

DENTAL STATUS AND DENTAL TREATMENT DEMANDS IN PRESCHOOLERS FROM URBAN AND UNDERPRIVILEGED URBAN AREAS IN MENDOZA CITY, ARGENTINA

Claudia N. Fernández¹, Aldo Squassi², Noemí Bordoni³

¹ Department of Pediatric Dentistry I, School of Dentistry, National University of Cuyo.
Master in Oral Health Services and Systems Management, National University of Cuyo.

² Department of Preventive and Community Dentistry; School of Dentistry, University of Buenos Aires.

³ Institute for Research in Public Health, University of Buenos Aires

ABSTRACT

The aim of this study was to establish the association between dental status and demand for dental care in preschoolers at urban and underprivileged urban schools in the city of Mendoza. Dental status was diagnosed in a purposive sample of preschoolers at urban schools (Group U: $n = 148$) and underprivileged urban schools (Group UnU: $n = 155$) in Greater Mendoza city, by determining the following indicators: (a) caries-free children (%), and (b) dmft/DMFT and its discriminated components, including active non-cavitated enamel caries. The characteristics of demand for care were determined using an ad hoc structured questionnaire. The following were determined: frequency distributions and confidence intervals for categorical variables, measures of central tendency and dispersion, tests for differences in means (Student's t test), association (chi squared) and correlation among variables (Pearson's r), at a significance level $p < 0.05$.

Comparison of dental status variables between groups showed significantly higher values in group UnU for: $d+D$ tooth ($\bar{x} = 5.4 \pm 3.8$; $t = 2.887$; $p = 0.004$); $dmft+DMFT$ ($\bar{x} = 5.7 \pm 4.1$; $t = 0.466$; $p = 0.020$); $d+D$ surface ($\bar{x} = 7.62 \pm 6.2$; $t = 0.956$; $p = 0.014$); $f+F$ surface ($\bar{x} = 0.12 \pm 4.5$; $t = 2.71$; $p = 0.007$) and percentage of caries-free children ($\chi^2 = 25.377$; $p = 0.018$). The following trends were found in this group: higher demand on the government sub-

system, fewer visits to the dentist ($\chi^2 = 7.02$, $p = 0.008$) and greater difficulty in getting appointments ($\chi^2 = 19.91$, $p = 0.001$). Frequency of visits was associated to the severity of dental status ($\chi^2 = 19.412$; $p = 0.001$), but no correlation was found between frequency of visits during the past year and $dmft+DMFT$ (Pearson's r coefficient = 0.091; $p = 0.0426$).

Group U showed preferential demand for the private or "obra social" (trade union managed health insurance) systems ($\chi^2 = 78.85$, $p = 0.00$) and there was no statistically significant association between visits to the dentist and $dmft+DMFT$ categories ($\chi^2 = 2.781$; $p = 0.427$), although there was direct correlation between frequency of visits during the past year and $dmft+DMFT$ (Pearson's r coefficient = 0.486, $p = 0.000$).

Preschoolers at UnU schools had higher caries indicators than preschoolers at U schools. For UnU the demand for care was related to the severity of dental status and situations of urgency, while U preschoolers demanded dental care in both health and disease, with a tendency to greater adherence to treatment.

Actions to promote oral health in preschoolers should take into account both internal and external barriers to access to and use of oral health services.

Key words: Dental caries; dental health services; school age populations; access to health care.

ESTADO DENTARIO Y DEMANDA DE ATENCIÓN ODONTOLÓGICA EN PREESCOLARES DE AREAS URBANAS Y URBANO-MARGINALES EN MENDOZA, REP. ARGENTINA

RESUMEN

El objetivo de este estudio fue establecer la asociación existente entre el estado dentario y la demanda de atención en alumnos de nivel inicial asistentes a escuelas del ámbito urbano y urbano-marginal de la ciudad de Mendoza.

Material y métodos: Sobre una muestra intencionada de alumnos/as asistentes a cuatro escuelas de nivel inicial de ámbito urbano (Grupo AU: $n = 148$) y de ámbito urbano-marginal (Grupo AUM: $n = 155$) del Gran Mendoza, se realizó el diagnóstico del estado dentario determinando los siguientes indicadores: (a) niños libres de caries (%), (b) $ceod/CPD$ y sus componentes discriminados, incluyendo caries adamantinas activas no cavitadas. Las características de la demanda de

atención fueron establecidas mediante una encuesta estructurada ad hoc. Se establecieron distribuciones de frecuencias e intervalos de confianza para variables categóricas, medidas de tendencia central y dispersión, pruebas de diferencias de medias (t de Student), de asociación (chi cuadrado) y de correlación entre las variables (r de Pearson), con un nivel de significación de $p < 0.05$.

Resultados: Al comparar las variables del estado dentario entre ambos grupos se encontraron valores significativamente mayores en el grupo AUM para: $c+C$ diente ($\bar{x} = 5,4 \pm 3,8$; $t = 2,887$; $p = 0,004$); $ceod+CEOD$ ($\bar{x} = 5,7 \pm 4,1$; $t = 0,466$; $p = 0,020$); $c+C$ superficie ($\bar{x} = 7,62 \pm 6,2$; $t = 0,956$; $p = 0,014$); $o+O$ superficie ($\bar{x} = 0,12 \pm 4,5$; $t = 2,71$; $p = 0,007$) y porcentajes

de niños libres de caries ($\chi^2=25,377$; $p=0,018$). En este grupo, se registraron las siguientes tendencias: mayor demanda al subsistema estatal, menor asistencia a la consulta dental ($\chi^2=7,02$, $p=0,008$) y mayor dificultad para obtener turno ($\chi^2=19,91$, $p=0,001$). La frecuencia de las consultas estuvo asociada con la gravedad del estado dentario ($\chi^2=19,412$; $p=0,001$), pero no se registró correlación entre la frecuencia de las consultas durante el último año y ceod+ CPOD (coeficiente r de Pearson = 0,091; $p=0,0426$)

El grupo AU demandó preferentemente en los subsistemas privado o de seguridad social ($\chi^2=78,85$ $p=0,00$) y no existió asociación estadísticamente significativa entre la concurrencia del niño a la consulta odontológica y las categorías de ceod+ CPOD ($\chi^2=2,781$; $p=0,427$), pero sí correlación directa entre la frecuencia de consulta durante

el último año y el ceod+ CPOD (coeficiente r de Pearson = 0,486, $p=0,000$).

Los preescolares asistentes a escuelas de AUM presentaron indicadores de caries más elevados respecto a los encontrados en el grupo AU. La demanda de atención para AUM se relacionó con la gravedad del estado dentario y con situaciones de urgencia. Los preescolares de AU demandaron atención dental tanto en salud como en enfermedad, con tendencia a mayor adherencia al tratamiento. Las acciones tendientes a promover la salud bucal en los preescolares deberán tomar en cuenta tanto las barreras internas como las externas en el acceso y utilización de los servicios de salud bucal

Palabras clave: Caries; servicios de salud bucal; poblaciones escolares; acceso al cuidado dental.

INTRODUCTION

Early childhood caries (ECC) was defined by the *American Academy of Pediatric Dentistry* (AAPD) as the presence of one or more decayed, missing (due to caries) or filled tooth surfaces in any primary tooth in a child 71 months of age or younger. Severe early childhood caries is the presence of any sign of softening of tooth surfaces in children under 3 years of age or the presence of one or more decayed, missing (due to caries) or filled primary anterior teeth from ages 3 through 5, dmfs = 4 at 3 years, 5 affected surfaces at 4 years or 6 surfaces affected at 5 years of age¹.

ECC is currently recognized as a public health problem with defined biological, social and behavioral etiological components². Its impact is higher when recurrence of caries in children who have had them previously is analyzed. Approximately 40% of children who have been treated for ECC develop new lesions within a year of completing the treatment^{3,4}. Family and community socio-economic variables act as potentiating factors for the severity and progression rate of the caries process in early infancy. Milnes⁵ reports that in developed countries, prevalence was 1% to 12%, but in developing countries and within disadvantaged populations in developed countries, it was as high as 70%. These findings have been confirmed by different studies⁶.

One model explaining the etiology of early childhood caries attributes it to family stress caused by joint socio-economic variables, particularly in mothers, leading to dysfunctional parenting behaviors and thus greater risk of caries in children⁷. In developing countries, studies on the prevalence of early childhood caries and caries in preschoolers

match the association found between high caries experience and disadvantaged socio-economic status⁸⁻¹².

Ly et al.¹³ in Xiamen, China, studied a population of 1570 children under 5 years of age and found that 56.8% to 78.31% were affected, and evidence of increasing tendency with age. These findings were confirmed by Karla et al.¹⁴ in a study in Gurgaon, Haryana (India) on 600 preschoolers of middle socio-economic class, where caries prevalence was 68%, with mean dmft 2.85, and increasing values with age. Pridaryarshini et al.¹⁵ found caries prevalence of 37.3% among low income preschoolers in the city of Bangalore, India, of whom 94.3% had high levels of untreated disease. Ramírez et al.¹⁶ analyzed a sample of 659 individuals and found that 67% were affected by dental caries according to ICDAS II criteria.

An increase in prevalence of ECC has been found even in developed countries. The US 2007 national health survey showed that caries prevalence is on the rise and that 28% of 2- to 5-year-olds have caries experience¹⁷.

Previous studies¹⁸ showed that preschoolers in Greater Mendoza city have high levels of caries, which are significantly higher in children who attend underprivileged urban schools, with a high level of decayed component (d) indicators and indication of extraction (ie). This background justifies the importance of this study, the aim of which was to analyze the characteristics of demand for care and the dental care itself, discriminating the differences between socio-economically distinct groups, and to advocate the adoption of evidence-based policies.

MATERIALS AND METHODS

This was a cross-sectional correlational descriptive epidemiological study on a cluster sample of preschoolers from 2 schools in an underprivileged urban area (School No. 17 Silvia Puebla and School No. 18 Xumec) and 2 urban schools (Hipólito Yrigoyen and Manuel Belgrano Schools) located in Greater Mendoza (n=155 and n=148, respectively). Demographics at the schools were established according to the criteria of the General Directorship of Schools of the Government of Mendoza, based on percentages of families with unmet basic needs. This was used to include children either in group U (urban environment, with basic needs satisfied) or group UnU (underprivileged urban environment, with unmet basic needs).

The parents or legal guardians of the children at all four schools were informed about the study and they provided written consent for children's participation. All children in the sample were provided with a preventive program at which oral hygiene techniques were taught and 1.2% acidulated sodium fluoride, pH 3.5 was applied professionally.

An oral clinical examination was performed by two calibrated examiners (inter-judge Kappa index = 77%). The caries category included the white spot lesion category (ICDAS II criterion 2) ¹⁹. The indices dmft, dmfs, DMFT and DMFS were calculated ²⁰. "Caries free" was used to describe children with dmft plus DMFT equal to 0.

Data were grouped into four ordinal categories according to the severity of the variable "sum of dmft+DMFT":

- dmft+DMFT = 0.
- dmft+DMFT = 1 to 3.
- dmft+DMFT = 4 to 6.
- dmft+DMFT = 7 or higher

An *ad hoc* structured survey (Fig. 1) was used to collect data about demand for dental care. It was answered by the parents of the preschoolers included in the study, administered by the teachers from each class.

The survey asked about whether the child had ever visited a dentist (Question 1). If the answer was 'yes', the following information was requested:

- which subsector care was requested at,
- number of visits to the dentist in the past year,
- whether they were satisfied with the care received, and
- whether it was difficult to get an appointment.

The category "Demand according type of school" was established by associating school setting to the yes/no variable (has/has not visited a dentist).

To establish the association between dental status and demand for care in each group, we used:

- the ordinal categories according to severity (dmft + DMFT), and
- the answers to survey questions 2, 3 and 4.

The data were processed with SPSS 18.0 software. The following were determined at a significance level smaller than 0.05:

- Frequency distribution and confidence intervals for each variable,
- Measures of central tendency and its dispersal, and
- Comparison between groups (Student's t-test, chi square and Pearson's r correlation coefficient).

RESULTS

Dental status

Caries experience was 85.8% for children from underprivileged urban schools (UnU) and 75% for children from urban schools (U). The percentage of caries-free children was significantly lower in group UnU (14.2%) than in group U (25%) ($\chi^2 = 25.377$; $p = 0.018$).

A comparison of the groups revealed significantly higher values in children from UnU schools for the following indicators (Table 1):

- d+D tooth ($\bar{x} = 5.4 \pm 3.8$; $t = 2.887$; $p = 0.004$);
- dmft+DMFT ($\bar{x} = 5.7 \pm 4.1$; $t = 0.466$; $p = 0.020$);

1. Has your child ever visited a dentist?: (mark with a cross)	
yes ___	no ___
2. If he/she has visited a dentist:	
a) The visit took place at: (mark with a cross)	
"centro de salud"*	"obra social"***
public hospital ___	others ___
b) How many times have you taken your child to the dentist in the past year?	
.....	
c) Are you satisfied with the dental care received? (mark with a cross)	
yes ___	no ___
d) Was it difficult to get an appointment to take your child to the dentist? (mark with a cross)	
yes ___	no ___

Fig. 1: Model of the survey used for classifying demand for dental care.*"centro de salud" refers to a government-run community health center. ***"obra social" refers to a trade union-managed health insurance plan.

- d+D surface ($\bar{x} = 7.62 \pm 6.2$; $t = 0.956$; $p = 0.014$), and
- fewer filled surfaces than children from U (f+F surface: $\bar{x} = 0.12 \pm 4.5$; $t = -2.71$; $p = 0.007$).

When mean dmft+DMFT was discriminated according to grouped categories, distribution was more

homogeneous among preschoolers from in the U group, with 52.7% corresponding to the sum of classes 0 and 1/2/3. In children from the UnU group, the problem was more serious: the sum of children with class 0 and 1/2/3 was 34.2% while 41.9% had dmft+DMFT equal to or higher than 7 (Table 2).

Table 1: Association tests for dental status variables and percentage of caries-free children from each school environment (Student's t-test for independent samples and chi-squared).

Indicator	Type of school	n	%	mean	SD	t	x2	p
D+Dt	Underprivileged Urban	155		5.40	3.78	2.887		0.004
	Urban	148		4.08	4.12			
ie+Mt	Underprivileged Urban	155		0.25	0.72	0.766		0.444
	Urban	148		0.18	0.70			
f+F	Underprivileged Urban	155		0.14	0.79	-1.496		0.136
	Urban	148		0.28	0.85			
dmft+DMFT	Underprivileged Urban	155		5.70	4.07	2.342		0.020
	Urban	148		4.54	4.55			
d+Ds	Underprivileged Urban	155		7.63	6.2	2.475		0.014
	Urban	148		5.76	6.89			
ie+Ms	Underprivileged Urban	155		1.23	3.61	0.766		0.444
	Urban	148		0.91	3.50			
f+F _s	Underprivileged Urban	155		0.12	0.45	-2.717		0.007
	Urban	148		0.45	1.44			
dmfs+DMFS	Underprivileged Urban	155		8.89	8.39	1.902		0.058
	Urban	148		6.99	8.96			
Caries-free percentage	Underprivileged Urban	155	14.2					
	Urban	148	25				25.377	0.018

Table 2: Contingency table for dmft+DMFT categories for each Type of school.

			Type of school		Total
			Underprivileged Urban	Urban	
dmft+DMFT categories	dmft+DMFT = 0	Count	22	37	59
		% for Type of school	14.2%	25.0%	19.5%
	dmft+DMFT = 1,2,3	Count	31	41	72
		% for Type of school	20.0%	27.7%	23.8%
	dmft+DMFT = 4,5,6	Count	37	30	67
		% for Type of school	23.9%	20.3%	22.1%
	dmft+DMFT = 7 y +	Count	65	40	105
		% of Type of school	41.9%	27.0%	34.7%
Total	Count	155	148	303	
	% for Type of school	100.0%	100.0%	100.0%	

Demand for dental care

The answers to ‘yes/no’ question No. 1: “*Has your child ever visited a dentist?*” differed significantly according to school setting (χ^2 with Yates’ correction = 7.022; $p = 0.008$), with 55% of the “yes” answers corresponding to U and 63% of the “no” answers to UnU (Figure 2, Table 3).

For the cases that answered “yes” ($n = 180$) there was association between type of school and place where the visit to the dentist took place ($\chi^2 = 78.851$; $p = 0.000$):

- For U, 85.6% of the answers were “*obra social*” (health insurance managed by trade unions) and “others”, whereas
- for UnU 80.3% of the answers were “*centro de salud*” (government-run community health centers) and “public hospital” (Figure 3).

No significant difference was found between groups for:

- type of school and average number of visits to the dentist during the past year (UnU = 1.82 ± 1.5 ; U = 2.07 ± 2.1 ; $t = -0.865$; $p = 0.394$);

- school setting and satisfaction with dental care received (χ^2 with Yates’ correction = 1.368; $p = 0.242$).

Among participants from the underprivileged urban group (UnU), 64% said they had encountered difficulty in getting an appointment for the visit to the dentist, while among participants from the urban group (U), 71% said they had not had difficulty (χ^2 with Yates’ correction = 19.910; $p = 0.000$).

Severity of dental status and demand for dental care

To establish possible associations between severity of dental status and demand for dental care, we analyzed frequency distribution between the dmft+ DMFT ordinal categories and the ‘yes/no’ question about visiting the dentist (Question 1) for each type of school. To establish whether there was a pattern in demand for dental care related to caries severity indicators, the correlation between number of visits in the past year (Question 2b) and dmft+DMFT categories was analyzed.

Table 3: Frequency distribution and association test for answers to the ‘yes/no’ question “Has your child ever visited a dentist?” according to type of school (Chi squared).

Type of school	Has your child ever visited a dentist?		chi square (with Yates’ correction)	p
	YES	NO		
Underprivileged urban	81	73	7.022	0.008
	45.0%	61.3%		
Urban	99	46		
	55.0%	38.7%		
total	180	119		
	100.0%	100.0%		

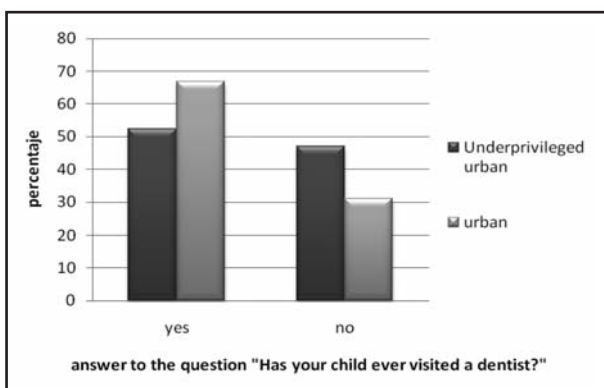


Fig. 2: Percentages of answers to the ‘yes/no’ question “Has your child ever visited a dentist?” according to type of school.

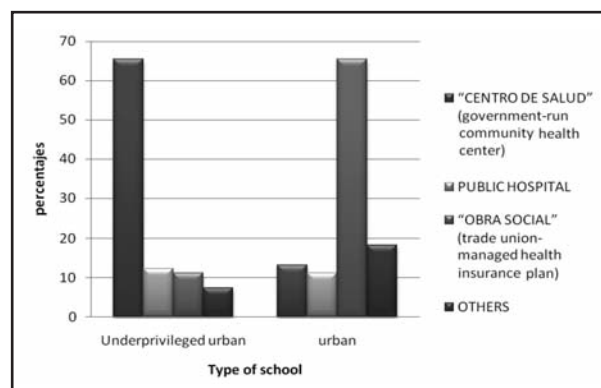


Fig. 3: Percentages of use of oral health subsystems according to type of school.

For children from schools there was association between visits to the dentist and dmft+DMFT categories ($\chi^2 = 19.412$; $p = .000$). A high percentage of preschoolers whose parents answered “yes” to survey Question 1 about going to the dentist corresponded to the category dmft+DMFT = 7 or higher (59.3%), whereas among children without caries experience, only 9.9% answered ‘yes’ (Table 4). No correlation was found between frequency of visits to the dentist during the past year and dmft+DMFT (Pearson’s r coefficient = 0.091; $p = 0.0426$), as

shown in Table 5. Children from the UnU group with more severe dental status had visited a dentist, but not as frequently or as regularly as required by their diagnosed dental status. Most children without caries experience had never visited a dentist, i.e. they had not been to preventive visits.

In children from urban (U) schools, no evidence was found of association between the child visiting the dentist and dmft+DMFT categories ($\chi^2 = 2.781$; $p = 0.427$). However, direct correlation was found between frequency of visits during the past year and

Table 4: Contingency table for the ‘yes/no’ question “Has your child ever visited a dentist?” according to dmft+DMFT categories and type of school.

			Dmft+DMFT categories								Total	
			dmft+DMFT= 0		dmft+DMFT= 1,2,3		dmft+DMFT= 4,5,6		dmft+DMFT= 7 or more		dmft+DMFT = 0	
			UU	U	UU	U	UU	U	UU	U	UU	U
Has your child ever visited a dentist?	Yes	Count	8	26	13	24	12	19	48	30	81	99
		% of “Has your child ever visited a dentist?”	9.9%	26.3%	16.0%	24.2%	14.8%	19.2%	59.3%	30.3%	100%	100%
		% of groups dmft+DMFT	36.4%	70.3%	41.9%	60.0%	33.3%	65.5%	73.8%	76.9%	52.6%	68.3%
	No	Count	14	11	18	16	24	10	17	9	73	46
		% of “Has your child ever visited a dentist?”	19.2%	23.9%	24.7%	34.8%	32.9%	21.7%	23.3%	19.6%	100%	100%
		% of groups dmft+DMFT	63.6%	29.7%	58.1%	40.0%	66.7%	34.5%	26.2%	23.1%	47.4%	31.7%
Total	Count	22	37	31	40	36	29	65	39	154	145	
	% of “Has your child ever visited a dentist?”	14.3%	25.5%	20.1%	27.6%	23.4%	20.0%	42.2%	26.9%	100%	100%	
	% of groups dmft+DMFT	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

Table 5: Association and correlation tests for questions 1 and 2 regarding demand for dental care according to severity of dental status at schools in urban and underprivileged urban settings (Chi squared and Pearson’s correlation coefficient).

Survey question on demand for dental care	Type of school	Type of statistical test and n	Asymptotic significance (bilateral)
Has your child ever visited a dentist?/dmft+DMFT categories	Urban	Pearson’s Chi-squared N of valid cases	2.781 145
	Underprivileged urban	Pearson’s Chi-squared N of valid cases	19.412 154
How many times have you taken your child to the dentist in the past year?/dmft+DMFT categories	Urban	Pearson’s correlation coefficient N of valid cases	0.486 98
	Underprivileged urban	Pearson’s correlation coefficient N of valid cases	0.091 81

dmft+DMFT (Pearson's r coefficient = 0.486; $p = 0.000$), (Table 5). Children from urban schools visited the dentist in both health and disease, but there was a tendency to increasing the frequency of visits to the dentist when the severity of the dental status was higher.

DISCUSSION

Caries experience in both the populations of children that were studied in Mendoza is high, in agreement with studies on caries prevalence in preschoolers in other developing countries.¹³⁻¹⁷

Early childhood caries in preschoolers in the study sample seems to be influenced by multiple factors related to socio-economic status. Dental status in children from underprivileged urban schools corresponded to high degrees of ECC severity and was worse than in children from urban schools. However, despite the prevalence of caries, only 47% of those children had ever demanded dental care, and the frequency and consistency of the visits were not sufficient to ensure the resolution of these dental problems. Kopycka-Kedzierawski and Billings²¹ reported similar results in Rochester (USA), finding that in a population of 246 children aged 1 to 4 years at child care centers, 28% had caries, but only 39% of them had demanded dental care.

Another important finding is that the demand for dental care due to caries problems in preschoolers from the underprivileged urban group was not related to the number of visits completed, from which it may be inferred that there was little adherence to treatment and that the demand was related to urgencies. This agrees with a study conducted in New York (USA) by Uargarkar et al.,²² who analyzed the demand and gradual increase in costs of care for children under 6 years old, which they claim is due to an increase in caries in low income sectors, the existence of physical barriers, lack of health insurance, lack of knowledge in parents and care givers, and the limited number of dentists willing to attend to preschoolers or who have contracts with the health insurance system in force (Medicaid in this case).

The health sub-system primarily used by the sample from UnU schools was the government system, which involved difficulty in getting appointments. This constitutes a real barrier to access to oral health care. To make matters worse, oral health is

undervalued compared to other health needs, particularly in low income populations. This points to the need to deal with oral health problems by means of policies involving both clients and health care providers²³.

An outstanding study with regard to this issue was conducted by Grembosky et al.²⁴ on the oral health status of children from low income families, showing that children whose mothers had a regular source of dental care were healthier than children whose mothers did not have that benefit.

In our study, preschoolers from the urban setting enjoyed a better socio-economic status, which was related to access to trade union-managed health insurance (*obra social*) or private subsystems. They tended to demand dental health care for both healthy and diseased status. Correlation tests showed that the more often they had visited the dentist, the higher was the dental status indicator (dmft+DMFT), and vice versa. This may be interpreted as higher adherence to treatment and it may be assumed that treatment was completed.

The association between school setting (defined by unmet basic needs in the school population) and dental status may be considered upon establishing sub-populations at risk of the disease. This concept is supported by studies such as Da Rosa et al., reporting a direct association between school deprivation indices and dental status in preschoolers in Quebec (Canada)²⁵. Muirhed et al. also propose school socio-economic context as an adequate indicator for mean dmft values in preschoolers²⁶.

It would be helpful to explore whether the results of this study are attributable to:

- Different perceptions in the families regarding the impact of oral status on the child's quality of life
- Structure and dynamics of the health care system fostering or hindering the entry and engagement of socially deprived population groups
- The current health care system, which does not focus on risk in individual or group programs.

Awareness needs to be created regarding the problem of early childhood caries and severe early childhood caries. It should be prioritized by political decision makers as a real and urgent public health problem in order to establish strategies for preven-

tive and curative intervention, with the participation of human resource training institutions, so that they will be prepared to deal with the situation^{27,28,22}.

CONCLUSIONS

- Preschoolers from underprivileged urban settings had higher caries indicators than preschoolers from urban settings, although this was not reflected by higher demand for dental care.
- Preschoolers from underprivileged urban settings tended to demand dental care only for more

severe dental problems, and the severity of their status was not related to the number of visits demanded. It may be inferred that demand was for urgencies.

- Children from urban schools demanded dental care for both healthy status and diseased status, and were more likely to adhere to the treatment.
- Action to promote oral health in preschoolers should take into account internal and external barriers against access to and use of oral health care services.

CORRESPONDENCE

Dra. Claudia N. Fernández

Facultad de Odontología. Universidad Nacional de Cuyo.

Centro Universitario. Parque Gral San Martín (s/n).

Mendoza- Rep. Argentina. CP 5500

e-mail: claudia.n.fdz@gmail.com

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