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Maternal characteristics and treatment needs as predictors of dental health services utilisation among Mexican school children

ABSTRACT

Aim To determine whether maternal characteristics and treatment needs are associated with dental health services utilization (DHSU) in school children.

Material and methods A cross-sectional study in 1373 school children aged 6-12 years in elementary schools in Campeche, Mexico collected family and sociodemographic characteristics; an oral examination was conducted. The dependent variable was DHSU in the year preceding the study.

Results DHSU prevalence was 65.5%. The variables associated ($p < 0.05$) with DHSU in the final multivariate model were age (OR=1.27), maternal schooling (OR=1.07), mother's attitude toward oral health (OR=1.39), frequency of tooth brushing (OR=1.83),

enamel defects (OR=1.55), and unmet oral health needs (moderate: OR=1.42 and high: OR=2.30).

Conclusion Specific sociodemographic and maternal variables were associated with DHSU. Strategies are needed to increase appropriate and timely use of services to improve health status.

Keywords Oral Health, Dental Health Services, Dental Health Needs.

Introduction

The model proposed by Andersen and Davidson [2007] allows us to study dental health services utilization (DHSU). This model divides variables into three groups:

- a) predisposing variables, which are characteristics leading to a higher probability of services use;
- b) enabling variables, which complicate or facilitate DHSU;
- c) need variables, which represent a change in health status.

Theoretically all of these variables influence the behaviour of the individual while he or she is searching for services. For example, prior studies on children and adolescents have shown that DHSU is affected by a variety of factors such as health insurance, age, sex, parents' schooling, race, tooth brushing frequency, socioeconomic variables, and oral health needs, both self-perceived and evaluated by health care workers [Medina et al., 2009; Noro et al 2008; Pontigo et al., 2012]. Health features among children and adolescents are more closely related to the mother than to the father, and perhaps constitute some of the best indicators to measure health inequalities among children. Cases in point, a higher level of schooling in mothers is associated with general health [Wamani et al., 2004], as well as oral health and DHSU of their children [Medina et al., 2008]. The few studies addressing coverage and DHSU in Mexico have accrued information about use and demand of health services [Medina et al., 2009; Pontigo et al., 2012] starting with the consistent finding that while many do not regularly use dental services, this is more marked among people with low socioeconomic status.

The objective of this study was to further characterise how sociodemographic, family, and treatment variables were related to children's DHSU.

Methods and materials

The study was given ethical approval by the

Universidad de Campeche to protect participants. A cross-sectional study was performed on school children aged 6 to 12 in the city of Campeche, Mexico. It is a secondary analysis of data from schoolchildren attending four elementary schools; the methodology has been reported elsewhere [Vallejos et al., 2007; 2008]. Briefly, consent forms were distributed to father/mother/tutors, inviting 1,603 children to participate. Response rate was 87.5%. After applying inclusion/exclusion criteria we ended with a sample of 1,373 children (85.7% from the original population).

The dependent variable was DHSU by children, categorised as 0="no DHSU" and 1="at least once in the 12 months prior to the study". Using a questionnaire for the mothers we documented age, sex, tooth brushing frequency, mother's level of schooling, and mother's attitude toward her son's/daughter's oral health. All child participants were clinically examined (kappa=0.92). Rather than using DMFT/deft indices (better suited for populations with less heterogeneous access to care) we used an index validated for Mexico and Nicaragua that summarises caries experience in four categories [Medina et al., 2008]. We used the developmental dental enamel (DDE) index to classify enamel defects [FDI, 1982].

After univariate analyses, logistic regression was used for bivariate and multivariate analyses, presented as odds ratio (OR) and 95% confidence intervals (95%CI), to determine the strength of association of independent variables with DHSU; we followed accepted procedures [Bagley et al., 2001]. Data were analysed using Stata 9.0®.

Results

Table 1 indicates that 65.5% of children reported having seen a dentist at least once during the year prior to the study. Average age was 8.8±1.8 years and 51.3% were females. Bivariate analyses showed that age, level of schooling, tooth brushing frequency, and caries severity were variables significantly related to DHSU.

Table 2 presents the multivariate logistic regression model. For each year of age, the probability of DHSU increased 27% (p<0.05). For each year of increasing mother's schooling, DHSU increased 7% (p<0.05). The odds of visiting a dentist for those children with mothers endowed with a positive attitude toward oral health were 1.39 (p<0.05) greater. Children who

VARIABLE	MEAN±SD	LIMITS	OR (95% CI)	P VALUE
Age (years)	8.8±1.8	6 – 12	1.21 (1.10 – 1.33)	0.000
Mother's schooling (years)	8.9±4.1	0 – 20	1.06 (1.02 – 1.09)	0.001
	n	%		
Sex				
Boys	669	48.7	1*	
Girls	704	51.3	0.90 (0.75 - 1.08)	0.244
Mother's attitude toward oral health of child				
Negative	373	27.2	1*	
Positive	1000	72.8	1.24 (0.94 - 1.64)	0.127
Tooth brushing frequency				
< 3 times/day	251	18.3	1*	
Every day 3 times/day	1122	81.7	2.04 (1.48 - 2.80)	0.000
Enamel defects				
Not present	1270	92.5	1*	
Present	103	7.5	1.61 (0.97 - 2.66)	0.063
Caries severity categories				
1	608	44.3	1*	
2	261	19.0	0.96 (0.81 - 1.14)	0.650
3	309	22.5	1.26 (1.12 - 1.43)	0.000
4	195	14.2	1.66 (1.29 - 2.13)	0.000
*Reference category Note: 95% CI were estimated with robust standard errors (school clustering).				

TABLE 1 Distribution of variables included in the study.

VARIABLE	OR	95% CI	P VALUE
Predisposing factors			
Age (age)	1.27	1.17 – 1.38	<0.001
Tooth brushing frequency			
< 3 times/day	1*		
Every day 3 times/day	1.83	1.39 - 2.40	<0.001
Mother's attitude toward oral health of child			
Negative	1*		
Positive	1.39	1.12 - 1.72	0.003
Enabling factors			
Mother's schooling (years)	1.07	1.03 – 1.10	<0.001
Health needs			
Enamel defects			
Not present	1*		
Present	1.55	1.02 - 2.37	0.042
Caries severity categories			
1 and 2	1*		
3	1.42	1.28 - 1.57	<0.001
4	2.30	1.80 - 2.94	<0.001
*Reference category Note: 95% CI were estimated with robust standard errors (school clustering). Goodness of fit test: Hosmer-Lemeshow $\chi^2(8) = 9.70$; $p = 0.2870$ Specification error test: linktest estimator $p = 0.000$, estimator ² $p = 0.526$			

TABLE 2 Multivariate logistic regression analyses for dental health services utilisation.

reported a high tooth brushing frequency had a higher probability of having one visit to the dentist (OR=1.83; $p<0.05$). Children with DDE had a higher frequency of dental visits (OR=1.55; $p<0.05$). Finally, children with a high caries burden (moderate: OR=1.42; and high: OR=2.30; $p<0.05$) had considerably higher probabilities of visiting the dentist.

Discussion

The present research showed that two thirds of these Mexican children (65.5%) had visited the dentist in the year prior to the study. DHSU was associated with characteristics of the mother, such as her maximum level of schooling and her attitude toward the importance of the child's oral health.

This is not a study representing the entire population in Mexico, just as other studies discussed below are not representative of Latin American countries. DHSU was higher than the one reported for Mexican 6 to 13 year-olds, for whom a DHSU of 46.2% was reported in the year prior to the study [Medina et al., 2004]. However, when we compared results with children 6 to 12 years old in Northwest Mexico [Medina et al., 2009], they turned out to be essentially the same: 65.7%.

A study in Nicaragua with children in the same age group as the present one reported a lower proportion (46.1%) [Medina et al., 2008]. Other studies carried out in Brazil [Noro et al., 2008] showed DHSU figures between 33.2% and 52.2%. One consistent finding was the relationship between age and DHSU [Medina et al., 2008; 2009], just as we found. If we were to take all age groups into a DHSU study, we would find age associated to DHSU in shape of a "bell"; in essence meaning that little DHSU would take place in the first two years of life but then prevalence would increase with age simply because as more teeth erupt, they pose more oral health needs – all other things being equal.

Many diseases follow a gradient relationship with socio-economic status. Oral diseases are no exception [Medina et al., 2008; 2009; Vallejos et al., 2007; 2008; Pontigo et al., 2012; Ferro et al., 2012]. Mother's maximum level of schooling is significantly associated with DHSU [Noro et al., 2008]. We can assume that the more educated the mother, the better access of the child to health information and to health services. While the impact of education may be less crucial than of income, measuring income is commonly problematic [Mirowsky and Ross, 2003], such as in our study population (they all belong to one insurance carrier program that, although is managed by a not-for-profit scheme within the public

sector, is primarily linked to having employment in private entities). Schooling is a proxy variable of socioeconomic status [Galobardes et al., 2007].

According to Andersen and Davidson [2007], attitude toward health is a strong predictor of DHSU. We found two variables thus associated: tooth brushing frequency and positive attitude of the mother toward the child's oral health. Tooth brushing during pre-school and school years is largely dependent on the mother [Khadri et al., 2010]. These two variables have been related with DHSU [Medina et al., 2008, 2009]; in some cases, a feature as simple as having a toothbrush implied a higher probability of getting any dental service (school children in Brazil) [Noro et al., 2008]. Of note is that the tooth brushing variable may not necessarily mean that a child brushing more frequently will unavoidably use more health services; the relationship is likely modified by diverse, relevant attitudes and behaviours.

Results from the present study showed that treatment needs, as measured through DDE and a validated index estimating caries burden, were variables strongly related with DHSU. Similar findings have been reported for studies pertaining to the same variables [Medina et al., 2009], using self-reported health needs [Baldani et al., 2010], or derived from oral examinations [Medina et al., 2008; 2009; Pontigo et al., 2012]. Our findings and past reports on DHSU ought to be considered in the light of the fact that Mexico has low dental health services coverage [Medina et al., 2009; Pontigo et al., 2012], making it less likely that people needing services would actually get them: variety of services is limited and usually does not cover specialised services.

Our study has two limitations. First, it was a cross-sectional design, which means it measures the outcome and its possible causes at the same time. Secondly, being able to distinguish between types of service (preventive, restorative, or emergency) would have allowed to more accurately characterizing the predictive role of each type of dental care sought.

Conclusion

Maternal characteristics influence the child's DHSU; unmet oral health needs are one factor related to DHSU. It is necessary to have a more detailed assessment of the current clinical and public health strategies to further inform and execute social, clinical, and school policies for children and their mothers to promote an effective and appropriate DHSU.

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