calculated using the formula to estimate an a priori ratio of 50%, in an infinite population with an expected 5% error and 95% confidence interval. A total of 368 individuals were evaluated. The distribution of the sample was proportional to each of the four groups; students of 6 to 12 years (T, n=92), pregnant women (PW, n=92), active workers (W, n=92) and people over 60 (OA, n=92). Temporary immigrants who have lived less than a year in the area were excluded.

The study was approved by the local ethics and research committee of the School of Public Health and Nutrition at Universidad Autónoma de Nuevo Leon, Mexico, registration number 12-FaSPyN-SA-17.

Variables

UDHS in primary care was measured with the following questions: *Have you used some type of dental health care service in primary care?* (yes or no); *When was the last time you visited the dentist?* (less than a year, a year ago, more than a year), and *the place where you were treated* (social security/popular insurance, welfare brigade or private care).

The health care access barriers evaluated were:

a) Geographical: approximate distance between your place of residence and the dental practice the last time you visited the dentist's (in minutes), perceived travel time (long, regular or little), and means of transport (walking, public transport, car).

b) Economic: approximate cost of transport the last time you used a dental service and perceived expense in dollars (high, normal, low).

c) Organizational: approximate waiting time for care the last time you used a dental service (in minutes), perceived amount of waiting time (long, regular, little) and perceived service quality (*Would you be willing to return to receive dental care?* yes or no).

Sociodemographic variables of interest were evaluated: age (in years), sex (male or female), marital status (single, cohabiting, married or widowed), education (none, primary, secondary, secondary or higher education) paid employment: (yes or no), monthly family income (greater than two minimum wages or equal to or less than two minimum wages), being a resident immigrant (living more than 10 years in the area) (yes or no), speaking indigenous language (yes or no), have social security or popular insurance (yes or no), being beneficiary of federal support "*Programa Oportunidades*"¹¹ (yes or no), monthly family income, monthly health spending and monthly dental health spending estimated in dollars.

Questionnaire items were written in simple language, avoiding technical terms and subjected to expert consensus to validate their content. Prior to the final application several tests were made to make sure they would be understood by participants.

Many households were visited consecutively on different days (including Saturdays and Sundays) and at various times (morning and evening) in the previously identified geographical area. If in any given household there was more than one person eligible for the study, one of them was randomly selected to participate in the study. Three trained and standardized pollsters conducted the survey. They collected data by doing interviews after participants have signed the informed consent. In the case of students, the informant was

the mother, father or guardian.

Statistical analysis

A descriptive analysis of the following sociodemographic variables was performed: mean and standard deviation for non-categorical variables, absolute and relative frequencies for categorical variables and 95% confidence intervals (CI). A bivariate analysis was performed to establish the relationship between the use of dental services in primary care with each of the sociodemographic variables using chi-square test. A multivariate analysis was conducted using binary logistic regression to control confounders. Statistical analysis was performed with SPSS 20.0 (IBM, USA). In all cases $p < 0.05$ was considered to be significant.

Table 1. Sociodemographic and economic characteristics in groups of dental epidemiological interest in northeastern Mexico (n=368).

Characteristic	Groups			
	Students* (n=92) IC95%	Pregnant women (n=92) IC95%	Workers (n=92) IC95%	Older Adults (n=92) IC95%
Age (mean in years)	11.3±7.7	25.1±6.0	32.8±8.6	66.7±8.0
Sex	Male	42.4% (32.3-52.5)	0.0%	66.3% (56.6-76.0)
	Female	57.6% (47.5-67.7)	0.0%	33.7% (24.0-43.4)
Marital status	Single	0.0%	17.4% (9.7-25.1)	10.9% (4.5-17.3)
	Married	0.0%	44.6% (34.4-54.8)	51.1% (40.9-61.3)
	Cohabiting	0.0%	33.7% (24.0-43.4)	29.3% (20.0-38.6)
	Divorced	0.0%	4.3% (0.2-8.4)	8.7% (2.9-14.5)
Schooling	None	2.2% (-0.8-5.2)	2.2% (-0.8-5.2)	2.1% (-0.8-5.0)
	Primary	82.6% (74.9-90.3)	50.0% (39.8-60.2)	35.9% (26.1-45.7)
	Secondary	14.1% (7.0-21.2)	40.2% (30.2-50.2)	52.2% (42.0-62.4)
	Secondary and higher	1.1% (-1.0-3.2)	7.6% (2.2-13.0)	9.8% (3.7-15.9)
Occupation	Student	81.5% (73.6-89.4)	1.1% (-1.0-3.2)	0.0%
	Worker	0.0%	2.2% (-0.8-5.2)	45.7% (35.5-55.9)
	Trader	1.1% (-1.0-3.2)	1.1% (-1.0-3.2)	37.4% (27.5-47.3)
Resident immigrant	23.9% (15.2-32.6)	23.8% (15.1-3.5)	24.5% (15.7-33.3)	36.4% (26.6-46.2)
Speaks indigenous language	2.2% (-0.8-5.2)	6.5% (1.5-11.5)	3.3% (-0.4-7.0)	4.3% (0.2-8.4)
Has social security and/or popular insurance	97.5% (94.3-100)	96.0% (92.0-100)	94.3% (89.6-99.0)	98.7% (96.4-100)
Has federal support from "Programa Oportunidades"	55.6% (45.4-65.8)	35.9% (26.1-45.7)	53.3% (43.1-6.5)	39.1% (29.1-49.1)
Monthly family income (Average in USD)	269.7±69.4	255.4±71.7	261.8±89.0	256.2±91.9
Monthly health spending (Average in USD)	2.5±0.4	5.6±0.5	5.4±0.5	4.2±0.4
Monthly dental health spending (Average in USD)	0.1±0.9	0.7±2	0.4±1	0.3±1

*In the characteristics education, occupation, migration and speaks indigenous language, information about the person responsible for the child was considered.

Table 2. Use of dental health services in groups of dental epidemiological interest in northeastern Mexico (n= 68).

Characteristic	Students* (n=92) IC95%	Pregnant women (n=92) IC95%	Workers (n=92) IC95%	Older adults (n=92) IC95%
Use of dental health services in primary care	53.3% (43.1-63.5)	46.7% (36.5-56.9)	40.2% (30.2-50.2)	43.5% (33.4-53.6)
Time since the last time you visited the dentist				
Less than a year	67.3% (57.7-76.9)	51.1% (40.9-61.3)	57.1% (47.0-67.2)	60.0% (50.0-70.0)
A year ago	22.4% (13.9-30.9)	28.9% (19.6-38.2)	31.0% (21.5-40.5)	22.5% (14.0-31.0)
More than a year	10.3% (4.1-16.5)	20.0% (11.8-28.2)	11.9% (5.3-18.5)	17.5% (9.7-25.3)
Place you used the last time you sought for dental care				
Social security/popular insurance	40.8% (30.8-50.8)	40.0% (30.0-50.0)	61.9% (52.0-71.8)	42.5% (32.4-52.6)
Welfare brigade	53.1% (30.0-50.8)	26.7% (17.7-35.7)	23.8% (15.1-32.5)	42.5% (32.4-52.6)
Private services	6.1% (1.2-11.0)	33.3% (23.7-42.9)	14.3% (7.1-21.5)	15.0% (7.7-22.3)

*In the characteristics education, occupation, migration and speaks indigenous language, information about the person responsible for the child was considered.

Table 3. Access barriers to use dental services by groups of dental epidemiological interest in northeastern Mexico (n=169).

Characteristic	Groups				
	Student* (n=49) IC95%	Pregnant women (n=43) IC95%	Workers (n=37) IC95%	Older adults (n=40) IC95%	
Geographic aspects					
Travel time (average in minutes)	36.2±37	51.5±34	47.1±36	42.2±34	
Perceived travel time	Long	36.8% (23.3-50.3)	55.6% (40.7-70.5)	38.1% (22.5-53.7)	42.5% (27.2-57.8)
	Regular	20.4% (9.1-31.7)	15.6% (4.8-26.4)	23.8% (10.1-37.5)	57.5% (42.2-78.8)
	Little	42.8% (28.9-56.7)	28.8% (15.3-42.3)	38.1% (22.5-53.7)	37.5% (22.5-52.5)
Means of transport	Walking	53.1% (39.1-67.1)	0.0%	7.1% (-1.2-15.4)	0.0%
	Public transport (autobus)	46.9% (32.9-60.9)	73.3% (60.1-86.5)	61.9% (46.3-77.5)	55.0% (39.6-70.4)
	Car	0.0%	26.7% (13.5-39.9)	31.0% (16.1-45.6)	45.0% (29.6-60.4)
Economic aspects					
Spending on transport (USD)	0.92±1.1	1.7±1.4	1.5±1.2	1.3±1.4	
Perceived spending on transport	High	65.0% (51.6-78.4)	35.6% (21.3-49.9)	30.4% (15.6-45.2)	35.0% (20.2-49.8)
	Regular	26.0% (13.7-38.3)	33.3% (19.2-47.4)	57.7% (41.8-73.6)	47.5% (32.0-63.0)
	Low	9.0% (1.0-17.0)	31.1% (17.3-44.9)	11.9% (1.5-22.3)	17.5% (5.7-29.3)
Organizational aspects					
Perceived quality and waiting time	High	53.0% (39.0-67.0)	24.4% (11.6-37.2)	54.8% (38.8-70.8)	72.5% (58.7-86.3)
	Regular	20.4% (9.1-31.7)	33.3% (19.2-47.4)	26.2% (12.9-40.4)	15.0% (3.9-26.1)
	Little	26.6% (14.2-39.0)	42.3% (27.5-57.1)	19.0% (6.4-31.6)	12.5% (2.3-22.7)
Dentist's availability	Yes	42.9% (0.32-0.53)	51.1% (0.40-0.61)	57.1% (0.46-0.67)	52.5% (0.42-0.62)
	No	57.1% (0.46-0.57)	48.9% (0.38-0.59)	42.9% (0.32-0.53)	47.5% (0.37-0.57)
Materials availability	Yes	69.4% (0.59-0.78)	57.8% (0.47-0.67)	78.6% (0.70-0.86)	55.0% (0.44-0.65)
	No	30.6% (0.21-0.40)	42.2% (0.32-0.52)	21.4% (0.13-0.29)	45.0% (0.34-0.55)
Perceived quality of service	Poor	0.0%	8.8% (0.3-17.3)	66.7% (51.5-81.9)	47.5% (32.0-63.0)
	Regular	28.6% (15.9-41.3)	30.8% (17.0-44.6)	26.2% (12.0-40.4)	45% (29.6-60.4)
	Good	71.4% (58.7-84.1)	60.4% (45.8-75.0)	7.1% (-1.2-15.4)	7.5% (29.6-60.4)
Would not return to the same dental center	22.4% (0.13-0.30)	40.0% (0.29-0.50)	90.5% (0.84-0.96)	35.0% (0.25-0.44)	

*Informant: mother, father or guardian

Table 4. Relationship between sociodemographic characteristics and associated factors for the use of dental health services in primary care (n=368).

Characteristic		Yes n (%)	No n (%)	χ^2	p
Group	Students	49 (29.0)	43 (21.6)	3.4	0.332
	Pregnant women	43 (25.4)	49 (24.6)		
	Workers	37 (21.9)	55 (27.6)		
	Older adults	40 (23.7)	52 (26.2)		
Sex	Male	60 (35.5)	78 (39.2)	0.5	0.271
	Female	109(64.5)	121(60.8)		
Marital status	Singer	58 (34.3)	58 (29.2)	5.7	0.223
	Cohabiting	32 (18.9)	51 (25.6)		
	Married	64 (37.9)	71 (35.7)		
	Divorced	10 (5.9)	7 (3.5)		
	Widowed	5 (3.0)	12 (6.0)		
Schooling	None	2 (1.1)	17 (8.5)	110	0.012
	Primary	101(59.8)	118(59.3)		
	Secondary	55 (32.5)	55 (27.6)		
	Secondary and high	11 (6.6)	9 (4.6)		
Occupation	Paid	147(73.9)	115(68.0)	3.56	0.038
	Unpaid	52 (26.1)	54 (32.0)		
Monthly Family Income	Larger than two minimum wages	147(73.9)	115(68.0)	1.51	0.133
	Equal to o lower than two minimum wages	52 (26.1)	54 (32.0)		
Speak indigenous language	Yes	61 (36.1)	82 (41.2)	1.0	0.193
	No	108(63.9)	117(58.8)		
Do you get federal support from "Programa Oportunidades"	Yes	92 (54.4)	77 (38.7)	9.1	0.002
	No	77 (45.6)	122(61.3)		
Do you have dental health care service	Yes	106(71.0)	46 (28.8)	38.9	0.001
	No	63 (29.0)	106(71.2)		

RESULTS.

The mean age of all respondents was 34±21 years; 62.5% were women, and 36.7% were married. Table 1 shows demographic and socioeconomic characteristics by group.

Table 2 shows the characteristics of UHDS by category for each group. Table 3 shows UHDS access barriers in the 169 respondents who reported having experienced such barriers. In the bivariate analysis, secondary or higher education ($p=0.012$), paid employment ($p=0.03$), federal support from "Programa Oportunidades" ($p=0.002$) and having dental health care services ($p=0.0001$) were identified as factors associated with UHDS. Other factors are shown in Table 4.

In multivariate analysis, secondary or higher education

($p=0.033$), paid employment (0.012), federal support from "Programa Oportunidades" ($p=0.04$) and having dental health care services ($p=0.019$) showed a significant effect on UHDS, independent of age, sex, marital status, income and speaking indigenous languages.

DISCUSSION.

This study presents results of UDHS in primary care and associated factors in different groups of epidemiological interest.¹²⁻¹⁴ In most of them, UDHS was less than 50%, which is different from the 60.2% observed in a study conducted in Spain in a population under 15 years of age, who lived in communities where a health care program aimed at this specific risk group was implemented.⁷

The most relevant factors observed in this study are related to geographical barriers, since most of the respondents used public transport and they perceived from regular to high the cost of using it. Specifically the group of PW spent on average 1.7 USD, equivalent to 60% of the local minimum daily wage. A previous study conducted in the State of Tamaulipas¹⁴ located in the same geographic region of northeastern Mexico, revealed people had lower spending on transport, and the population included in the study did not come from an economically vulnerable group as the participants in this study. These results show evidence of inequality between populations, where those who need the most are also those who pay the highest cost. On the other hand, the PW group estimated travel time close to an hour and most of those interviewed perceived it as too long, similar to the results obtained in the study conducted in Tamaulipas.¹⁴

Regarding economic access barriers, monthly family income was ranked in the fourth decile group reported for the state of Nuevo Leon, Mexico, from 391.3 to 623 USD in average.¹⁵ It was found that between 6% and 30% used private dental services, which would not be the case if a universal state coverage were implemented. The latter has not been observed in any country.¹⁶ An example of difference in access to dental care is reported by a study in Brazil.¹⁷ The study shows strong inequality in students and older adults living in marginal urban areas. The impact on dental health was directly related to their income level. This situation represents a serious problem, because if the population stops seeking dental care due to the lack of health insurance or financial support, there will be severe consequences for their dental health in the long term, involving a higher health spending in the future.¹⁸⁻²¹ It has been established that in high-income countries, traditional curative dental care represents a significant financial burden from 5% to 10% of public health spending.^{16,22,23}

Regarding organizational barriers, between 10% and 20% has spent more than a year without visiting a dentist, especially PW and OA. This is despite the fact that more than 35% of them were receiving federal support from

"Programa Oportunidades". Beneficiaries of this program have the responsibility of visiting the dentists at least once in a year. In a similar study conducted in Spain, 39.7% of students had not attended a dental care service in a year, although this may be explained because Spanish children had healthy habits such as tooth brushing.⁷

Although most of W were beneficiaries of social security, they did not use dental care services. This is probably due to geographical and organizational access barriers, considering that their employment situation is precarious. In a study in Mexican cooperatives, sociodemographic variables were associated with lack of access to dental health.¹⁰ In Brazil, it was established that about 40% of pregnant women and 67% of older adults had not used dental health services in the past three years prior to the interview. However, in Brazil, a dental health policy named *"Smiling Brazil"*¹⁷ and aimed at groups of epidemiological interest was proposed and implemented.

Sometimes when patients arrive at the health center, there are not dentists or dental material available. This situation is similar to that reported in Colombia, where organizational barriers such as opening hours, lack of availability of dentists and difficulty to get an appointment were reported.²⁴

Almost all the groups studied estimated an average of 60 minutes of waiting time at the dental practice. This contrasts with Cuba, where 77.8% of PW estimated less than 15 minutes of waiting time on average to receive treatment in each of the visits, as there is a specific medical-care program for PW.¹³ Paradoxically, in the present study PW did not perceive waiting time as being too long; this may be because patients are "accustomed" to wait.¹⁸

The 72.5% of OA perceived waiting time as long, 47.5% perceived poor quality of service, and 35% said they would not return to the same health center. A similar study found that OA in Cuba were the least frequent group attending dental health services and were the most dissatisfied.²⁵ The same was reported in Chile, where it was established that the group with the least access to UDHS was OA.²⁶

A high percentage of people were unschooled or had only

primary education. This is relevant, since schooling was a factor associated with UDHS, probably because lack of education makes it difficult to obtain a formal paid employment and therefore have limited access to dental health services.²⁷⁻²⁹ Another associated factor was being a beneficiary of the "Programa Oportunidades", one of the most important programs in the country, which includes among its benefits, dental care. However, only one third of the PW and OA have such support. The rest of the population have only limited access to dental health services and suffer the effects of the marked inequalities in dental health care services.¹¹

One limitation of this study was choosing only one family member to represent each surveyed household. Another limitation was the possible recall bias regarding UDHS. However, its strength lays in having been

conducted in an open population and not just users of health services.

CONCLUSION.

Geographical, economic and organizational access barriers were identified. It was established that secondary or higher education, paid employment, being a beneficiary of "Programa Oportunidades", and the availability of health services were factors associated with UDHS.

ACKNOWLEDGEMENTS.

The authors would like to thank the Head of the Jurisdiction No. 2 of the Ministry of Health in Nuevo Leon, Mexico: Dr. David Soto Gómez and health promoters of the Colonia Alianza Real del Municipio de Gral. Escobedo, Nuevo León, Mexico

Factores asociados al uso de servicio de salud dental en atención primaria en el noreste de México.

Resumen: En México, como en muchos otros países latinoamericanos, se ha estudiado escasamente el uso de servicio de salud dental (USSD) especialmente el relacionado con grupos considerados de riesgo en dicha área. El objetivo fue evaluar los factores asociados al USSD en atención primaria en grupos de riesgo. Material y Métodos: Estudio transversal, participaron escolares (E), mujeres embarazadas (ME), trabajadores (TA) y adultos mayores (AM) (n=368). Se midieron variables de uso de servicio y factores asociados como barreras de acceso de origen geográfico; económico y organizacional, Se aplicó estadística descriptiva, chi cuadrada y análisis multivariado con regre-

sión logística binaria. Resultados: El 40.2% (IC95% 30.2-50.2) del grupo de TA tenía el antecedente de USSD en atención primaria, el 20% (IC95% 11.8-28.2) del grupo de ME tenía más de un año sin acudir al odontólogo y el 33% (IC95% 23.7-43.9), había acudido a servicio de salud privado para resolver problema de salud dental. La escolaridad, ocupación, apoyo federal del "Programa Oportunidades" y contar con servicios de salud dental ($p<0.01$), fueron factores asociados al USSD independiente de confusores potenciales. Conclusión: El sistema de salud debiera garantizar la atención ofreciendo servicios integrales de salud dental y eliminar barreras de acceso organizacionales para favorecer que los servicios de consulta dental sea más equitativos.

Palabras clave: Accesibilidad a los servicios de salud, Servicios de salud dental, Grupos de riesgo, México.

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