RELATIONSHIP BETWEEN DENTAL STATUS AND FAMILY, SCHOOL AND SOCIOECONOMIC LEVEL.

Enilde Ravera[(†)1], Gabriel A.Sanchez[2], Aldo F.Squassi[3], Noemí Bordoni[2,3]

[(†)1]In memoriam. Social Psychology Master Program. University of Mar del Plata. Argentina

[1]Social Psychology Master Program. University of Mar del Plata. Argentina

[2]Preventive and Community Dentistry Department. School of Dentistry, University of Buenos Aires. Argentina

[3]Institute for Public Health Research. University of Buenos Aires. Argentina

ABSTRACT

The aim of this study was to analyze the association between the knowledge, attitudes, practices and formal schooling of parents and the oral health status in schoolchildren enrolled in educational institutions of different socioeconomic levels, using dental caries as the tracer disease. A convenience sample of 300 school children aged 6-14 years old and living in Mar del Plata city, Argentina, was composed according to income characterization in three strata: low, middle and high income. The children were grouped according to age (6-8, 9-11 and 12-14 years old). A validated questionnaire on knowledge, attitudes and oral health practices was administered to parents . Children were examined for dental and gingival status. DMFS, dmfs, plaque and gingival bleeding indexes were determined. Mean and SEM and/or frequency distribution of each variable were determined and differences assessed by ANOVA, chi-squared, Yates chi-squared and Scheffé tests (p < 0.05). Association among variables was tested by chi-squared test. The children from low income families showed significantly higher levels of oral disease in all the studied age groups. These families revealed significantly less healthy practices and attitudes along with lower formal schooling level. Dental indicators were inversely and significantly associated with parents‘ knowledge, attitudes and formal schooling and with plaque index. Bleeding on probing was inversely and significantly associated with plaque index, parents‘ formal schooling and practices. Plaque index was found to be inversely associated with parents‘ knowledge, attitudes and formal schooling. Parents' knowledge, formal schooling, attitudes and health practices are intervening variables on oral health status of school children and an intervention field with potential impact for the oral component of health.

Key words: Oral health. Socioeconomic factors.

RELACIÓN ENTRE EL ESTADO DENTARIO DE ESCOLARES Y LOS CONOCIMIENTOS, ACTITUDES Y PRÁCTICAS Y NIVEL DE ESCOLARIDAD DE LOS PADRES

RESUMEN

El objetivo de este estudio fue analizar la asociación entre conocimientos, actitudes, prácticas y escolaridad formal de los padres y el estado dentario de escolares asistentes en instituciones de diferente nivel socioeconómico, empleando la caries dental como enfermedad trazadora. Fue seleccionada una muestra intencionada de 300 escolares de 6 a 14 años de edad, asistentes a escuelas representantes de tres niveles de ingresos familiares. Los niños fueron agrupados en 3 niveles etarios (6-8, 9-11 y 12-14 años de edad). Un cuestionario validado referido a conocimientos, actitudes y prácticas fue administrado a los padres (Anrup et al, 2001). Los niños fueron examinados clínicamente y determinados los índices CPOS, ceos, índice de biofilm de placa y sangrado gingival. Las medias y el error standard y la frecuencia de distribución de cada variable fue establecida y calculada según ANOVA, chi², Yates chi² y tests de Scheffé (p < 0.05). La asociación entre variables fue calculada por medio del test chi².Los resultados revelaron que los niños pertenecientes a familias con menores ingresos presentaban mayores niveles de enfermedad bucal en todos los grupos de edad. Estas familias revelan menos prácticas y actitudes saludables coincidentes con un menor nivel de escolaridad. Los indicadores dentarios, el sangrado gingival y el índice de biofilm resultaron inversa y significativamente asociados con los conocimientos, las actitudes y la escolaridad formal de los padres. Los conocimientos, la escolaridad formal, las actitudes y prácticas de los padres resultaron variables intervinientes sobre el estado de salud bucal de escolares y constituyen un campo de intervención con potencial impacto sobre el componente bucal de la salud de los escolares.

Palabras clave: Salud bucal; factores socioeconomicos

INTRODUCTION

The existence of myths and individual perceptions related to oral health has been demonstrated. By using the semiotic analysis of discourse, Squassi et al.[1] reported the presence of psycho-social factors in the concepts of social critical actors such as parents and professionals who influence on the adherence or drop off in pediatric oral health treatment. Likewise, rigid cores related to myths regarding the process of "healthy condition-dis-

ease-health care" were identified such as the absence of the preventable condition of dental caries as tracer disease.

To contribute to understand the importance of some health determinants in clinical research, studies on the impact of gender, schooling level and ethnics on dental clinical indicators and studies on the predictive ability of health perceptions and their usefulness to assess results of clinical interventions, were conducted [2,3].

Poverty related factors have been analyzed as determinants of dental status. By using questionnaires for parents, an analytical study conducted in school children samples stratified according to the deprivation index[4], revealed significant differences in dmfs index between poor children and those who were not[5].

The impact of family socioeconomic status on pre-scholars was investigated[6-8]. The authors reported a different association between socioeconomic status and dental caries prevalence.

Bordoni et al.[9] reported significant positive correlation among socio-economic problems, the lack of health cover and the dental caries prevalence in Argentine children as well as between specific educational activities and dental and gingival status. The same research group reported that poverty related variables appeared to be related to factors with a significant role in the dental caries development in children living in the metropolitan are of Buenos Aires city[10].

Green et al.[11] interpreted that health promotion results from combining learning experiences socially built to facilitate voluntary adaptations of health favorable behaviors. Such conceptualization supports the understanding of individuals' voluntary participation in their health practices determination. To meet this need, a process able to guarantee agreement between health professionals and those whose receive education is required. This aspect has been discussed by Squassi et al. after the administration of a questionnaire[12], and a qualitative methods [1] which allowed the identification of biases able to make difficult the acquisition of healthy behaviors. An intervention can be performed at any level of the process "healthy condition-disease-health care" and at either individual or collective dimen-

sions to influence directly on the subject and on the behaviors of those who have a decisive influence on resources and motivations, such as parents, teachers, professionals, leaders and opinion formers. Roberts[13] reported that low income families showed exaggerated dental disease conditioned by deficient schooling, wrong food choice or low food availability and the poor access to health preventive care.

The aim of this study was to analyze the association between parents' knowledge, attitudes, practices, formal schooling and the oral health status in school children enrolled in educational institutions of different socioeconomic levels, using dental caries as the tracer disease.

MATERIALS AND METHODS
Study population
A convenience simple was composed according to family income in three strata (low, middle and high income). The Home Permanent Survey[14] stratification criteria in agreement with the opinion experts from the Psychology School of the National University of Mar del Plata were used. Three schools meeting these criteria were selected: Stella Maris School (high income), No. 27 (middle income) and No. 4 School (low income) from Mar del Plata City, Buenos Aires Province, Argentina.

Children from each school and age group (6-8, 9-11 and 12-14 years old.) were randomly selected to compose a sample of 300 study participants. These age groups were chosen in order to include children in the early and late mixed dentition period as well as children with permanent dentition. The distribution according age is included in Table 1.

Written informed consent and acceptation within the assigned group were obtained from parents or legal guardians and children respectively. The study design was reviewed and approved by the Ethics Committee, Institute for Health Public Research, University of Buenos Aires, Argentina.

Table 1: Quantity of children included in each group.

Age	Schools			Total
	Stella Maris	No. 27	No. 4	
6-8 years old	32	33	33	98 children
9-11 years old	32	35	33	100 children
12-14 years old	33	34	35	102 children
Total	97	102	101	300 children

Data Collection

The study protocol included:

a) Collection of affiliation data for each participant (age, gender) and parents' formal educational level.

b) Administration of a questionnaire[15] for parents composed of questions related to three out of four domains of the original questionnaire: (a) knowledge, (b) attitudes and (c) practices, and the responses applied the semantic differential[16]. The administered questionnaire was previously validated as for validity and reliability; translated into Spanish; validated using back translation[1*] and semantically adjusted according to the opinion of Argentine experts.

The questionnaire included the formal schooling level of the parents. The cutoff point for the formal schooling level considered the highest level of any member of the family for nuclear families and the only one level for single parent families.

c) Analysis of results obtained from the questionnaire administration. Percentage quantification of the frequency distribution of responses.

d) Children's dental and gingival status determination. The presence of dental plaque biofilm, decayed teeth and surfaces including dental white spot on dried surfaces was recorded. Gingival status was assessed by the presence of inflammation and bleeding o probing. The following indicators were recorded:

DMFS and dmfs[17, 18]

Sum of DMFS plus dmfs,

D component in both primary and permanent dentition,

Sum of D plus d surfaces,

Bleeding on probe index (yes/no),

Dental plaque index[19] and

Percentage of decayed surfaces

Diagnostic oral examinations were performed by one dental researcher calibrated by a reference examiner from the Institute for Health Public Research, University of Buenos Aires (Cohen K coefficient = 0,89). Questionnaires were simultaneously administered to participants' parents, individually answered and single blind evaluated.

Data management and Statistical analysis

For qualitative variables, numerical values were assigned to build nominal scales congruent between each other.

Mean and standard error and/ or frequency distribution was determined for each domain. Differences at each school and between age groups were assessed by ANOVA, chi^2, Yates chi^2 and Scheffé tests. The significant level used was $p < 0.05$.

RESULTS

Results related to oral health status are shown in Tables 2 and 3.

The analysis of data from the three schools grouped by age did not show significant differences as for dental caries prevalence, dental plaque biofilm index and bleeding on probing (Table 2 and 3). However, the Standard error was high. This fact suggests that the experimental units included in each age group might come from different populations. Consequently, data were analyzed grouped by school, that is, according to socioeconomic level so as to draw more valid conclusions (Tables 4 and 5).

This analysis revealed that the school with children from low income families show significantly higher levels of oral disease compared to

Table 2: Overall results related to oral health status according to age group.

Age gorup (years old)	n	Gender distribution#		Average present teeth per child*		D+d*	DMFS+ dmfs	Decayed surfaces#	Plaque index	Bleeding on Probing#	
		Female	Male	Permanent teeth	Primary teeth					Yes	No
06-08	98	54 % (44.13 - 63.8)	46 % (36.13 - 55.86)	10 ± 1	13 ± 3	3.42 ± 0.84	3.78 ± 0.66	2.99 (0.38 - 6.36)	1.19 ± 0.058	4 % (0.12 - 7.8)	96 % (92.12 - 99.8)
09-11	99	47 % (37.16 - 56.83)	53 % (43.16 - 62.83)	15 ± 2	8 ± 3	2.47 ± 0.62	2.99 ± 0.81	2.08 (0.73 - 4.89)	1.03 ± 0.056	6 % (1.32 - 10.76)	94 % (89.32 - 98.67)
12-14	103	36 % (26.73 - 45.26)	64 % (54.73 - 73.26)	26 ± 1	0.3 ± 0.5	3.28 ± 0.88	3.89 ± 0.83	2.50 (0.50 - 5.51)	1.10 ± 0.053	11% (4.95 - 17.04)	89% (82.95 - 95.04)

*Mean ± ESM; # %, CI 95.

Table 3: Comparison of oral health status among age groups.

Indicator	Test	statistic	P
D+d	ANOVA	F = 1.05	0.352
DMFS+dmfs	ANOVA	F = 0.93	0.395
No. of decayed surfaces	ANOVA	F = 1.31	0.272
Bleeding on probing	Chi²	Chi²=3.99 (df: 2)	0.136

schools with children from middle and high income families.

Table 6 shows no significant differences in parents' knowledge among the three schools in the age group 12-14 y.o. However, parents' knowledge is significantly lower in No. 4 School when compared to middle and high income schools in the 6-8 and 9-11 y.o. groups.

Table 4: Oral status at schools with different socioeconomic level.

Indicator	Age (years old)	Stella Maris School	No.27 School	No. 4 School	F (ANOVA)	P	Conclusion*
D+d	12-14	1.12 ± 0.38	2.08 ± 0.47	6.31 ± 1.56	7.60	0.001	School 4 >
	09-11	1.44 ± 0.36	1.65 ± 0.47	3.42 ± 0.56	6.62	0.001	School 4 >
	06-08	1.73 ± 0.57	2.02 ± 0.62	5.47 ± 1.07	6.54	0.002	School 4 >
Dental Plaque Index	12-14	0.68 ± 0.06	0.60 ± 0.02	1.94 ± 0.08	159.11	0.0001	School 4 >
	09-11	0.79 ± 0.04	0.72 ± 0.06	1.56 ± 0.07	126.21	0.0001	School 4 >
	06-08	0.84 ± 0.06	0.88 ± 0.05	1.87 ± 0.06	145.63	0.0001	School 4 >

*by Scheffe test

Table 5: Comparison of oral status among schools and age group.

Indicator	Age	Chi²	Df	P	Conclusion
Bleeding on Probing	12-14	16.85	4	0.001	School 4 >
	09-11	14.21	2	0.003	School 4 >
	06-08	11.10	2	0.005	School 4 >

Table 6: Knowledge, concepts, practices and formal schooling level. Comparison of domains among schools and according to age group.

Domain	Age	Chi²	DF	p	Conclusion*
Knowledge	12-14	8.14	4	0.086	No differences
	09-11	12.36	4	0.046	School 4 <
	06-08	14.28	4	0.037	School 4 <
Practices	12-14	28.25	4	0.001	School 4 <
	09-11	23.44	4	0.004	School 4 <
	06-08	24.39	4	0.003	School 4 <
Attitudes	12-14	40.67	2	0.0001	School 4 <
	09-11	33.23	2	0.0005	School 4 <
	06-08	30.27	2	0.0008	School 4 <
Schooling level	12-14	68.02	2	> 0.0001	School 4 <
	09-11	53.42	2	> 0.0001	School 4 <
	06-08	55.78	2	> 0.0001	School 4 <

*by Scheffe test

The school with low income families revealed practices and attitudes significantly less healthy for every age group. The formal schooling level was significantly lower in the low income school for every age group.

Analysis of associations
The global data analysis reveals the association between variables shown in Table 7.

Table 8 shows the associations between oral status and the studied domains in the different age groups.

The parents' knowledge is not associated with dental status in children between 12-14 y.o. (Tables 9 and 10). D, D+d, DMFS+dmfs, % of decayed dental surfaces, bleeding on probing and plaque index were significantly higher in the low socioeconomic school for every age group.

Table 7: Analyisis of associations.

Age(years old)	Association	CHI^2	DF	P
12-14	Caries/Knowledge	24.9	2	0.001*
	Caries/Attitudes	4.19	1	0.040*
	Caries/PI	18.2	3	0.001*
	Caries/Schooling level	19.51	6	0.003*
	Bleeding on Probing /PI	45.20	3	0.001*
	Bleeding on Probing /Practices	10.79	2	0.005*
	Bleeding on Probing / Schooling level	17.24	6	0.008*
	PI / Knowledge	17.50	6	0.006*
	PI / Attitudes	8.02	3	0.040*
	PI / Schooling level	32.90	21	0.043*
9-11	Caries/ Knowledge	17.2	2	0.023*
	Caries/ Attitudes	4.01	1	0.047*
	Caries/PI	16.3	3	0.017*
	Caries/ Schooling level	17.88	6	0.012*
	Bleeding on Probing / PI	47.14	3	0.001*
	Bleeding on Probing / Práctices	9.25	2	0.010*
	Bleeding on Probing / Knowledge	18.14	6	0.006*
	PI / Knowledge	16.50	6	0.012*
	PI / Attitudes	7.15	3	0.048*
	PI / Schooling level	33.21	21	0.037*
6-8	Caries/ Knowledge	25.1	2	0.001*
	Caries/ Attitudes	4.26	1	0.037*
	Caries/ PI	19.6	3	0.001*
	Caries/ Schooling level	20.36	6	0.002*
	Bleeding on Probing / PI	41.22	3	0.001*
	Bleeding on Probing / Practices	9.59	2	0.011*
	Bleeding on Probing / Schooling level	18.11	6	0.005*
	PI / Knowledge	15.50	6	0.022*
	PI / Attitudes	12.02	3	0.024*
	PI / Practices	9.14	6	0.017*
	PI / Schooling level	33.14	21	0.038*

*Statistically significant

Table 8: Associations between oral status and domains analyzed according to age groups.

Association	6-8 y.o.	9-11 y.o.	12-14y.o.	Overall
Caries/ Bleeding on Probing	NO	NO	NO	NO
Caries/Knowledge	YES	YES	YES	YES
Caries/Atitudes	YES	YES	YES	YES
Caries/PI	YES	YES	YES	YES
Caries/ Practices	NO	NO	NO	NO
Caries/ Schooling level	YES	YES	YES	YES
Bleeding on Probing /Knowledege	NO	YES	NO	NO
Bleeding on Probing /Atitudes	NO	YES	NO	NO
Bleeding on Probing /PI	YES	YES	YES	YES
Bleeding on Probing / Practices	YES	NO	YES	YES
Bleeding on Probing / Schooling level	YES	YES	YES	YES
PI/Knowledge	YES	YES	YES	YES
PI/Atitudes	YES	YES	YES	YES
PI/ Practices	YES	NO	NO	NO
PI/ Schooling level	YES	YES	YES	YES

Table 9: Association between dental caries and the domains of parents´ knowledge, attitudes and practices according to children age.

Association	6-8 y.o.	9-11 y.o.	12-14y.o.	Overall
Caries/Knowledge	YES	YES	NO	YES
Caries/Atitudes	YES	YES	YES	YES
Caries/ Práctices	NO	NO	NO	NO
Caries/Schooling level	YES	YES	YES	YES
PI/ Knowledge	YES	YES	YES	YES
PI /Atitudes	YES	YES	YES	YES
PI /Practices	YES	NO	NO	NO
PI / Schooling level	YES	YES	YES	YES

Table 10: Comparison among domains (knowledge, attitudes, practices and formal schooling level) according to school and age group.

Domain	Edad	CHI ^{2}	GL	P	Conclusion
Knowledge	12-14	8.14	4	0.086	No significant differences
	09-11	12.36	4	0.046	Esc 4 es <
	06-08	14.28	4	0.037	Esc 4 es <
Atitudes	12-14	28.25	4	0.001	Esc 4 es <
	09-11	23.44	4	0.004	Esc 4 es <
	06-08	24.39	4	0.003	Esc 4 es <
Practices	12-14	40.67	2	0.0001	Esc 4 es <
	09-11	33.23	2	0.0005	Esc 4 es <
	06-08	30.27	2	0.0008	Esc 4 es <
Parent´s schooling level	12-14	68.02	2	> 0.0001	Esc 4 es <
	09-11	53.42	2	> 0.0001	Esc 4 es <
	06-08	55.78	2	> 0.0001	Esc 4 es <

Values recorded in the remaining schools, No. 27 School and Stella Maris School were not different between each other.

DISCUSSION

The association between poverty-related factors and oral health has been proved in studies conducted in vulnerable groups from developed countries with different heatlh care systems[9,20-25].

Freire et al.[20] and Roberts[13] confirmed that children in families with poverty related factors showed less preventive health care practices. Likewise, there are contradictory studies reporting positive associations between parents' knowledge and health self-care practices. White et al.[26] concluded that the lack of schooling was associated with the lack of health preventive self-care practices in adult patients.

In this study, the results revealed a positive association between high dental caries prevalence and low socioeconomic level and the low parents' formal schooling level was found to be associated with higher prevalence of all oral diseases and higher indicators of oral health self-care practices (plaque index) in children with low socioeconomic level.

An analysis from Green's model perspective demonstrate the absence of parents' reinforcing factors to motivate this group of children and specially the lack of facilitating factors in this group. The health knowledge is advisable and necessary for subjects to decide to act in favor of their own health care. Facilitating factors are needed to perform an action and reinforcing factors to support behaviors. Parents, teachers and peers, as well as massive communication means, provide children and adolescents with reinforcements. Roberts [13,] Mitchell et. al.[29] and Stewart et. al.[30] reported on the impact of oral health status on the quality of life of children and adults. The authors attribute the beginning of the deficient oral health status to the deficient schooling level and socioeconomic level. Similar findings were reported by Hochtetter et al.[31] in Argentine preschool children.

To demonstrate the impact of the factor opportunity on the quality of life, Hamemerlid & Taft[32] conducted a clinical study in patients with head and neck cancer. This study suggests that the high cost of the treatment might have affected the attendance.

Another intrinsic aspect of the opportunity is the subject's resilience to keep healthy due to the ability to avoid stress and recover successfully. Research studies by Atchinson et al.[2] showed lack of coherence between average health measurements reported by clinicians and the individuals' reports. The subjective factors were highly predictive on how adults perceived their oral health, which was unknown to the clinicians. An interesting matter to be solved is whether clinicians with knowledge of the patient's symptoms and aware of the quality of life related problems would be able to provide health care levels similar to those expected by the patients.

Culture components are frequently associated with health perceptions in a conceptual model which determines what characteristics help determine the way each patient sees the disease and the ability to cope with it or avoid it[33]. A lower perception of the oral component of health is frequently reported in racial and ethnic minorities[34]. That is, health perception may vary on ethnic groups and might be of great importance on the value assigned to the priorities of an individual in a population. Hunter and Arbona[35] showed associations between gender and oral health perceptions in a qualitative analysis.

Lencová et al.[36] studied the association between the degree of the parents locus of control and the oral health status. The authors found that children with parents in the highest quintiles were 2.32-fold (1.02-5.25; $p<0.05$) more likely to be caries-free children than those in the lowest parental locus quintiles. Tagliaferro et al.[37] found that the mother's schooling level was a predictor of the dental status.

Poverty is a multi-dimensional concept. It focuses on various aspects of deprivation, both income and no-income. It reflects disempowerment, insecurity against shocks, lack of opportunities, income deprivation, shortfalls in consumption and inadequate supply of nutrition, poor access to education and low physical asset bases, dismal health status and health care access. It is expressed in each and all of them together[27]. Poverty as a social construct cannot be reduced to quantitative aspects of measurement alone.

In our study, the reported parents' knowledge, attitudes and practices according to low, middle

and high socioeconomic level as well as the differences recorded among them and compared to School No. 4 coincided with the described characteristics for the social structure of the urban areas of our country[38]. In Argentina, families from middle socioeconomic level were a large social sector frequently associated with values, attitudes, and even some practices, of the high socioeconomic level. On the other hand the social dynamics allowed the arise of "new poor people" who maintained values, beliefs and attitudes adopted prior to their impoverishment[39]. The poverty measurement from the global incidence rate does not measure the extent of the gap between incomes and the poverty threshold and it is insensible to incomes distribution among poor people. In order to avoid this deficiency, was calculate the incidence rate of each individual variable to be analyzed, goods or characteristics. This approach supports the decision to assess the oral health determinants from multidimensional perspectives (Knowledge, attitudes and practices) and to determinate the correlation with oral status of children included in this study[10,27]. The non-significant differences in the parents' knowledge of older children among the different schools could be ascribed to the information given by the health system institutions regarding the required health care demand due to accumulated needs. However, this information did not seem to impact on the practices and attitudes in low socioeconomic level schools since significant differences with respect to high socioeconomic level remained.

Knowledge translation is a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve the population health provide more effective health services and products and strengthen the health care system. Canadian Institute Health Research divides Knowledge Translation into two broad categories: end of grant knowledge translation and integrated knowledge translation[40, 41]. In both cases, the goal is to ensure that new knowledge generates action to improve health or health care services, through the "Knowledge to Action Cycle" that requires:

a) identifying the problem and selecting the relevant knowledge;

b) adapting the knowledge to the local context;

c) assessing barriers to knowledge use;

d) selecting, tailoring and implementing interventions;

e) monitoring knowledge use;

f) evaluating outcomes; and

g) sustaining knowledge use, which completes and reinitiates the cycle.

Our results contribute to understand the three first points and allow supporting recommendations to improve the discussion among all of those responsible for health oral care.

CONCLUSIONS

Parents' knowledge, formal schooling, the low familiar income, attitudes and health practices are intervening variables on oral health status of school children and an intervention field with potential impact for the oral component of health.

The translation of knowledge into practices and attitudes appear to require the installation of processes able to approach the perception of the oral component of health in families and school institutions.

CORRESPONDENCE
Dra. Noemí Bordoni
Cátedra de Odontologia Preventiva y Comunitaria
Facultad de Odontología, UBA
M. T. de Alvear 2142, 5º piso B
(C1122AAH)
Buenos Aires, Argentina
e-mail: nbordoni14@gmail.com
nbordoni@rec.uba.ar

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