Article

Knowledge, attitudes, practices and oral health status in adolescents of the city of Córdoba, Argentina.

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Abstract: Adolescence is a critical period in the appropriation of knowledge, attitudes and health practices. Objective: To analyze the experience of caries in relation to the level of knowledge, to attitudes and oral health practices in adolescents. Materials and methods: An analytical cross-sectional study was carried out in 52 adolescents attending the *Provincial Dental Institute* in the city of Córdoba, Argentina. The study included a clinical dental examination and a self-administered survey. All participating subjects provided an informed consent signed by their parents or guardians. The DMFT index and relative frequency of responses were calculated. Indices of *"knowledge"*, *"attitudes"* and *"practices"* were created. Spearman's rank correlation coefficient between indices and a linear regression model with respect to the DMFT index were applied. Results: Mean age was 16.57±2.27 years. Female subjects accounted for 57.7% of participants. Between 92% and 96% of adolescents acknowledged that the presence of bacteria and a lack of oral hygiene could promote tooth decay. Ninety-six per cent reported using toothbrush and toothpaste, 32% reported using fluoride toothpaste, and only 19% used dental floss. The DMFT index was 4.7±4.0; component C 4.4±2.9. There was a significant correlation between the indices of knowledge and attitudes about oral health ($p<0.05$). The linear regression analysis showed as main predictors the questions: *"Does brushing teeth prevent cavities?"* And *"How important is it for you to clean your teeth?"* Conclusion: Although participants have information on some oral health care practices, it is necessary to design strategies that involve the participation of young people, with contents that take into account the interests and characteristics of the target population.

Keywords: Oral health; adolescents; health knowledge; attitudes; practice.

INTRODUCTION.

The health of adolescents is a key element for the economic, social and political development of Latin American countries.[1]

There is still no agreement on the ages that comprise adolescence. According to the *United Nations Convention* on the *Rights of the Child* and *UNICEF*, adolescence goes from 10 to 18 years of age; the *World Health Organization* (WHO) establishes a chronological parameter between 10 and 19 years, while the *United Nations* places adolescence between 15 and 24 years of age.[2] According to *the National Population Census of the National Institute of Statistics* and *Census of the Argentine Republic,* 2001 (INDEC),[3] adolescence and youth take place between 10 and 24 years of age. Although it is a subjectively established framework

in all cases, these criteria are frequently applied, especially as statistical categories.

The WHO has always recognized the importance of the health and well-being of adolescents, pointing out the need to give high priority to the promotion of health and prevention of diseases among young people.[4] Harmful behaviors such as alcohol consumption, drug use, premature sexual activity, among others,[5,6] do not normally increase morbidity and mortality rates during adolescence; however their effects are evidenced in later stages of life. Adolescence is then a critical moment for the appropriation of knowledge, attitudes and health practices, as these usually persist during adulthood.

Oral diseases are considered as critical public health problems due to their high incidence and prevalence in all regions of the world (WHO).

Furthermore, although their mortality rate is low, they have a high morbidity burden, especially regarding the amount of pain generated and even more because of the possible loss of teeth, a condition that affects physical appearance, nutritional intake, interpersonal relationships, and eventually quality of life.[7]

Dental caries and periodontal disease are the most prevalent oral pathologies.[8] These problems can be avoided by reducing the risk conditions that favor their development, such as: hygiene, diet, stress, consumption of tobacco, alcohol and other psychoactive substances.[8]

Oral health knowledge is crucial for the adoption of healthy behaviors (attitudes and practices), as an association between a greater amount of knowledge and better oral health has been established.[9,10]

When planning and carrying out activities to promote oral health in order to reduce risk conditions and modify behavior, it is important to determine the level of knowledge, attitudes and practices of the target subjects. Although there are studies that report on the attitudes and practices in relation to general health and oral health in particular,[10-14] there is no record of this type of research in dentistry.

The aim of the present study was to analyze caries experience in relation to the level of knowledge, attitudes and oral health practices in adolescents attending the *Provincial Dental Institute* in the city of Córdoba, Argentina.

MATERIALS AND METHODS.

An analytical cross-sectional study was carried out in adolescents aged 14 to 19 years. Participants attended the Provincial Dental Institute in the city of Córdoba, Argentina, between the months of January and March of 2017. The *Provincial Dental Institute* is located in the downtown area of the capital city, mostly providing care to people who lack private health insurance.

In order to know the level of knowledge, attitudes and practices of the young participants, the survey by Gupta *et al.*,[13] was applied. It has been previously analysed by researchers, other dental professionals and psychologists, regarding the interpretation, acceptance of questions and linguistic forms. The first 10% of the total number of adolescents who entered the study did not participate in the final study, as they were considered a pilot group. The survey was composed of 24 questions: 11 with true/false answers and 14 with multiple choice answers, distributed in four domains: 1) Demographic characteristics; 2) Knowledge of oral health; 3) Attitudes related to oral health; 4) Practices related to oral health.

Inclusion criteria consisted of agreement to participate in the study, informed consent signed by their parents or guardian, and absence of any physical or mental disability to answer the survey. The study population consisted of 52 adolescents of both sexes.

The study protocol was developed according to the regulations of the *Council for International Organizations of the Medical Sciences* (CIOMS)[15] that establish the guidelines for the application of the principles of the *Helsinki Declaration,* adopted by the *World Medical Association* in 1964 and amended in 1975, 1983 and 1989. It also had the approval of the *Training and Teaching Committee of the Provincial Dental Institute.* All adolescents participating in the study expressed their agreement and presented an informed consent signed by their parents or guardians.

The survey was voluntary and anonymous, administered in person in paper format, before the clinical examination. To reduce possible bias, participants were advised to respond honestly and reminded that all information would be absolutely confidential. Relative frequency of the survey responses was determined and

expressed as percentages.

The general level of knowledge, attitudes and practices were calculated using:

a) A *"knowledge index"* based on the answers to the 11 questions of this dimension, which were assessed as follows: 3 points for each correct answer, 1 point to each "Dk/Na" answer (Dk: Don't know and Na: No answer), and 0 points to each incorrect answer, the sum of the 11 answers was divided by 3.3, in this way, a range or scale of 0-10 was obtained, the maximum score corresponding to 10 points and 11 correct responses.

b) *"Attitude index"* the five answers of this dimension were given 2 points for each question for the category considered as the most favorable attitude, and 0 for the worst or Dk/Na. The intermediate categories of the A3 and A4 answers were given 1 point. In questions A1 and A2 the answers "well"/"good" received 1.5 points, and "moderately good/medium", 0.75 points. The answer "The dentist" in response to A5 was assigned 0.5 points. Later the scores of the five answers were summed, and a maximum of 10 points could be obtained.

c) *"Practice index"*, the eight responses of this dimension were assessed as follows: 2 points were given to each question for the most favorable category, and 0 points to the worst and Dk/Na; intermediate categories were scored with values of regular incremental intervals and proportional to the number of categories in each case, for example in question P.7, which consists of 5 categories, the intermediate values were: 0.5, 1 and 1.5. Subsequently, the scores of the eight responses were added and multiplied by 0.625, to obtain a scale from 0 to 10 points. Mean values and distribution of the indices according to age and sex were calculated. Spearman's rank correlation coefficient was applied to the indices.

To determine the factors with the highest degree of importance with respect to the DMFT index, an automated linear regression model was applied in which all the variables that formed the dimensions of knowledge, attitudes and practices related to oral health were introduced, considering them as predictors in the model. The factors of age, sex and educational level of the mother were also included. The data was processed with the statistical program Infostat version 2010.[17]

RESULTS.

The analysis of the sociodemographic characteristics of the study group (Table 1) shows that females accounted for more than half of the adolescents in the study (n=30, 57.7%) with a mean age of 17.2 years, whereas there were 22 males (42.3%) with a mean age of 16.4 years.

Regarding the educational level of the mother, more than half indicated that she had completed secondary education (53.8%). Regarding the health system, respondents who answered this item (84.6%), indicated that they used the public system, three of which also used other systems (prepaid system, health insurance, private care system).

The DMFT index of the group of adolescents under study was 4.7±4.0, and component C was 4.4±2.9.

The oral health knowledge expressed by adolescents (Table 2) shows that 96.2% recognize that bacteria cause tooth decay, and 94.2% believe tooth brushing is useful as a prevention factor. In relation to gum disease (gingivitis) 92.3% responded that it could occur due to poor dental hygiene.

Regarding the attitudes of adolescents in relation to oral health (Table 3), 42.3% said they took good care of their teeth, and 53.8% believed they had moderately good knowledge about gum diseases.

Also, 92.3% of respondents considered it important and very important to clean their teeth, and 69% stated that it was very important to have good oral health

Table 1. Demographic data of adolescents under study (n=52)

Sex		Educational level of the mother				Health system		
M (%)	F (%)	Primary (%)	Secondary (%)	Tertiary(%)	No answer (%)	Public (%)	Other (%)	No answer (%)
42.3	57.7	21.2	52.8	21.2	3.8	84.6	9.6	5.8

Table 2. Oral health knowledge of adolescents under study.

Questions about oral health knowledge		Correct answers (%)	Dk/Na (%)	Incorrect answers(%)
(C.1)	Do bacteria (germs) on the teeth cause cavities?	96.2	1.9	1.9
(C.3)	Does brushing your teeth prevent cavities?	94.2	0.0	5.8
(C.9)	Can gum disease be caused by poor dental hygiene?	92.3	7.7	0.0
(C.2)	Are natural teeth better than dentures (false teeth)?	86.5	5.8	7.7
(P.5)	Should you visit the dentist at least once a year, even if you do not have problems or tooth pain?	80.8	7.7	11.5
(C.8)	Can bleeding when brushing your teeth be a sign of gum disease?	80.8	15.4	3.8
(C.10)	Is keeping natural teeth NOT so important?	80.8	9.6	9.6
(C.4)	Does eating and drinking sweet foods NOT cause cavities?	78.8	3.8	17.3
(C.6)	Does flossing prevent tooth decay?	65.4	23.1	11.5
(C.7)	Does the use of fluoride prevent cavities?	46.2	34.6	19.2
(C.10)	Does brushing your teeth NOT prevent gum problems?	42.3	23.1	34.6

Dk/Na: Do not know/ No answer

Table 3. Oral health attitudes of adolescents under study.

		n	%
A1. How well do you take care of your teeth?	No answer	1	1.9
	Bad	7	13.5
	Moderately well	20	38.5
	Well	22	42.3
	Very well	2	3.8
A2. My knowledge about gum disease is	No answer	1	1.9
	I have no knowledge	14	26.9
	Moderately good	28	53.8
	Good	9	17.3
A3. How important is it for you to clean your teeth?	No answer	1	1.9
	Little or of no importance	3	5.8
	Important	26	50.0
	Very important	22	42.3
A4. Importance of oral health status	No answer	1	1.9
	Little or of no importance	3	5.8
	Important	26	50.0
	Very important	22	42.3
A5. What is the most important factor for the future of oral health?	No answer	3	5.8
	The dentist	12	23.1
	My own efforts	36	69.2
	Both	1	1.9

Table 4. Oral health practices of adolescents under study

		n	%
P1. Use of toothbrush	No answer	1	1.9
	Yes	50	96.2
	No	1	1.9
P2. Use of dental floss	No answer	0	0.0
	No	42	80.8
	Yes	10	19.2
P3. Use of toothpaste	No answer	0	0.0
	No	2	3.8
	Yes	50	96.2
P4. Type of tooth paste	No answer	1	1.9
	Do not know	26	50.0
	Not fluorinated	8	15.4
	Fluorinated	17	32.7
P5. Teeth brushing time	No answer	1	1.9
	Less than 3 min.	30	57.7
	More than 3 min.	21	40.4
P6. At what time of day do you brush your teeth	No answer	1	1.9
	Only at night	2	3.8
	Only in the morning	7	13.5
	Morning and night	32	61.5
	After each meal	10	19.2
P7. How often do you change your toothbrush?	No answer	1	1.9
	Do not know	7	13.5
	After 1 year	4	7.7
	Every 7 or 12 months	2	3.8
	Every 4 or 6 months	21	40.4
	Every month or every 3 months	17	32.7
P8. Brushing technique	No answer	1	1.9
	Do not have any technique	4	7.7
	Horizontal movements	27	51.9
	Movements from top to bottom	18	34.6
	Both movements	2	3.8

Table 5. Value of the indices of knowledge, attitudes and practices in the group under study.

Index	Mean ± SD	Difference between sexes ($p<0.05$)	Correlation with age ($p<0.05$)
Knowledge	7.48±10	0.74	0.148
Attitude	5.99±1.9	0.372	0.914
Practice	6.58±1.4	0.440	0.563

Table 6. Predictive value of the variables with respect to the DMFT Index.

C10. Brushing your teeth does NOT prevent gum problems?

C3. Does brushing your teeth prevent cavities?

A3. How important is it for you to clean your teeth?
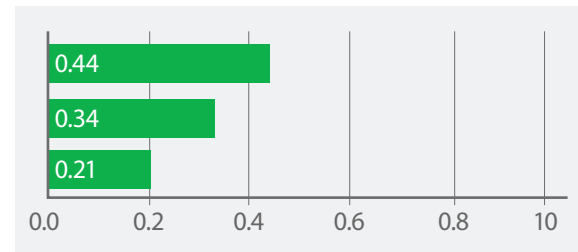
status. Finally, 69.2% believed that their own efforts were the most important factor for their future oral health status.

In relation to oral health practices (Table 4), 96.2% reported using a toothbrush with water and toothpaste. Fifty per cent said they did not know if their toothpaste contained fluoride. Regarding brushing, 57.7% reported brushing their teeth for less than three minutes, 51.9% performing horizontal movements; 61.5% brushed their teeth in the morning and at night. In addition, 40.4% reported changing their toothbrush every 4 or 6 months.The mean values of the indices of *"knowledge"*, *"attitudes"* and *"practices"* are shown in Table 5. No significant differences were observed between sexes. No correlation of the indexes with the age of the adolescents and with the educational level of their mother was observed. The correlation tests between the indices showed a significant positive correlation (p=0.024) between the indices of *"knowledge"* and *"attitudes"*.

The automated linear regression model in which all the variables that make up aspects of knowledge, attitudes and practices related to oral health were introduced, considering them in the model as predictors of DMFT, including factors such as age, sex and educational level of the mother, showed two questions of knowledge (C10 and C3) and one regarding attitude (A3) as the most relevant items associated with the DMFT index. (Table 6) The questions that had less relevance were excluded from the final result shown in Table 6.

DISCUSSION.

The information on knowledge, attitudes and practices in relation to oral health is very important for the promotion of oral health and effective preventive care, which should consider the particular needs and characteristics of the target population.

The DMFT index values found in this study are lower than those found in a population of young drug addicts in the rehabilitation phase (7.14±5.01),[18] and lower than in adolescents in educational detention centers in the city of Córdoba (8.94± 4.75).[19] However, the results are far higher than the DMFT goals of 1 to 2.9 points established for the year 2015 in Latin America.[20]

The results of this study showed that participating adolescents have a similar level of knowledge to young people from other regions of the world. A high percentage knows the causes of dental caries, identifying bacteria as the main factor involved in the development of this pathology, similar to what has been reported in other studies.[10-12]

Although, the degree of the importance that they give to the intake of sweet foods and drinks is different.

Although participating subjects emphasized the impact of poor hygiene on caries development, in terms of prevention methods, most of them only identified toothbrushes as relevant, without recognizing the importance of other hygiene elements as adjuvants, unlike what has been reported about adolescents in India[9] and Sweden,[12] who considered the quality of tooth brushing as a caries risk factor.

The respondents showed little knowledge in relation to the preventive role of dental floss and fluoride, which is in agreement with data reported in various studies.[11-13] Regarding gingivitis, 92.3% considered poor oral hygiene as a causal factor. This figure is very different from the findings reported in a study conducted in Sweden in 2005,[12] where respondents did not associate poor oral hygiene with periodontal conditions. On the other hand, in this study, 80.8% of

adolescents recognized bleeding gums as a symptom of gingivitis, a figure slightly higher than that reported by a study conducted by Barrientos *et al.*,[16] in 2013 in which only 75.9% indicated bleeding gums as a sign of gingival disease. These differences could be related to the advertising of toothpaste, very widespread in recent years in the region, which suggests that gum bleeding is a sign of disease and that oral hygiene should thus be improved.

Unlike what has been reported in similar studies,[11,13] only 23.1% thought that going to the dentist, even in the absence of pain, was important; 69.2% of the respondents said that the future of their oral health depended on their own effort, similar to that reported by young people in Sweden.[12] The recognition of their own responsibility in maintaining oral health offers dentists a great opportunity to think about using promotion strategies focused on self-care.

Regarding practices related to oral health, 96.2% of respondents stated that they used toothpaste for brushing; however, 50.0% did not know if their toothpaste contained fluoride, so it might be inferred that they ignore the preventive role of fluoride.

Although they recognized the importance of tooth brushing, they do it mainly in the morning and at night, for more than three minutes, similar to data reported in other studies,[13,14] which shows a lack of oral hygiene after each meal. This could be due to the fact that most have lunch in their educational establishments or at work, where in many cases there is not the possibility or the facilities to brush their teeth, or just maybe because they do not carry the necessary items.

Regarding the brushing technique used by respondents, 51.9% reported using horizontal movements. The practices referred by our respondents are comparable to those found in a study conducted in a similar population in Chile.[11]

In general terms, there were significant differences in the indices between sexes or the educational level of the mother. A significant positive correlation was found between the indices of knowledge and attitudes, but not with practices, which would reveal a disruption between the information received and the action taken, or insufficient information to lead to the appropriation of healthy habits or practices.

The linear regression model showed the association and consistent predictive value of knowledge about the importance of brushing in the prevention of cavities and periodontal disease. It also showed that the DMFT index was higher in those who answered incorrectly the questions *"Does brushing your teeth NOT prevent gum problems?"* and *"Can brushing your teeth prevent cavities?"*: those adolescents responded that it was *"not at all important"* to clean their teeth. Conversely, the DMFT index was lower in those who correctly answered the same questions.

The data obtained in this study come from subjects who attended a provincial public dental center, in a specific period of time, and were treated because they had an oral pathology, so they might not be representative of the adolescent population of Córdoba. However, rather than a limitation of the study, it can be taken as an indicator of the need to develop educational strategies in adolescents and pre-adolescents in order for them to take responsibility for their oral health and self-care.

Other studies on the oral health of adolescents conducted in the city of Córdoba[21] contributed to the same objective. These studies focus on oral health mainly in relation to pain, the loss of teeth (from an aesthetic, not functional perspective) and ignorance regarding oral health practices.

CONCLUSION.

The findings of this study suggest that participating adolescents have an acceptable level of oral health knowledge despite the fact that caries experience evidenced through the values of the DMFT index is above the values suggested by the WHO.[20]

Therefore, it is necessary to design, with the participation of the recipients, educational strategies for the promotion of oral health, in which contents are organized according to the interests and characteristics of the target group.

These must be focused on providing tools that allow adolescents not only to identify the most common oral diseases, but also to follow healthy practices to maintain good oral health.

REFERENCES.

1. Organización Mundial de la Salud (OMS) Salud para los adolescentes del mundo. Una segunda oportunidad en la segunda década. Argentina: OMS; 2014.

2. Maurás M. La adolescencia y la juventud en las políticas públicas de Iberoamérica. Argentina: Cumbre Iberoamericana de Jefes de Estado y de Gobierno; 2008.

3. Instituto Nacional de Estadística y Censos de la República Argentina (INDEC) Estructura poblacional de la República Argentina. Censo Nacional de Población Hogares y Vivienda 2001. Argentina: INDEC; 2005.

4. Manglukart L, Whitman CV, Posner M. Enfoques de habilidades para la vida para un desarrollo saludable del niño y adolescente. Programa de Salud Familiar y Poblaciones OPS,OMS,Kellogs, ADI; 2001.

5. Rodríguez Rendón AB. Autopercepción de salud en adolescentes de nivel medio. Hospital General de Zona y Medicina Familiar No 1. México: Universidad de La Colina; 2001.

6. Adaszko A. Trayectorias de vida y manejo de la enfermedad en la vida cotidiana de adolescentes que crecieron viviendo con VIH/sida. Actualizacionesen Sida. 2012;75:19–32.

7. Organización Mundial de la Salud (OMS) Salud bucodental. Nota Informativa No 318. Oxford: Organización Mundial de la Salud; 2012.

8. Jiménez Palacios C, Villarroel Dorrego M, Pérez C, Bauce B, Córdova M. Factores que influyen en la prevalencia de patologías bucales de tejidos blandos y duros de niños y adolescentes - Revisión de la literatura. Acta Odontol Venez. 2013;51(1)

9. Al-Omiri MK, Al-Wahadni AM, Saeed KN. Oral health attitudes, knowledge, and behavior among school children in North Jordan. J Dent Educ. 2006;70(2):179–87.

10. Barrientos C, Becerra P, Parra A, Jouannet JP. Rev Chil Salud Pública. 2014;18(2):140–8.

11. Organización Panamericana de la Salud (OPS); Consejo de Organizaciones Internacionales de las Ciencias Médicas (CIOMS) Pautas éticas internacionales para la investigación relacionada con la salud con seres humanos. 1a Ed. Oxford: CIOMS; 2017.

12. Bordoni N, Escobar A, Mercado RX. Odontología Pediátrica. La salud bucal del niño y el adolescente en el mundo actual. Buenos Aires, Argentina: Editorial Médica Panamericana; 2010.

13. Gupta T, Sequeira P, Acharya S. Oral health knowledge, attitude and practices of a 15-year-old adolescent population in Southern India and their social determinants. Oral Health Prev Dent. 2012;10(4):345–54.

14. INFOSTAT. Di Rienzo JA, Casanoves F, Balzarini MG, Gonzalez L, Tablada M, Robledo CW. InfoStat versión 2011. Grupo InfoStat, FCA, Universidad Nacional de Córdoba, Argentina; 2011. Available from:http://www.infostat.com.ar/

15. Gigena PC, Cornejo LS, Lescano-de-Ferrer A. Oral health in drug addict adolescents and non psychoactive substance users. Acta Odontol Latinoam. 2015;28(1):48–57.

16. Barnetche MM, Cornejo LS. Oral health of youth housed in socio-educational centers of the Juvenile Penal Area of the Province of Córdoba, Argentina. Acta Odontol Latinoam. 2017;30(3):129–40.

17. Romero Y. Las metas del milenio y el componente bucal de la salud. Acta Odontol Venez. 2006;44(2):210–5.

18. Hattne K, Folke S, Twetman S. Attitudes to oral health among adolescents with high caries risk. Acta Odontol Scand. 2007;65(4):206–13.

19. Suprabha BS, Rao AI, Ramya-Shenoy R, dan Khanal S. Utility of knowledge, attitude, and practice survey, and prevalence of dental caries among 11- to 13-year-old children in an urban community in India. Glob Health Action. 2013;6:207–50.

20. Ericsson JS, Östberg AL, Wennström JL, Abrahamsson KH. Oral health-related perceptions, attitudes, and behavior in relation to oral hygiene conditions in an adolescent population. Eur J Oral Sci. 2012;120(4):335–41.

21. Lucero MF. Representaciones sobre salud/enfermedad/atención construida por adolescentes de la Ciudad de Córdoba, Argentina.[Tesis doctoral] Córdoba, Argentina: Facultad de Odontología, Universidad Nacional de Córdoba; 2013